

M. Tech. Dissertation
On
ENVIRONMENTAL PLAN AND PROCEDURES
IN
SCHLUMBERGER ASIA SERVICES PRIVATE
LIMITED, MUMBAI

Final year project report

Submitted by

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DEHARADUN
2015



BONAFIDE CERTIFICATE

Certified this titled “*Environmental Plan and Procedures in Schlumberger Asia Services Private Limited*” is the bonafide work of **Ravi Sharma (R080213039)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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ABSTRACT

Environmental Plan and Procedure project dealt with upgrading the internal environmental compliance of MI Enterprises India Pvt. Ltd. Of Schlumberger Asia services Ltd. The company introduced its new environmental standard in January-February 2014, and it was required to upgrade and strengthen the environmental compliance as per the new objectives and not forgetting the requirements of MPCB. The new standard requires prompt reporting, updated records and complete compliance towards company standards as well as regulatory requirements of the local authorities.

Environmental B.O.O.K (Body of Organizational Knowledge) provides a detailed description, and user guidance for the environmental management tools established by the Environmental Standard. Studying and understanding these standards and guidelines and thereby preparing a new worksite Environmental plan and procedures was the major deliverable of the project.

Various procedures that act as control measures and which are needed to be prepared for individual sites are the, Nuisance Management Procedure, Spill preparedness and response Procedure, Waste management procedure and Resource Management Procedure.

A site layout / map was developed as one of the requirements indicating the waste segregation areas, nuisance causing devices.

Keywords: *Fundamental controls, Risk based controls Environment Compliance, Regulatory Training, Others.*

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CHAPTER 1

INTRODUCTION

1.1 General

This report presents the Environmental Plan and Procedures for the given MI SWACO (one of the segments of Schlumberger. Environmental issues are mostly neglected in the company which has great impact on the society. This Plan is used to manage the environmental risks (including environmental regulatory requirements and other stakeholder requirements) associated with Schlumberger's activities, products and services. The Plan helps in determining the risks which have the potential for significant environmental impacts on directly controlled company worksites.

1.2 Aim

The aim of Environmental Plan is

- To identify and assess the environmental risks associated with the Schlumberger's activities, products and services.
- To manage the activities in order to minimize the environmental impacts.
- To assess the Criteria and the Risk level for determining the required level of control.

1.3 Objective

The objective of the project is

- Study the Environmental B.O.O.K (Body of Organizational Knowledge), standards and guidelines.
- Prepare an Environmental Plan in order to strengthen the environmental compliance of MI SWACO-Sweco, Vasai.
- Assessment of the procedures with respect to the new standards, guidelines and establish new environmental procedures

1.4 Background

Schlumberger is the world's leading supplier of technology, integrated project management and information solutions to customers working in the oil and gas industry worldwide. Employing approximately 120,000 people representing over 140 nationalities and working in more than 85 countries, Schlumberger provides the industry's widest range of products and services from exploration through production.

Founded in 1912 by French brothers Conrad and Marcel Schlumberger, Schlumberger is the world's leading supplier of technology, integrated project management and information solutions to customers working in the oil and gas industry worldwide. Employing approximately 123,000 people representing over 140 nationalities and working in more than 85 countries, Schlumberger provides the industry's widest range of products and services from exploration through production. Its principal offices are in Houston, Paris, and The Hague.

The company comprises two business segments: – Schlumberger Oilfield Services supplies a wide range of products and services from formation evaluation through directional drilling, well cementing and simulation , well completions and productivity to consulting , software, information management and IT infrastructure services that support core industry operational processes. WesternGeco is the world's largest seismic company and provides advanced acquisition and data processing services. Schlumberger offers its clients four key advantages: Deep domain knowledge of exploration and production operations gained through more than 80 years of experience – The service industry's longest commitment to technology and innovation through a network of 125 research and engineering technology centers – A global reach in more than 85 countries coupled to strong local experience and the diversity in thought, background and knowledge that more than 140 nationalities bring – A commitment to excellence in service delivery anytime, anywhere.

Business Services and Products:

Schlumberger provides a diverse range of products and services which are enlisted below:

Seismic- Seismic oil exploration refers to the geophysical method of determining geological structure of earth's crust and mantle to determine its elastic properties

Drilling- Drilling an oil well by means of a boring through the Earth's surface that is designed to find and acquire petroleum oil hydrocarbons

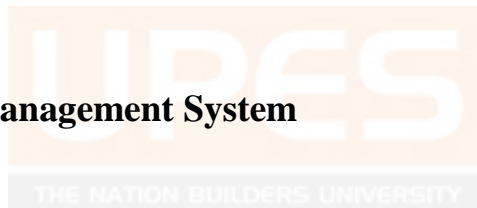
Characterizations- Reservoir characterization is the process of building a reservoir model between the discovery phase of a reservoir and its management phase by incorporating certain characteristics that has to do with its ability to store and produce hydrocarbons

Completions- Completion is the process of making a well ready for production (or injection)

Subsea Production- It refers to the exploration, drilling and development of oil and gas fields in underwater locations.

Oil and Gas software- Schlumberger provides oil & gas software solutions to solve today's tough reservoir challenges by enabling the creativity of geoscientists and engineers through innovative workflows and comprehensive global services. Some of the software are ECLIPSE, INTERSECT

Schlumberger HSE Management System



The Schlumberger HSE Management System defines the principles by which we conduct our operations worldwide with regards to health, safety, and the environment.

Management communicates the HSE philosophy to all employees, customers, contractors, and third parties associated with our business, and each Schlumberger organization must provide positive evidence of conformance to the system.

The HSE Management System model comprises eight interrelated components:

- Commitment and leadership and accountability
- Policies and objectives
- Organization and resources
- Contractor and supplier management
- Risk management
- Business processes
- Performance monitoring and improvement
- Audits and reviews.

These are continuously improved by conformance checks

- On day-to-day standards and procedures (controls)
- On the management system (correction)
- Through modifications to the management system (improvement)

HSE Policy Statement

The long-term business success of Schlumberger depends on our ability to continually improve the quality of our services and products while protecting people and the environment. Emphasis must be placed on ensuring human health, operational safety, environmental protection, quality enhancement, and community goodwill. This commitment is in the best interests of our customers, our employees and contractors, our stockholders, and the communities in which we live and work.

Schlumberger requires the active commitment to, and accountability for, QHSE from all employees and contractors. Line management has a leadership role in the communication and implementation of, and ensuring compliance with, QHSE policies and standards. We are committed to

- Protect, and strive for improvement of, the health, safety and security of our people at all times;
- Eliminate Quality non-conformances and HSE accidents;
- Meet specified customer requirements and ensure continuous customer satisfaction;
- Set Quality & HSE performance objectives, measure results, assess and continually improve processes, services and product quality, through the use of an effective management system;
- Plan for, respond to and recover from any emergency, crisis and business disruption;
- Minimize our impact on the environment through pollution prevention, reduction of natural resource consumption and emissions, and the reduction and recycling of waste;
- Apply our technical skills to all HSE aspects in the design and engineering of our services and products;

- Communicate openly with stakeholders and ensure an understanding of our QHSE policies, standards, programs and performance. Reward outstanding QHSE performance;
- Improve our performance on issues relevant to our stakeholders that are of global concern and on which we can have an impact, and share with them our knowledge of successful QHSE programs and initiatives.

This Policy shall be regularly reviewed to ensure ongoing suitability. The commitments listed are in addition to our basic obligation to comply with Schlumberger standards, as well as all applicable laws and regulations where we operate. This is critical to our business success because it allows us to systematically minimize all losses and adds value for all our stakeholders.

MI Enterprises India Private Limited Div:- Sweco,Vasai

M-I SWACO is a vital part of the world's hydrocarbon exploration and production industry. M-I SWACO are the leading supplier of drilling fluid systems engineered to improve drilling performance by anticipating fluids-related problems, fluid systems and specialty tools designed to optimize wellbore productivity, production technology solutions to maximize production rates, and environmental solutions that safely manage waste volumes generated in both drilling and production operations. In August 2010, M-I SWACO became part of Schlumberger through its merger with Smith International. The primary driver behind this merger is drilling optimization. In order to sustain and increase world oil and gas production, higher levels of drilling will be necessary in increasingly challenging and complex environments. This means wells with longer and more complex profiles. Understanding the technical challenges and mitigating the consequent risk in advance of a drilling program can mean major cost savings and well performance improvement for our customers. M-I SWACO will play a critical part in meeting these challenges.

SWECO is the world leader in particle separation and size reduction solutions. SWECO have 12 screen and separator manufacturing facilities and over 100 screen and separator service offices surrounding the globe.

Chapter 2

Literature Review

New Environmental Standard was introduced in Schlumberger in January- February 2014. The projects required its detailed study and thus implement the requirements as per the new regulations. The Environmental standard specific to the segment was referred. Since Sweco base comes under the MEA (Middle East & Asia) Geomarket, the Environmental Standard specific to the Geomarket was also referred. In the consent to operate provided to Schlumberger by the Maharashtra pollution Control Board (MPCB), various acts and rules are mentioned to which the company is required to adhere to. Hence various acts such as the Guidelines for environmentally sound management of E-waste, The Environment (protection) Act, 1986, The hazardous Wastes (management, Handling & Trans boundary Movement) Rules, 2008, Ewaste (Management, Handling) Rules, 2011, The Air (Prevention and Control of pollution) Act, 1981, The Water (Prevention and Control of pollution) Act, 1974 were studied.

- Schlumberger Environment Standard SLB QHSE S008: This Standard is used to manage the environmental risks (including environmental regulatory requirements and other stakeholder requirements) associated with Schlumberger's activities, products and services. The Environment Risk Matrix(ERM) was used for deciding the criteria and risk level applicable at the segment
- Schlumberger MEA Area Specific Environment Standard: The standard is specific to all the locations in the Middle East Area. The fundamental and risk based controls applicable at the sites are identified and controls are applied for safeguarding the environment.
- Schlumberger Book of Organizational Knowledge (B.O.O.K): The book helped in understanding the Environmental Management System Structure at Schlumberger. The Procedures in detail helped in understanding the basic fundamentals through which the plan is applied at the segment.

Chapter 3

Methodology

3.1 Project Methodology / Approach

The methodology for preparing the Environmental Plan and Procedures as follows:

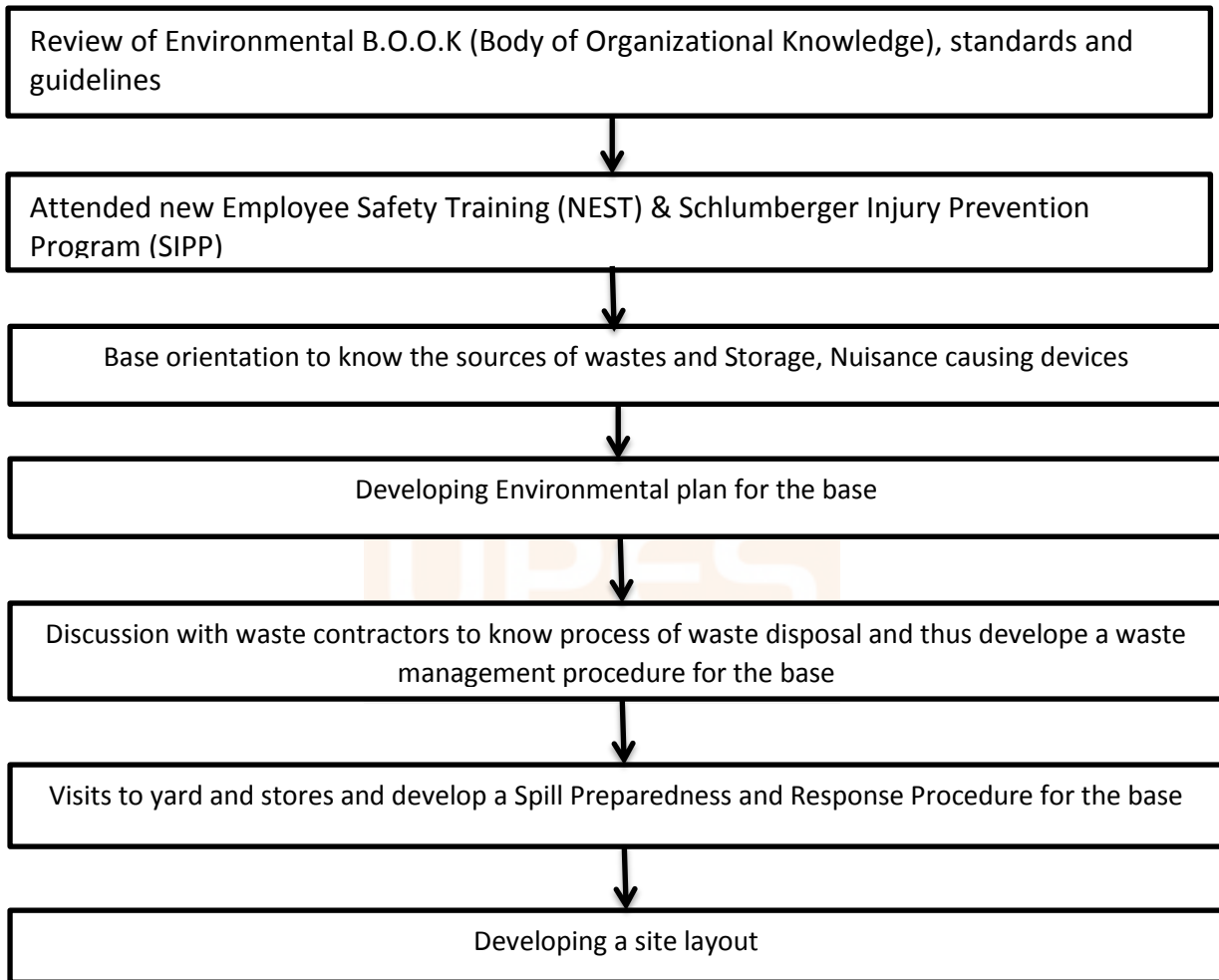


Figure 3.1 Flow chart for Project Methodology

3.2 Environmental management system structure

The management of the environmental aspects and impacts of Schlumberger’s activities, products and services is achieved through the implementation of an Environmental Management System (EMS). The EMS is part of Schlumberger’s Health, Safety and Environmental (HSE) system, which in turn is part of Schlumberger’s business management system. These management system components are organized as follows:

Blue Print: Describes Schlumberger's identity, purpose, ambitions, values and mind-set

QHSE Policy: Describes Schlumberger's commitment to quality health, safety & environmental performance and protection & HSE management system: Provides a process and a set of Standards, and associated tools for management of HSE risks in Schlumberger

Environmental Standard: Establishes a risk-based process to identify and manage the environmental impacts, and regulatory or other stakeholder requirements associated with Schlumberger's activities, products and services.

Environmental B.O.O.K: Provides a detailed description, and user guidance for the environmental management tools established by the Environmental Standard.

Geography and Segment-Specific Environmental Standard: Statements of the risk-based controls that are applicable to a specific business unit or /and specific geography (i.e. and Area or GeoMarket) within Schlumberger.

Environmental Plan: A worksite-specific document that identifies the procedures used to implement the controls required by the applicable Geographic and Segment Environmental Standards

3.3 Environmental control methodology

3.3.1 Fundamental Controls

Schlumberger Environmental Standard establishes a three-level risk-based environmental control methodology. The risk levels are Fundamental, Medium, and High. This methodology facilitates the implementation of controls that are appropriate to the level of environmental risk associated with Schlumberger's diverse business activities. There are six groups of fundamental controls as follows:

1. Chemical management: Restriction on the use of certain hazardous substances .Prohibition of the use of underground storage tanks for chemical & fuel storage. Provision,

maintenance and use of secondary containment for liquid chemicals & fuel storage.
Implementation of an appropriate environmental emergency response plan at worksites

2. Contractor management:

- Contractor management processes for environmental services that may adversely affect Schlumberger's reputation

3. Life Cycle Management:

- Management of environmental impacts associated with the life cycle of Schlumberger Products and Services

4. Monitoring:

- Internal compliance via an assessment process
- Regulatory compliance via jurisdiction-specific compliance assessment process
- Application of environmental objectives, reporting & management review of environmental performance
- Environmental incident reporting in QUEST
- Environmental record keeping in RCTS and QUEST

5. Acquisition & divestiture Environmental risk assessment :

- Performance of real estate site entry and exit environmental due diligence assessments
- Performance of business merger and acquisition environmental due diligence assessments

6. Training:

- Provision of appropriate environmental training

3.3.2 Risk Based Controls

In addition to the Fundamental Controls, the use of risk-based controls may also be required. Six criteria are used to determine the application of risk-based control, as follows:

- The requirements or legitimate expectations of stakeholders who are associated with the environmental impacts of Schlumberger's activities, products and services. Stakeholders may include: Customers; Local Communities; NGOs; Regulators; External Standards; Third-Party Contractors and Partner Contractors.
- The ecosystem and biodiversity impacts of Schlumberger's activities, products and services on the natural environment. This includes identification of, and implementation of actions required to manage the impact of Schlumberger business on sensitive ecosystems.
- Resource consumption that is associated with Schlumberger's activities, products and services both in Schlumberger facilities and at third-party workplaces. This applies when resource consumption associated with Schlumberger activities, products or services represents a significant burden on local or regional resources, or when Schlumberger operates in a resource constrained region, or when the Schlumberger activity consumes a substantial quantity of a specific resource
- Chemicals, Hazardous Materials, Pressurized Wellbore Fluids or Reservoir Fluids. This criteria includes two distinct aspects of Schlumberger's activities, products and services:
 - Where Schlumberger has responsibility for containment systems and structures related to flammable gases, energized fluids or process hydrocarbons (including crude oil, gas, sour gas).
 - Where chemicals are used at Schlumberger facilities, at third-party workplaces, or are transported between Schlumberger facilities and third-party workplaces. This includes use (manufacturing, operations, storage or transport) of chemicals and of hazardous materials (including waste)
- Management of waste and waste water associated with, or generated by Schlumberger's activities, products and services including generation of operational (hazardous or non-hazardous) waste from activities, products or services under Schlumberger's direct control, or where Schlumberger has the responsibility for management or processing of waste on behalf of a client
- Air emissions from Schlumberger activities, products and services, both in Schlumberger facilities and at third-party workplaces including generation of regulated non-hydrocarbon related emissions that are associated with hydrocarbon production.

3.3.3 Control Procedures

In addition to the mandatory Fundamental controls, a set of required controls for each of the six criteria, in each of the two risk levels is established. Each of the six criteria shall be assessed independently: a Medium (or High) assessment in one exposure does not imply that any or all of the other criteria shall also have as Medium (or High) risk level associated with them. Various Control procedures are mentioned below:

Air Emissions Management Procedure (AEMP): a procedure that describes how significant atmospheric emissions from Schlumberger equipment will be managed.

Chemical and Fluids Management Procedure (CFMP): a procedure for the management of environmental risks associated with chemicals or pressurized fluids and hydrocarbons used for or processed by Schlumberger activities, products and services.

Communications Procedure (CP): a procedure for communication with applicable stakeholders on significant environmental impacts associated with Schlumberger activities.

Competence Profile (COMP): defines minimum competencies for positions with responsibility for critical environmental protection activities.

Contract-specific Environmental Bridging Document (CEBD): a document developed where contractually required, or where requested by the client, or where significant environmental risks are associated with the contracted services, to ensure appropriate assignment of environmental management tasks.

Ecosystem and Biodiversity Management Procedure (EBMP): a procedure to manage the ecosystem or biodiversity impacts associated with a specific Schlumberger project, site, or activity.

Environmental Impact Assessment (EIA): a detailed assessment of environmental impacts associated with a specific Schlumberger project, site, or activity.

Environmental Risk Register (ERR): a detailed evaluation of the environmental aspects and associated impacts of Schlumberger activities, products or services, and associated control measures.

Nuisance Management Procedure (NMP): a procedure for the management of significant local particulate, acoustic, or visual impacts on the environment.

Resource Management Procedure (RMP): a procedure for the management of environmental impacts associated with consumption that exceeds prescribed thresholds for energy, water, or other materials.

Spill Prevention and Response Procedure (SPRP): a procedure to demonstrate that operations are suitably prepared to respond to environmental incidents.

Waste Management Procedure (WMP): a procedure for the management of wastes associated with Schlumberger activities, or for third party wastes that Schlumberger is contractually responsible for, and that describes certain required technical control processes associated with waste water

3.3.4 Control Procedures required for SWECO-Vasai, Schlumberger

Depending upon the location and the activities performed at the base only few of the control procedures are required.

Table 3.1 Procedures required and successfully completed

Procedures required for Sweco, Vasai	Procedures included in the deliverables and completed successfully
Worksite Environmental Plan	Worksite Environmental Plan
Environmental Risk Register (ERR)	Nuisance Management Procedure(NMP)
Resource Management Procedure (RMP)	Resource Management Procedure (RMP)
Nuisance Management Procedure(NMP)	Waste Management Procedure (WMP)
Chemical and Fluids Management Procedure (CFMP)	Spill Prevention and Response Procedure (SPRP)
Waste Management Procedure (WMP)	
Spill Prevention and Response Procedure (SPRP)	

3.4 Environmental Process Controls

3.4.1 Worksite Environmental Plan

At the operational level of the Schlumberger organization a set of clearly defined procedures are used to manage the environmental aspects and impacts of Schlumberger's business. These procedures may be required by either the Geography or Segment environmental standards. Therefore the requirements of these environmental standards shall be used to develop Environmental Plans (EP), which can be specific to a Schlumberger worksite or to a contract, a project, or a vessel. The Environmental Plan

- Includes a description of the scope of the business including the Segments and the activities, Products, and services that are to be managed by the EP
- Identifies the controls that are required by the environmental standards of all of the applicable

Segments at the worksite, and of the geography within which the worksite is located.

- Identifies the specific procedures that will be used to implement the controls
- Identifies worksite-specific permits, licenses, and consents, and related procedures
- Assigns responsibility for the implementation of all required procedures
- Identifies the manager responsible for approval, implementation and review of the EP

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
12	Prohibition of the use of underground storage tanks for chemical & fuel storage		Underground Storage Tank: Prohibited for use with fuels and chemicals & assessed via internal compliance process Underground Storage Tanks: Hazardous Material Underground Storage Tank Program (Element 7.1.1.13) required					Assurance of this prohibition is provided by the internal audit process associated with SLB QHSE Standard S008, as required by SLB QHSE Standard S007. Responsibility: Ganesh Sonje											
16	Requirement		Details of Control(s) to be Implemented by this Plan					Specific worksite procedure(s) to implement the Control(s)											
17	Provision, maintenance and use of secondary containment for liquid chemicals & fuel storage		Site stores chemicals & fuel storage in total quantities > 250 litres. Storage of liquid chemicals & fuel storage to be provided in accordance with requirements of Environmental B.O.O.K. & implemented via a worksite-specific Chemical & Fluids Management Procedure (CFMP). Secondary Containment: Required(in accordance with B.O.O.K) & assessed via internal compliance process. Hazardous Material Identification Program (Element 7.1.1.14) and Secondary Containment Evaluation Program (Element 7.1.1.11) Required					Worksite-specific Chemicals & Fluids Management Procedure (CFMP) with details of secondary containment system. Completion of M-I SWACO Hazardous Material Identification Program (Element 7.1.1.14) and M-I SWACO Secondary Containment Evaluation Program (Element 7.1.1.11) Responsibility: Ganesh Sonje											
21	Requirement		Details of Control(s) to be Implemented by this Plan					Specific worksite procedure(s) to implement the Control(s)											
22	Implementation of an appropriate environmental emergency response plan at worksites		Spill Response for SLB Facilities: Site stores liquid chemicals & fuel storage in total quantities > 250 litres. Spill response procedure, including drills (in accordance with the B.O.O.K. and checklist) & training. Approved Spill Prevention Countermeasure and Control (SPCC) Plans.					Worksite-specific Spill Preparedness & Response Procedure(SRP) ,Spill Response drill and trainings are conducted as per plan and reports are uploaded in QUEST. Responsibility: G. Gurusamy											
25	Contractor Management																		
27	Scope Environmental Standards Fundamental Controls Risk Based Controls Permits Licences Consents Documentation & Records RWP																		

Figure 3.2 Environment Plan Template

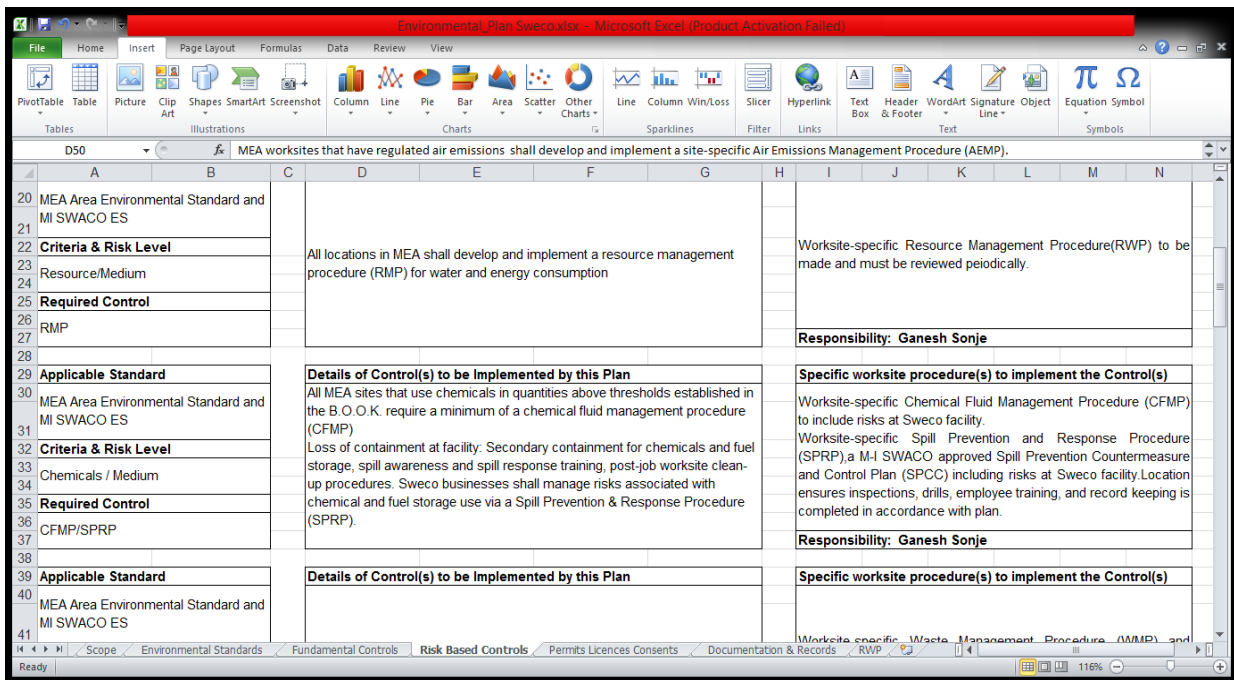


Figure 3.3 Environmental Plan Criteria and Risk level

Since Sweco, Vasai base of Schlumberger comes under the MEA (Middle East & Asia) Area, so MEA standard is referred..

3.4.2 Waste Management Procedure (WMP)

Schlumberger worksites, projects and operations plan to minimize their impact on the environment through prioritization of reduction and recycling of waste. Fundamental controls are applied when domestic wastes which are generated by Schlumberger are handled. Medium level risk controls along with fundamental controls are applied when hazardous & non-hazardous wastes along with wastewater discharges are generated by activities, products or services under Schlumberger's direct control. So for Mahape base, both control levels are applicable.

- **General requirements**

Worksites, projects and operations apply a waste management hierarchy that gives priority to Minimization and reduction of waste in preference to waste disposal methods like landfill and incineration. The amount of waste that is recycled should be maximized by determining the type of materials that can be recycled, and identifying any requirements to maximize opportunities for recycling e.g. segregation and proper storage of different types of waste.

- **Waste Storage**

Wastes shall be segregated, contained, classified and labeled in accordance with applicable regulatory requirements. Wastes shall be handled and stored so as to facilitate their planned treatment and disposal

Storage areas for wastes should have controls appropriate to the associated risks e.g. ventilation, chemical compatibility, and temperature control.

- **Waste and Wastewater Management Procedure**

Waste and Wastewater Management Procedure shall be developed and implemented, maintained and periodically reviewed and updated in order to include:

- 1. Details of specific roles and responsibilities** (e.g. for obtaining permits, signing and collection of waste transfer notes, required regulatory training, etc.)
- 2. Regulatory requirements** including details of required permits, licenses and reporting, waste water discharge requirements, record retention.

An inventory of waste streams that are generated at the worksite, detailing all the local Regulatory waste classifications

- **Description of applicable waste minimization and recycling activities**
- **Description of waste storage facilities** and on-site handling procedures including controls for pollution prevention
- **Waste collection and transfer procedures**
- **Description of processes for treatment and disposal** of different types of waste, including

Waste water, both on site and off site

- **Details of waste transport contractors, and recipient waste management facilities** including
- Required permits, approval and contractor audit programs
- **Procedures, and assignments of responsibility for sampling, testing, monitoring, data collection analysis and reporting** (including external regulatory reporting requirements)
- **Maintenance and cleaning requirements for on-site waste or wastewater treatment equipment** and systems (including oil separators)
- **Monitoring and sampling requirements for wastes or wastewater discharges**

- **Details of the on-site drainage system(s)**, connections to municipal (city) surface and/or waste water system (as appropriate)

Waste Services Compliance Assurance

Schlumberger ensures any contractor used to transport, treat and, or dispose of waste holds the appropriate licenses and permits in accordance with local regulations in advance of the provision of any service being provided. Periodic audits of the waste management process are to be undertaken to ensure that waste contractors are working in accordance with the terms of the agreed contract and are meeting or exceeding performance expectations. As a minimum, waste contractor audits shall be conducted as part of the contractor evaluation and selection process, and then periodically as appropriate to the associated risks and the regulatory regime with a minimum of an audit once every thirty-six months.

Monitoring and Discharge of Waste Water

Surface water runoff from onshore facilities and assets shall be controlled so as to comply with applicable regulatory requirements, to prevent soil erosion, to protect water bodies and to minimize risk of localized flooding.

Waste Water Test

Monitoring of industrial or domestic wastewater discharges shall be undertaken on a frequency as determined by local regulatory requirements. Prior to discharging any industrial or domestic wastewater directly to the natural environment (i.e. to a natural or open water body, or to the land), the quality of the water shall be verified to ensure that it meets or exceeds any applicable local regulatory or permitting obligations. Where there is no local regulatory requirement, discharges shall conform to the waste water quality limits as mentioned in the consent to operate. Discharges shall be assessed via quarterly sampling and analysis, and records of this monitoring should be maintained.

3	Type of Waste	Generating Process or Activity	Annual Quantity Generated (Tons)	Segregation & Storage Process	Waste Classification	Waste Code	Waste Objectives		Disposal Route	
							3R	Specify 3R	Contractor Name	Destination
5 Solid Waste										
6	Domestic Waste	Paper and cardboard packaging from Office activity	2	Blue bins in the yard and workshop	Non-Hazardous		Reduction	Reduce cardboard packaging purchased and increase re-use of boxes.	Sent to Municipal Waste Collection Point	Recycling
7	Metal waste	From manufacturing works	2	Stored in dedicated area	Non-Hazardous		Recycling	Recycling for further use	Sent to Scrap Merchant	Recycling
8	Oily rags	Equipment cleaning, maintenance	1.5	Red bins in the yard and workshop	Hazardous		Reduction	Maximum utilization of oily rags	Sent to MWML, Talaja	Transfer
	Dust	From the grinding machine, shot blasting and	1	Container under grinding machine, dust collector in shot blasting and glass	Non-Hazardous		Reduction	Change in grinding process by use of	Sent to Municipal Waste Collection	Landfill

Figure 3.4 Waste Management Procedure

3.4.3 Spill Preparedness and Response Procedure (SPRP)

All Schlumberger worksites, projects and operations should be prepared for, and be ready to respond to, reasonably foreseeable spills. To determine the minimum level of control by Schlumberger, the following parameters shall be used. Fundamental risk controls apply when chemicals are used in simple maintenance tasks in limited quantities e.g. 25 liters per container and, or a combined total of 250 liters. Medium risk controls are applied together with identified fundamental controls when Schlumberger stores, transports, or utilizes chemicals in large quantities.

General Requirements

Environment incident response processes should reflect all regulatory requirements that apply to the site. Responsibility for the provision and maintenance of spill response equipment should be appropriately assigned, and suitably trained personnel should be available for its use. Only suitably competent persons must be involved in the development, implementation and review of environment incident response programs. Schlumberger should ensure effective procedures are in place to identify all reasonably foreseeable emergency and crisis

situations. Consideration must be given to both on-site site impacts and off-site impacts (e.g. to neighbors and local communities).

Spill preparedness and response Procedure:

A SPRP is a stand-alone document and can be incorporated into a worksite or project Emergency Management Plan and must include the following:

- **Details of the type, quantity and location of chemicals**, spill response equipment, site drainage, access to the facility, etc. combined in a site diagram
- **Potential spill scenarios and crisis situations**
- **Identification of potential pathways for pollution to the environment** (on site surface or groundwater drainage, open ground).
- **Details of the emergency spill response procedures.** Roles and responsibilities for dealing with emergency situations.

Description of resources needed for effective implementation of emergency and response procedures:

- Trained and competent personnel with defined roles and responsibilities
- Equipment required to deal with the incident
- Maintenance and inspection of equipment
- Availability of appropriate personal protective equipment
- Emergency services support or specialist contractors

The SPRP should be maintained and periodically reviewed and updated as necessary

Spill Drills, Monitoring and Review

SPRP drills and exercises shall be undertaken periodically (at least annually) to test the effectiveness of the SPRP. Corrective actions identified from emergency response drills should be documented, reviewed by management, and a remedial action plan should be developed. The snapshots of waste management procedure are shown below:

Spill Scenario	Receptor
During Movement of Hazardous chemicals and fluid within the site	Discharge could affect human health, could contaminate soil
Due to Leakage in the primary/secondary container (spillage during storage)	Discharge could affect human health, could contaminate soil
During use of Hazardous chemicals and fluids for site operations	Discharge could affect human health, could contaminate soil
During Loading/Unloading and handling of Hazardous chemicals and fluids for site operations	Discharge could affect human health, could contaminate soil
During maintenance operations of equipment with the use of Hazardous chemicals and fluids	Discharge could affect human health, could contaminate soil
Water discharge: Civil discharge (bathroom, lavatory)	Ground, groundwater which could contaminate soil

Figure 3.5 Spill Preparedness and Response Procedure template

Spill Response Kits/Equipment	Location on Site	Responsible person (maintenance/stocking)
Spill Kits	Behind DG	QHSE Engineer
Dry Chemical Fire Extinguisher	In each storage area	QHSE Engineer
Absorbent booms, pillow	In each Emergency spill kit	QHSE Engineer
Over pack drum	Drum storage pad	QHSE Engineer
Location of MSDS for Hazardous Material	Manufacturing Cabin	QHSE Engineer

Figure 3.6 Site Emergency Response and decontamination equipment

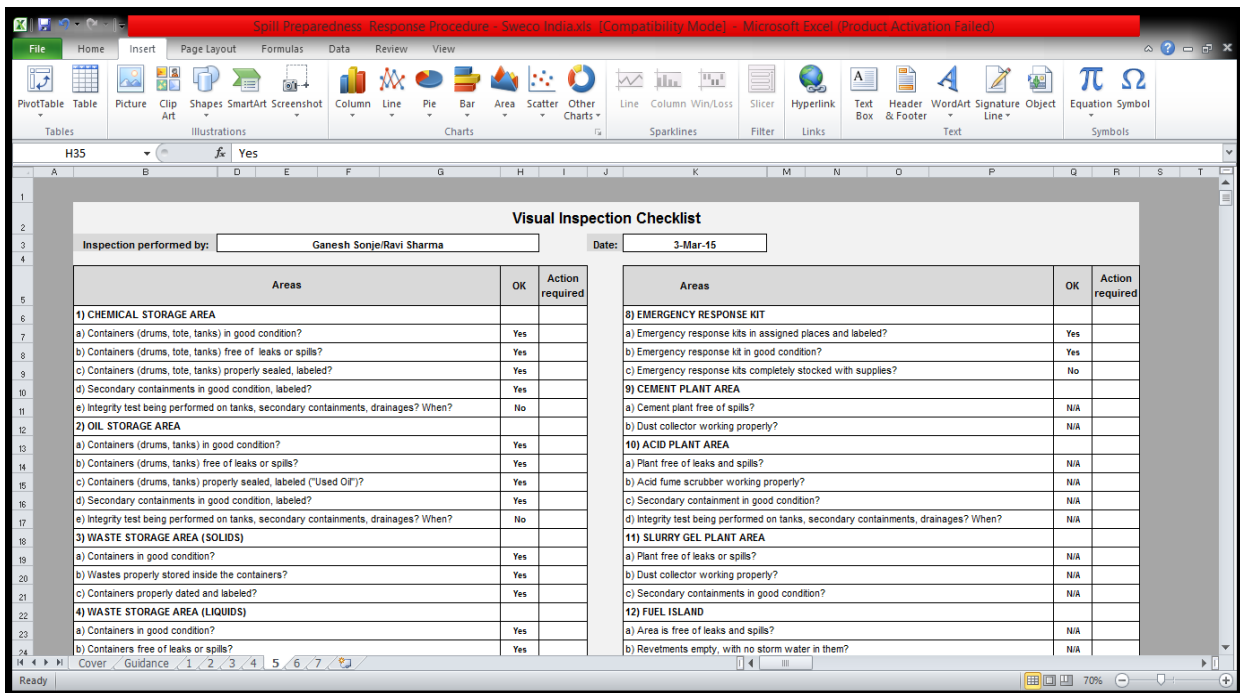


Figure 3.7 Visual Inspection Checklist

3.4.4 Resource Management Procedure

A Resource Management Procedure (RMP), which may include energy or water management, or both, for a worksite or project is required when indicated by the ERM and ERR.

For energy management, the procedure shall include:

- Identification of sources of energy supply, measurement and records of consumption
- Identification of principle uses of energy (processes, equipment), assessment, and where appropriate, selection of opportunities to improve energy efficiency
- Performance improvement targets based on energy consumption and normalized to reflect business activity

For water management the procedure shall include:

- Identification of sources of water supply and an assessment of the suitability, quality, sustainability and reliability of the supply
- Assessment of the requirements for process and potable water over the lifetime of the operation or project

- Measurement and recording of all sources (including water withdrawn from rivers and lakes, as well as potable supplies taken from ground water wells or supplied from third parties, such as tank deliveries or directly piped), volume and, where appropriate, quality of water supplied along with documentation that details the water supply and distribution network at the site
- Details of applicable statutory documentation (such as permits and licenses), which shall be obtained prior to sourcing water supplies
- Planned inspection and maintenance for water storage and supply infrastructure.
- All RMPs shall be recorded in RCTS, communicated as required, reviewed at least annually, and implemented to achieve continuous improvement.

Resource Management Procedure Sweco India.xls (Compatibility Model) - Microsoft Excel (Product Activation Failed)

Location Manager/QHSE Engineer

Roles and responsibilities are defined by the site manager. All responsible people shall be informed of their responsibilities.

#	Action	Responsible Person
1	Overall responsibility for Resource Management (including review of this program and associated plans)	Location Manager/QHSE Engineer
2	Identification of applicable legislation	QHSE Engineer
3	Reviewing the practical measures to reduce energy consumption	Line Management and Operations Dept
4	Reviewing the practical measures to reduce water resources consumption	Line Management and Operations Dept
5	Ensuring regular inspection and maintenance of energy and water resources infrastructure is performed	Location Manager/QHSE Engineer
5	Ensuring regular inspection and maintenance of energy and water resources infrastructure is performed	Location Manager/QHSE Engineer
6		

Figure 3.8 Roles and Responsibilities for Resource Management Procedure

Status of Opportunity	Opportunity Type	Opportunity Description	Unit of measure	Potential (Actual) Units Saved	Cost per Unit	Financial Saving	Implementation Cost (inc. installation & any ongoing cost)	Payback Period (years)	Comments
Initial Scope	Lighting	Replace all 36W(32 in number)/fluorescent tube lites with 20W LED tubes	kWh	2236 kWh/yr	Rs 9 per unit	Rs 20,127/yr	Cost of one LED tube light is Rs 1750 and replacing all Fluorescent tube lites the total cost is Rs 56000. The LED tube lites can be used in the same installation, so no installation costs	56000/20127=2.7 years(The life of LED is 15,000hrs as compared to fluorescent tube lites which is 6,000hrs)	Feasible
Initial Scope	Lighting	Replace 15W(6 in number)/CFL with 9W LED bulbs	kWh	151.2 kWh/yr	Rs 9 per unit	Rs 1360/yr	Cost of one LED bulb is Rs 485 and replacing all CFL the total cost is Rs 2910. The LED can be used in the same	2910/1360=2 years(The life of LED is 15,000hrs as compared to CFL which is	Feasible

Figure 3.9 Energy and Water Resources Efficiency Options Appraisal

3.4.5 Nuisance Management Procedure

Nuisance Management Procedure (NMP) shall be established when required to address regulatory requirements and stakeholder concerns (e.g. facility construction near residential areas). The NMP shall identify and document acceptable nuisance limits as defined by site permits, licenses, and applicable regulations. The NMP shall be developed from the outcome of the nuisance assessment.

The NMP shall, as a minimum, address the following:

- Potential sources of nuisance
- Potential receptors for the nuisance stakeholder consultation (to include provision of relevant information on the purpose, nature, scale, duration and potential impacts of proposed site activities)
- Control and mitigation measures
- Assignment roles and responsibilities
- Implementation timetable
- Monitoring plan to include measurement of progress against actions in the NMP

The NMP shall be prepared by competent persons. In the majority of cases it is expected that the use of specialist contractors will be required for this activity.

In this document, nuisances are defined as emissions from Schlumberger activities in the form of:

- noise
- dust
- visual impacts
- odor
- light

These emissions cause a degradation of the quality of the surrounding environment, as perceived by residents and other users, and, in doing so, create a risk for the public acceptability of Schlumberger activities.

When an environmental impact assessment (EIA) has been prepared, it should specify which specific nuisances are relevant to the proposed activities, and the principles for their management. The EIA should determine whether or not an NMP is required

NMP Methodology - Assessing Nuisances

The NMP will rely on a nuisance assessment that shall be undertaken to identify potential nuisance impacts associated with existing operations and new projects or developments.

Identify all sources of nuisances that are subject to legal requirements (for example noise limits imposed by regulations or permits) with which Schlumberger must comply.

The assessment shall consider possible sources from on-site operations, off-site ancillary infrastructure, construction, transport or movement of machinery, mobile plant, or vehicles.

Consideration should be given to impacts under routine, non-routine and emergency operating conditions. For each source of nuisance identified, record the following information:

- The source or process which could lead to potential nuisance
- Whether or not the source is associated to routine, non-routine or emergency situations

Assessment of source of nuisance may in certain circumstances require monitoring e.g.

- Noise monitoring showing noise level in dB(A) within the project footprint or area of influence
- Light monitoring showing light levels in lux within the project footprint or area of influence
- Air quality monitoring showing dust or gases concentration in mg/m³ for ambient air in the project footprint or area of influence

NMP Methodology - Identifying Sensitive Receptors

Sensitive receptors are defined as receptors that may be adversely impacted by the effects of nuisances. These may include residential communities and businesses, users of sensitive public facilities such as hospitals and clinics, educational facilities, retirement homes, leisure amenities, etc.

They should be identified through:

- Consultation with the project team on the extent of nuisances expected and the geographical extent of the project
- A general site-setting analysis of the proposed activities, using available maps, aerial imagery, supported (where possible) by a site reconnaissance visit
- Consultation with local stakeholders, which may include local authorities, nearby residential communities and local businesses, etc.

Where feasible, some baseline environmental quality monitoring should be undertaken to provide an indication of the existing ambient noise, air quality, odour and light pollution prior to project activities.

NMP Methodology - Assessing Impacts from Nuisances

The impacts generated by nuisances should be assessed to determine the extent to which they should be managed. The assessment of impacts should be consistent with the methodology specified in the EIA Guidance in this B.O.O.K., taking into account:

- The magnitude of the nuisance (e.g. sound level intensity, concentration of dust in ambient air etc.
- The sensitivity of receptors

NMP Methodology - Control Measures

After assessment, nuisances that generate significant impacts should be managed with appropriate control measures.

As a first approach, as far as reasonably practicable, Schlumberger shall avoid siting facilities and operations in proximity to sensitive receptors, thereby removing the nuisance to receptors. If this is not possible, impacts from nuisances should be controlled using the following hierarchy:

- Avoid generating the nuisances at source by re-design of the project in order to remove potential impacts resulting from a specific project feature (e.g. re-routing a pipeline, relocating facilities, etc.)
- Reduce the impact using emissions abatement measures such as noise mufflers, dust suppression at site, wastewater treatment systems for odor

- Reduce off-site impacts using receptor-specific abatement measures such as sound screens or visual screening e.g. by planting of hedges

Roles and Responsibilities

Action or Responsibility	Responsible Personnel
Responsibility for undertaking the nuisance study in compliance with the present document	OPS Manager/QHSE Engineer/Approved supplier by MOEF
Responsibility for supporting and participating in the stakeholder engagement process	OPS Manager/QHSE Engineer
Responsibility for supervising the drafting of the document drafted by the team responsible for the NMP	OPS Manager/QHSE Engineer
Responsibility for reviewing (audit) of the nuisance management plan (NMP), reporting and corrective action	OPS Manager/Environmental Champion
Responsibility for reviewing and monitoring the control measures in place to reduce nuisance associated with site activities	Line Management and Operations Dept

Figure 3.10 Nuisance Management Procedure template

Nuisance Sources and Controls

Ref #	Activity, Source & Process	Nuisance type	Impacted receptor(s)	Routine or Non-Routine	Control and Mitigation measures	Applicable limits (Including Units of measurements)	Restrictions on Working
1	Activity: Welding	Noise, Visual Impact	Employees and contract workmen	Routine	Face shield, ear plug, Welding Apron, Gloves, Shoes, Leg guard and hand sleeve to be used during welding. The welding area to be cordoned off by welding curtains.	Average noise levels not to exceed to 75dBA in day time(6am-10pm) and night time(10pm-6am) not to exceed 70dBA	None
2	Activity: Polishing	Noise, dust	Employees and contract workmen	Routine	Separate area for polishing work. Mandatory PPEs are worn.	Average noise levels not to exceed to 75dBA in day time(6am-10pm) and night time(10pm-6am) not to exceed 70dBA and RSPM no to exceed 150 µg/m ³	None
3	Activity: Grinding	Noise, dust	Employees and contract workmen	Routine	Separate room/Area covered by curtains during grinding work. Container for dust collection and proper ventilation provided. Mandatory PPEs are worn.	Average noise levels not to exceed to 75dBA in day time(6am-10pm) and night time(10pm-6am) not to exceed 70dBA and RSPM no to exceed 150 µg/m ³	None
4	Activity: Shot and Glass bead blasting	Dust, Noise	Employees and contract workmen	Routine	Use of blast rooms for the activity. Dust collectors for the collection of dusts generated. Mandatory PPEs are worn.	Average noise levels not to exceed to 75dBA in day time(6am-10pm) and night time(10pm-6am) not to exceed 70dBA and RSPM not to exceed	None

Figure 3.11 Nuisance Sources and Controls

CHAPTER 4

RESULT & DISCUSSION

- Environmental Plan is developed by gathering information from the site and upgrading Environmental Internal Compliance at the site.
- Environmental Plan helps in achieving the Local rules and regulations. The fundamental and risk based controls helps in identifying the procedures to be implemented at the site.
- Environmental Plan helped in identifying the procedures used to implement the controls required by the applicable segment.
- The procedures identified through the plan helped in managing the risks associated with the Sweco's activities, products and services.
- The procedures act as control measures for the site and helps in making guidelines for the risks which have the short and long term impact on the environment.
- The plan and procedures act as a guide for the new employees at the segment for understanding the risks associated and how they have been managed by the location.
- The Sweco, Vasai location comes under Middle East Area, so Middle East Asia Area standard applies to the location.
- The Environmental Risk Matrix helps in identifying the Criteria and Risk Level for the location, further suggesting the controls to be implemented through the different procedures
- The procedures which were completed to put controls at the site were Waste Management Procedure, Nuisance Management Procedure, Spill Preparedness and Response Procedure and Resource Management Procedure.
- The Waste Management Procedure defines roles and responsibilities, Waste classification and disposal routes, details of the waste contractors and disposal methods for waste water generated on the site.
- The Waste classification was done for the different types of wastes generated at the site and different disposal methods were suggested depending on the type of waste generated.
- The Nuisance Management Procedure was done for identifying the different sources/activity which are creating nuisance.

- As per Schlumberger standard, there are five types of nuisance-noise, visual impact, odour, dust, light pollution. The different sources are identified, nuisance type is defined and control and mitigation measures are given.
- The spill preparedness and response procedure gives an insight about the different potential spill scenarios and mitigation measure to control the spill.
- The Environmental Plan and Procedures is updated in the Record Compliance Tracking System (RCTS) and can be accessed by other locations for review and reference.

Chapter 5

SUMMARY AND CONCLUSION

Summary

This project gave me an opportunity to understand the concept of environmental compliance. It also provided an immense opportunity to gain insightful knowledge about various phases in which environmental compliance needs to be done. Reviewing and understanding the legal documents helped me immensely to understand how local regulatory requirements play a role in efficient operation at the Sweco, Vasai. Environmental Plan becomes the basis for the environmental compliance monitoring. The procedures are an effective method for assessing the risks and putting the control measures to have minimum impact on the environment. The plan and procedures are an easy way to communicate with the employees. The plan and procedures must be periodically monitored and updated as per the changes and the requirement.

Conclusion

The Plan and Procedures are a definite way for managing the risks associated with the Schlumberger activities and its products. These are an effective means of showing the clients the way all the different aspects of environment are taken care by the segment. The procedures can be made more effective by more employee involvement, contractor participation and suggestions from everyone working in the segment. Trainings must also be conducted for the employees giving them the insight of the procedures and the way it will be implemented.

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