JOSOP - 602 – Waste Management and Minimization Plan

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1.0 Introduction

The first Tenet of the Operational Excellence states “Operate within design and environmental limits,” and, the seventh tenet states:”comply with all applicable rules and regulations.” This Standard Operating Procedure (SOP) document is designed to help Wafra Joint Operations (JO) meet both of these tenets by considering the environment throughout all operations while adhering to all applicable Kuwaiti and other non-operators environmental regulations. The last time this document was revised was on October 8, 2002 and approved on November 4, 2002 under the title: Waste Minimization & Management. Efforts will be made to update the existing document by including recent environmental organization at JO and the most recent regulations affecting JO operations. The approval date of this document will be used as an initial document date and it will be revised annually afterwards.

1.1 Purpose and Objectives

The purpose of this SOP is to reduce the potential impact of JO operations on the environment, minimize the potential liability to JO from generation of waste, and conserve resources.

It is very important that operations make every reasonable effort to develop and implement methods to reduce the generation of wastes of all types. Such active programs should consider process changes, modified waste management methods and other innovative techniques.

Wastes should be prevented or reduced in volume or toxicity at the source whenever feasible, particularly in the case of the introduction of a new source or modification of an existing source. Those that cannot be prevented should be recycled or reused in an environmentally safe manner, whenever feasible; and

wastes which cannot be prevented, reused, recycled, or treated should be disposed of in an environmentally safe manner.

This document also summarizes a waste management system as it applies to all Joint Operations activities and provides a structure for its implementation. The objective is to include existing practices and available facilities as well as proposing new or improved facilities as needed to meet the goal of achieving a proper waste management system. The scope is comprehensive in attempting to address all the essential pieces of a waste management plan.

1.2 Scope

The goal of this SOP is to manage all wastes generated at JO including wastes generated by JO contractors.

1.2.1 In Scope

The following waste streams and sources are in scope for this SOP:

- All wastes generated onsite
- Waste management methods, equipment, and facilities
- Pollution prevention/waste minimization/recycling
- Capital and exploration projects including both seismic and exploration drilling
- Existing facilities
- Wastes generated by contractors as part of the contracted scope of work on premises owned or controlled by JO

1.2.2 Out of Scope

The following waste streams and sources are out of scope for this SOP:

- Produced water
- Air emissions and gaseous wastes, except as related to air emissions from incineration

- Contractors waste generated at their camps such as paint containers and small maintenance operations wastes

2.0 Legal Requirements Summary

2.1 Kuwait Environmental Public Authority (KEPA)

Petroleum operations and their associated activities occurring within Kuwait are regulated by the Ministry of Oil Technical Affairs as authorized by Law No. 19 promulgated in 1973. Regulations for implementation of Law No. 19 are within the "Regulations for the Conservation of Petroleum Resources" published in 1975 and amended in 1989 which were based on Canadian Conservation Regulations of the 1970's. Additionally, the associated Kuwait public regulatory body "Environment Public Authority" (KEPA) as established by Laws No. 21 of 1995 and No. 16 of 1996 has primary oversight responsibilities over public sector environmental issues with gray area input into KOC (and JO by affiliation), where their activities may affect the general public. KEPA oversight has become clearer with the publication of Order 210/2001 establishing rules for environmental protection in the public and industrial sectors of Kuwait. This 210/2001 publication has used the International Basel Convention in identifying and listing of hazardous waste.

2.2 Non-Operators Requirements (KGOC and Saudi Arabian Chevron)

Environmental activities at JO are also regulated by the two non-operators (Kuwait Gulf Oil Company and Saudi Arabian Chevron) regulations and standards. Kuwait Petroleum Corporation (KPC) Corporate HSE Policy, Volume 3-Corporate Standards and Guidelines plays a vital role in JO Waste Management program. Of special interest to JO operations, are chapter 13 (Management of Waste Minimization and Disposal) and chapter 14 (Management of Waste Water Discharges). Please see appendix 14.1.

The following is a description of the Chevron Environmental Performance Standard (EPS). (Reference: GU-Waste Management Performance Standard, Approved October 24, 2007), Appendix 14.2:

2.2.1 Capital Project Design Requirements

All new projects will be screened using JOSOP 602 for the need to complete an Environmental Impact Assessment.

All of Chevron Environmental Performance Standards (EPS) requirements apply to capital projects during planning and design stages. Projects in the Chevron Project Development & Execution Process (CDPEP) Phase 2 or early Phase 3 are required to assess the waste management needs for the project and develop a Waste Management Plan

2.2.2 Existing Operating Requirements

All existing operations at JO should follow the following requirements as per Chevron Waste Management EPS:

1. **Prohibited Practices**
    - Burning of liquid or solid materials in pits, piles, drums or other open containers
    - Disposal of liquid waste in landfills
2. **Prohibited Materials**: The procurement of new materials or any equipment containing materials listed below is prohibited:
    - Ozone-Depleting Substances (ODS), as defined by Montreal protocol
    - All forms of asbestos-containing products
    - Lead-based paint
    - PCBs
    - Leaded thread compound (pipe dope)
3. **Preferred Management Methods for Wastes**
   In-scope waste management facilities shall be operated in accordance with Chevron GU Waste Management EPS- Preferred Management Methods for Wastes found in (Appendix 14.3)
4. **Technology Standards**
   JO should operate waste management processes and equipment, and conduct waste management practices in compliance with the detailed requirements of the following Technology Standards:

- Bioremediation
- Landfill
- Incinerator
- Construction Incorporation
- Downhole Disposal
- Waste Transportation and Storage
- Pits

5. **Records of Waste Management Facility Locations**
   JO should maintain detailed records of locations of current waste management operations, including pits. (Appendix14.4). Currently, JO is maintaining detailed GPS locations and photos of all the evaporation pits throughout its fields.
6. **Onsite Waste Tracking**
   Records are maintained for all wastes which are disposed at in-scope waste disposal facilities. These records should apply to the point of treatment and/or final disposition (i.e., incinerator, landfill, bioremediation, construction incorporation, etc.). The electronic records should be maintained in a permanently archived and easily retrievable location and include the following:
   - Type of waste
   - Quantity/Volume of waste
   - Final disposition location
   - Date waste was transferred.

   See (**Appendix 14.5**) for required tracking forms.

7. **Waste Minimization**
   JO should select at least one solid waste stream and develop a plan to reduce the total annual volume of that waste. The minimization plan shall be reviewed annually to evaluate progress or close out the plan for the currently targeted waste and add a new waste stream for minimization.

For year 2009, JO has selected waste paper to be the targeted waste stream and used that year's values to be the base values for the coming years.

Note: Exclusions for the above EPS are found in the GU-Waste Management Performance Standard, Section 2.1.3 found in **Appendix 14.2**). Also, the completed GU Waste Minimization form used at JO is included in **Appendix 14.6.**

3.0 Terms and Definitions

EPS	Environmental Performance Standard
KEPA	Kuwait Environmental Public Authority
GU	Chevron Global upstream
PCBs	Polychlorinated biphenyls
ODS	Ozone-Depleting Substances
JOSOP	Joint Operations Standard Operating Procedures
CDPEP	Chevron Project Development & Execution Process
NORM	Naturally Occurring Radioactive Materials
MGC	Main Gathering center
TCLP	Toxicity Criteria Leaching Procedure
PMP	Pressure Maintenance Plant
PPE	Personal Protective Equipment
NCC	National Cleaning Company
MSDS	Material Safety Data Sheet
POD	production Operation Division

4.0 Waste Management Strategy and Hierarchy

Responsible waste management is based on hierarchical system of source reduction, reuse, recycling/recovery, treatment and responsible disposal.

Moreover, the specific management practices employed within this system:

- Comply with Kuwaiti environmental laws and regulations
- Protect human health and the environment
- Are tailored to specific waste streams and local site characteristics
- Take into account the availability of Kuwaiti reuse, recycling, treatment and disposal infrastructure

Waste management begins with source reduction, which is also sometimes referred to as pollution prevention. Pollution prevention focuses on eliminating, modifying or reducing operating practices that generate waste. If pollution prevention efforts fail to eliminate a particular waste stream, then the remaining elements of the waste management hierarchy should be successively investigated.

The individual elements of the hierarchy are as follows:

1. Source Reduction: The process of eliminating or minimizing, as far as possible, the volume and/or toxicity of wastes through use of alternative materials, processes or procedures.
2. Reuse: After all source reduction options have been considered, the next step is to evaluate reusing the waste material. This reuse may be in the same, an alternative, or downgraded service. It may also involve returning material to a vendor for reconditioning.
   An example of the material reuse is the historical practice at JO of using oily soil to supplement or replace construction materials needed for building facility roads, parking areas, and tank berms. (SOP 606-Reuse of Oily Material as Road Mix)
3. Recycling/Recovery: Once all recourse reduction and reuse options have been considered, the next step is to evaluate recycling and recovery of the waste material. Recycling and recovery involves either converting the

waste into usable materials or extracting energy or usable materials from the waste. Some examples of recycling/recovery include:

- Third-party recycling of scrap metals, paper, glass and plastic
- Burning used lubricating oils for energy recovery

When recycling scrap metal, care should be taken to ensure that hazardous materials such as NORM scale, lead-based paint, PCB-contaminated oil, asbestos, mercury switches, and end-of life vehicle fluids are not sent to a recycling facility along with the uncontaminated materials.

4. Treatment: After source reduction, reuse, recycling and recovery options have been fully explored, treatment of the waste to reduce its volume and/or toxicity must be considered. Potential treatment options include biological, thermal, physical, and chemical processes.

5. Responsible Disposal: This is considered the last resort, when all the above options have been fully explored. Waste disposal typically involves either secure storage in a third-party properly engineered and monitored landfill, or subsurface injection via properly designed and monitored injection system.

5.0 Waste Classification

In general, wastes may be classified as non-hazardous or hazardous. Handling procedures such as storage, treatment, shipment and disposal of these materials will depend on their characteristics. It is the responsibility of the individuals as well as the Division generating a waste to know the proper classification and handling procedures for that material. Improper waste handling and disposal can expose workers to unnecessary health risk and damage the environment. For each waste stream identified it is necessary to classify it to determine the way it should be handled and its ultimate disposal means. For many of the waste streams it is relatively easy and straight-forward to determine its hazardous classification following the guidance provided in **Section 5.2.** Unfortunately some waste streams of unknown nature may require extra review and even

possible lab analysis to properly determine its hazardous classifications until such time there is reason to believe the waste stream constituents have changed which would trigger the need for an updated characteristic profiling. A summary listing of common waste streams and their classification is included in the **Specific Waste Stream Guidance Sheets (Appendix 14.7)**. It should be kept current as additional waste streams are identified and profiled.

5.1 Non-Hazardous Waste

Wastes that do not meet the hazardous criteria are considered non-

hazardous and in general can be handled and disposed of in an easier

manner as the risks to humans and the environment are inherently less.

Most production and exploration related oilfield wastes fall into the non-hazardous category yet may contain sufficient contaminates that could be detrimental to the environment if handled or disposed improperly. Or they may require special handling due to their physical characteristics such as pyrophoric iron sulfide scale which must be kept wet to keep it from igniting. Some examples of these types of wastes that may be found in JO's operations are:

- Produced water
- Tank or Vessels Bottoms
- Oily Soil
- Oil Contaminated Debris
- Oilfield Laboratory Wastes
- Inert construction wastes
- Glass
- Scrap metal
- Used containers

These types of waste should be reviewed periodically to verify that they do not have hazardous characteristics and that their properties remain consistent over time.

5.1.1 Non-Hazardous Waste Disposal

In general, the means for disposal of non-hazardous solid material is through landfill at Mina Abdullah Municipal dump facility. Construction debris can be sent to the EPIC facility on the seventh ring near Amghara for recycling. Dumping is not allowed in JO administered areas.

Landfills are appropriate for "solid" non-hazardous material but not for liquids and a substitute disposal means is required. The preferred method for disposal of non-hazardous liquid waste would be subsurface with well disposal to the extent that the waste material is compatible with our water disposal systems.

Produced water is either injected into disposal wells or used to enhance oil recovery in injection wells after lowering the oil contents to around 30 ppm.

Tank or vessels bottoms and oily soil are stockpiled and being treated by biological methods such as land farming.

Oil contaminated debris should be disposed of in separate containers and sent to Mina Abdullah municipal landfill.

Oilfield lab wastes are currently neutralized and collected in a small pit outside the lab. The accumulated liquids are sent along spent oil samples to MGC's pit # 1.

5.2 Hazardous Waste

Determination that a waste is hazardous is based on specific chemical hazard testing or operational knowledge of the waste. Some wastes are designated as hazardous solely due to the industrial processes that generate them or due to a specific constituent and its inherent risk of environmental or health hazard if improperly managed.

Kuwait EPA regulations, Order 210/2001 Chapter IV and Appendix 11-2 have included several wastes listed under the international Basel Convention in Chapter IV and Appendix. Of concern to our operation are:

- Y6 wastes from organic (non-halogenated) solvents – lab samples of crude oil, water and solvents – xylene, methanol, butanol, etc.

- Y9 wastes that are wastes from oil and oil/water mixtures – sludges, tank bottoms, lube oil, produced water.
- Y10 wastes containing polychlorinated biphenyls – dielectric fluids, transformers, capacitors, rectifiers.
- Y12 wastes from paints, laquers, varnish
- Y20-Y31 wastes containing heavy metals – beryllium, hexavalent chromium, copper, zinc, arsenic, selenium, cadmium, antimony, thorium, mercury, thallium, and lead – copper or lead pipe dope,
- Y34-Y35 wastes of acid and base solutions – cleaning and treating with acids and bases, lead-acid batteries
- Y36 wastes containing asbestos – transite sheets, gaskets, insulation
- Y41 wastes containing halogenated solvents – chlorinated solvents, halogenated solvents & refrigerants

The limits or hazard criteria that define a waste as hazardous are specified in several international standards and have been adopted by the Kuwait EPA and summarized in the following sections:

5.2.1 Hazardous Waste by Flammability and Ignitibility Characteristics

- Liquids that can result in flammable fumes under 60.5ºC.
- Solids or semi-solids capable of causing fire through friction, absorbing moisture, or spontaneous chemical change, and burning vigorously and persistently when ignited.
- Gases which are compressed and ignitable.
- Examples: paints, solvents, oil/water mixtures, acetylene

5.2.2 Hazardous Waste by Corrosivity Characteristics

- Corrosive wastes are capable of damage to materials due to acidic or basic chemical properties.
- These wastes may, by a chemical reaction, cause deep, untreatable harm to tissues
- These wastes may harm other goods or transportation means or destroy them.
- Substances with pH less than 2.0 or greater then 12.5

- Examples: strong acids or caustics solutions, unspent well operations chemicals

5.2.3 Hazardous Waste by Reactivity Characteristics

- Waste materials that reacts easily, spontaneously or when exposed to air or water to produce heat, explosion or toxic gases.
- Oxidizers or those wastes not necessarily flammable themselves, but they may cause other materials to flame by producing oxygen.
- Organic peroxides that are thermally unstable in that they are subjected to automatic, rapid heat release upon decomposition.
- Examples: iron sulfide, reactive sulfides and cyanides

5.2.4 Hazardous Waste by Toxicity Characteristics

- Waste substances that exceed leachate test concentration levels containing certain heavy metals, organic chemicals, and pesticides as described in 5.2.4.1.
- Wastes that can cause acute or delayed (chronic) health effects.
- Wastes that can cause adverse reproductive effects.
- Environmental toxins that may case immediate or delayed harm to the environment by the power of their accumulation in living organisms or systems.
- Examples: biocides, benzene, lead, cadmium, mercury

5.2.4.1 Limits for Toxicity Characteristics through the Toxicity Criteria Leaching Procedure (TCLP)

A list of hazard constituents and their corresponding concentrations in mg/liter can be found in **Appendix No. 11-3 of KEPA 2001 regulations.** Please refer to the latest edition of this appendix for toxicity determination.

For unused or expired chemicals, the above characteristic information should be available on the associated Material Safety Data Sheet (MSDS) for the particular

material in question. If a MSDS sheet is not available for a waste material or its identification is unknown, then lab analysis for the above criteria is necessary to properly determine its hazardous classification. Unknown materials should be considered and handled as hazardous until they are clearly known to be of a non-hazardous nature.

In addition to the materials determined to be hazardous by the above characteristics criteria, there may be additional waste materials that require special care and treated similar to hazardous waste (e.g. radioactive waste). Unique procedures are necessary to handle these special types of waste and should be developed.

5.3 Hazardous Waste Disposal

The Shuaiba Solid Reception & Treatment Station was established in 1993 by the Public Authority for Industry to receive and dispose of inert and hazardous industrial wastes. Shuaiba facility can handle hazardous materials through temporary storage followed by either recycling or pre-treatment. Pre treated hazardous wastes are then land filled in the lined onsite-landfill. For inert materials, following segregation and crushing operations, the inert waste is sent to the inert onsite landfill. Shuaiba facility is capable of disposing of both “solid” and “liquid” hazardous wastes. The facility is equipped with a Hydrocarbon Sludge Treatment Unit, Anaerobic Thermal Desorption Unit, and a Liquid Chemicals Solidification Unit.

In the State of Kuwait, the classification criteria for hazardous wastes are defined in KEPA Regulations [Gazette # 533, dated October 2, 2001], Chapter IV- Management of Household, Hazardous, Healthcare and Sludge Wastes, Article 19 including Appendix 11-1, 11-2, and 11-3.

MANY WASTE STREAMS CONTAIN SMALL AMOUNTS (*DE MINIMUS*) QUANTITIES OF WHAT WOULD OTHERWISE BE CONSIDERED TO BE A HAZARDOUS WASTE. MANY PRODUCTS USED IN THE HOUSEHOLD WOULD BE CONSIDERED TO BE HAZARDOUS DUE TO THEIR TOXICITY OR CORROSIVITY. EXAMPLES INCLUDE PAINTS, SOLVENTS PESTICIDES, AND SOME CLEANING PRODUCTS. IT IS GENERALLY ACCEPTED THAT SMALL AMOUNTS OF THESE PRODUCTS DISCARDED WITHIN HOUSEHOLD TRASH POSE A MINIMAL RISK TO THE ENVIRONMENT.

5.3.1 Solid and Liquid Hazardous Waste Disposal

Due to its inherent hazardous nature and current availability of a proper disposal facility, all generated solid and liquid hazardous waste should be transported and disposed of at the Shuaiba facility. Specific procedures and guidelines regarding use of Shuaiba are available in section **10.6.** An example of a liquid hazardous waste generated by JO is write-off warehouse chemicals. Some of solid hazardous waste are gas filters, oil filters, air filters, light bulbs, fluorescent bulbs, used batteries, and waste oil.

5.3.2 Monthly Waste Disposal Report

Efforts will be made to control the issuance of waste manifest forms to all divisions and disposal invoices received from disposal facilities to prepare a monthly waste.

6.0 Waste Inventory

JO EHS Engineers will establish and maintain a waste inventory register to keep track of all generated wastes by all divisions. Efforts will be made to update this inventory register by working with all divisions including Warehouse, Purchasing and General Services. The inventory form should include:

- Waste name
- Generating Division or work group
- Waste classification
- Quantities generated
- Final waste disposal or management method

The waste inventory forms the baseline from which improvements will be planned and future environmental performance assessed. This for could also be used in as input data into our waste minimization plan. See appendix 14.8 for a sample waste inventory form.

7.0 Waste Streams

The following is a general discussion of some major JO waste categories and recommendations for consideration regarding use of currently available disposal options. Detailed information regarding proposed handling and disposal of specific identified JO waste streams will be developed as Specific Waste Stream Guidance Sheets.

7.1 Solid Waste Rubbish

Inert solid waste includes general debris such as paper, plastic, wood metal, concrete, rubber, hoses, wire, tires, empty cans, insulation, construction debris, etc. Once all reuse/recycle efforts have been made, any remaining solid non-hazardous waste should be disposed of in a managed dumping site such as the Kuwait municipal landfill at Mina Abdullah or the EPIC facility on the 7th ring. General material exclusions from disposal at these landfills are no liquids and no hazardous materials.

7.2 Domestic Wastewater

Domestic wastewater refers to waste water from lavatories, kitchens, bath facilities, laundries etc. The preferred disposal method is transport to a sewage treatment facility for processing and ultimate disposal. If disposal through a treatment plant is impractical, subsurface disposal on-site in septic tanks or suitable holding tanks is an acceptable alternative. Discharge into open pits should be avoided as it invites disposal of other waste materials and creates a general

health hazard unless it is located at a site controlled by a municipality such as the Mina Abdullah dump site. It is important to keep domestic wastewater systems isolated from all industrial waste water sources such as shop floor drains, parts cleaner bins, and also from any surface runoff water collection system. Commingling domestic, industrial, and surface water system floods during heavy seasonal rains can cause spreading of contamination over a wide area.

Currently, sewage wastewater (20,000 gallons per day) is collected by vacuum trucks from a total of 59 below surface collection pits and the collected wastewater is transported to Mina Abdullah Municipal Wastewater Treatment Facility. Any rejected trucks due to oil contents is currently been directed to the Government-owned new Industrial Liquid Waste Treatment Facility located at Wafra Road

KM-30.

JO is currently in the process of building its own 300 cubic meters per day packaged wastewater treatment facility. The project will be offered for biding in the first quarter of 2011 and expected to be completed by end of 2011. This proposed system will treat all of our sewage wastewater and the treated wastewater will be used for onsite irrigation.

Grease carried over from the kitchen and other food preparation locations

7.3 Drilling Waste

Drilling activities are a major generator of various waste streams including drill cuttings, mud, associated fluids, and miscellaneous solid waste materials. To the maximum extent possible recycle efforts should be made for all materials. Bulk containers for mud additives should be used and returned to the vendor for reuse. Solid non-hazardous waste disposal preference is transport to an off-site, managed landfill. *Drilling contractors should be encouraged to utilize the Shuaiba facility as appropriate*. Open domestic wastewater discharges should be avoided. Routing domestic wastes to a simple perforated buried drum would meet the objective avoiding an exposed health hazard.

7.3.1 Water-based Mud and Cuttings

The JO Drilling activity has historically employed water based drilling operations and has employed numerous waste minimization efficiencies. These include water/mud recycling, minimizing the amount of waste fluids being generated and the amount of make up raw water required. A further improvement is to incorporate methods of

dewatering and concentrating the solids portion of the cuttings prior to disposal further reducing the amount of wastes being generated. Screening tests on mud and cuttings from representative wells indicate that concentrations of heavy metals do not requiring additional treatment or disposal as a hazardous waste. Should drilling practices or mud components change significantly in this regard, specific guidance and criteria regarding the level of heavy metals allowed for general disposal needs development. Environmentally friendly alternative additives should be considered wherever possible. Water based drill cuttings free of hydrocarbon and excessive levels of heavy metals can be disposed of in on-site shallow reserve pits. Upon well completion and site abandonment, the pits (once dry), should be closed within 90 days in accordance with DRL-004 guidelines.

7.3.2 Oil-based Mud and Cuttings

Oil based mud has not been routinely used at JO. Due to their potentially hazardous nature, use of any oil-based muds should be thoroughly reviewed and approved by the drilling superintendent. If oil based mud is determined necessary, alternative synthetic oils should be considered. If oil-based muds are required for certain portions of a well, all resulting oily muds and cuttings should be segregated from the water based muds and cuttings to prevent commingling of the wastes creating a larger volume of oily waste to be dealt with. All oil-based muds and cuttings should either be hauled away for off-site disposal or further managed on-site. Similar to recommendations for water based mud systems, recycling of water and concentration of solids should be an objective. Once solids are concentrated, further treatment/disposal methods could include grindings and injecting into loss circulation zones or landfarm remediation. If on-site storage of oily muds and cuttings is required it should only be in portable tanks or within a lined pit. All oily fluids collected should be hauled to production facilities for oil recovery. Prudent reuse of oily solids to supplement local road building materials should be considered.

7.4 Production Fluids

JO generates a significant amount of produced water and oily fluid waste from production and processing, crude storage tank cleaning, vessel and line drainage, spill cleanup, well workover work, maintenance activities etc. Key in minimizing

oily waste volumes is solids concentration and oil/water separation. As these oily wastes are generated at various locations spread out across the production areas, efficiencies in having a portable solids concentration oil/water separation mobile unit should be considered. A targeted example process might be the bulk crude tank cleaning. If the tank sludge solids can be concentrated and the remaining fluids separated on site, the recovered crude portion can easily be placed in an adjacent tank for recover and processing. Having mobile separation equipment onsite minimizes the amount of material that needs to be transported elsewhere for processing.

JO has limited facilities for proper handling and disposal of oily waste. Facilities that are currently available include the skim oil facility at the MGC, water disposal wells and remaining evaporation pits. Oil recovery from evaporation pits is limited to contracted oil skimming service. The skimming services and the pits themselves will only be available for a finite period until such time as all pits are taken out of service and closed.

7.4.1 Produced Water

Disposal of produced water effluent is one of the larger challenges to JO. Phased implementation of total underground disposal or use of produced water is well established in JO's work plans and continues to be expanded to keep ahead of forecasted produced water increases.

As stated in Section 8.1.1.2 (Evaporation Pits), Joint Operations has eliminated surface pits as the primary means to dispose of wastewater with the exception of the MGC operations pits used to manage small volumes of produced liquids.

7.4.2 Oily Fluids

To the maximum extent possible, all hydrocarbon liquids from an oily fluid waste should be recovered and processed into the production facilities. Separated water should be disposed of by disposal/injection wells.

Waste lube oil generated by different operation and maintenance facilities should be disposed of at the proper waste lube oils recycling facilities after consulting with the EHA personnel.

7.4.3 Oily Sludge

Oily sludge is generated from tank and vessel cleaning, pipeline pigging, spill clean up, reserve pits cleaning and various maintenance related activities. Concentrating the solids portion of these oily wastes would reduce the waste volume significantly. Options for separation of large quantity of oily sludge include centrifugal separation and filter presses. The liquid phases both oil and water may be returned to the processing line and drain line respectively. Preferred disposal means of the concentrated oily solids if it is hazardous, would be at approved

disposal yard NCC-Shuaiba. If the concentrated solid is non-hazardous, it may be disposed as land fill. For small quantities of oily sludge, it may be collected at a designated location for later centrifuge separations or to be disposed with Pit remedial project waste.

7.5 Waste Chemicals

Oil production treatment processes require a large volume use of a wide variety of chemical products. These chemicals are transported and used in a variety of containers varying from bulk trucks to liter bottles. In general, these chemicals are considered hazardous requiring extra arrangement in their handling, storage, and disposal. Guidelines for chemical use and handling are in JOSOP 505 Hazard Communication. Wherever possible, chemicals should be used or introduced to a process stream where there is an incremental beneficial use of the material. As a last resort, they are rendered waste materials and must be disposed. Some chemical materials are encountered that have been stored for a number of years with the contents becoming unknown due to the loss of labels or purchase records. Many of the containers are degraded into a poor condition. 200 drums of these waste chemicals are being classified and will be disposed of at Shuaiba Solid Reception & Treatment Station. If spent or waste chemicals cannot be beneficially introduced into waste water or oil process streams. They must be evaluated for their hazardous waste characteristics and managed in accordance with Section 5.

To minimize the amount of chemicals becoming surplus, purchase and inventory control procedures should be reviewed to ensure they promote full use of all materials purchased. Bulk shipment of most commonly used chemicals has been initiated as this practice is preferred over drums. As eventual disposal of all materials requires

identification of contents, cost savings can be had if all containers are well marked regarding contents.

7.6 Miscellaneous Trucked Fluids

Processing, operations, maintenance and emergency response activities generate small quantities of waste fluids. Historically, these fluids are removed from the point of generation via vacuum tanker and ultimately disposed in the evaporation pits (1,000 bbl/day). As evaporation pits are removed from service, these fluids will require alternatives for disposal. Primarily, the disposal options will be in either the skim oil recovery system at the MGC or the waste water disposal well systems at the Pressure Maintenance Plant. Suitable truck cleanout facilities will be required at each of these sites. Problematic in the handling of miscellaneous trucked fluids are some of the constituents (solids, water, chemical, detergents, etc.) that can cause upset to either the skim oil facility or waste water disposal wells. Examples of the processes generating these waste streams are:

Maintenance Activity Washdown Fluid

Oil Spill Clean-up

Vehicle Wash Water

Test Tank Fluid

Vessel and Line Drain Fluid

Tank Cleaning

LSP brine solution (7000 bbl/day)

Drilling and Workover operations

To properly monitor and inventory the movement of these fluids throughout the operation and to prevent discharge into systems incompatible with any waste stream, a transfer and tracking document (Manifest) has been developed. This manifest requires the identification of the generating process, quantity and contents of the shipment,

which contractor is transporting the material and where the material is to be responsibly discharged. A JO Supervisor must sign at the point of generation and point of discharge. See **section 10.5.1**.

An Industrial Liquid Waste Treatment Plant is currently being planned (Phase 2) in order to treat all industrial liquids currently vacuumed into Pit # 1.

7.7 PMP Filter Backwash

Approximately 15,000 bbl per day of produced water filter backwash water are sent to two evaporation pits near the MGC area. This backwash water will be diverted to the proposed Industrial Liquid Waste Treatment plant for treatment.

8.0 Facilities

8.1 On-site Waste Management

Through the development of the Joint Operations, several operations have been established to competently manage waste and recyclable materials in conjunction with our production activities. Other waste management facilities will need to be established in the future to continuously improve our operations. As waste related activities are not our primary core business, it may be beneficial to contract out some operational aspects of some specialized waste activities.

8.1.1 Produced Water Management

By far the highest volume waste stream generated by JO is associated produced and process water. It is the core business of JO to efficiently separate produced water from the crude oil. This water is briny and contains trace quantities of hydrocarbon and other contaminants. Historically, this water was disposed in surface evaporation pits throughout the operations. Commencing in 1999, phased projects have been implemented to reverse the practice of surface disposal in favor of environmentally preferred beneficial use in reservoir pressure maintenance or underground disposal wells. Full implementation of the phased produced water management projects was realized in 2009.

8.1.1.1 Disposal/Injection Wells

Disposal/Injection wells can perform two purposes - injection wells for large volumes of relatively clean produced water in support of Enhanced Oil Recovery (EOR) reservoir pressure maintenance or wells for disposal of water and waste fluids into subsurface geological structures designated as compatible with that purpose.

8.1.1.2 Evaporation Pits

The historical use of the evaporation pits to dispose of produced water was effective and acceptable for this operation when water production was relatively low. This was a convenient final oil water separation point as well as a convenient depository for oily fluids, trucked fluids, and rig fluids. Joint Operations has eliminated surface pits as the primary means to dispose of wastewater with the exception of the MGC operations pits used to manage small volumes of produced liquids.

8.1.2 Skim Oil Recovery

Oily fluid, hydrocarbon containing liquids, and trucked fluids resulting from spill clean-up or other activity is recycled through the Main Gathering Center Skim Oil facility. This plant has provisions for separation of hydrocarbon and reprocessing through the other MGC facilities and ultimately to shipping tanks. Water separated from this process is transferred to the disposal wells.

8.1.3 Rig Fluid Facility (proposed)

Historically, rig and completion fluids have been discharged to surface pits along with other waters and fluids. With the elimination of surface pits, a facility to manage rig and completion fluids will be established. These fluids often include chemicals that promote suspension of solids and strengthen emulsions and are incompatible with the majority of fluids handled by wastewater and oil skim facilities. Separate treatment and disposal well facilities are necessary to prevent process upsets. Solids separated by this process can be managed through landfarming or disposal at an appropriate landfill. It is proposed that rig liquids be treated at the proposed Industrial Liquid Waste Treatment facility.

8.1.4 Recyclable Material Storage (proposed)

JO does some recycling through its salvageable materials program with material lots collected and periodically offered by tender through the General Services, Purchasing and Warehouse Divisions. Satellite collection yards and staging areas for scrap metal are established and maintained by the Warehouse Division. To support and expand on these recycling efforts, the Warehouse Division should have a dedicated storage area for other recyclable materials. The storage area should allow for material segregation as needed with category examples being metals, batteries, etc. Special precautions for proper storage of hazardous recyclable materials such as batteries should be taken. The dedicated recycle materials storage area should be large enough to be useful but not too large to encourage permanent storage. The intent is to simply allow for consolidation of recyclable material from the JO area for efficient use by vendors in picking up bulk lots of material intended for recycling.

8.1.5 Landfill

Landfills or disposal pits shall not to be utilized in JO. Sufficient, well-managed sites are available off-site to accommodate disposal needs. The municipal or Shuaiba Industrial Waste Facility should be utilized for all solid waste.

8.1.6 Hazardous Waste Storage Area (proposed)

The Shuaiba Industrial Waste Facility can dispose of inert solid, non-hazardous waste and solid and liquid hazardous waste materials. Joint Operations should utilize Shuaiba to the maximum extent possible for the disposal of all its hazardous waste. However in order to allow for efficient bulk transport and also as a contingency plan in the event Shuaiba becomes unavailable, JO needs a dedicated area for the short term storage of hazardous waste materials.

Facilities for dealing with the expected smaller amounts of hazardous waste that will be generated on a regular basis across the field are needed. Such a site would store material until an adequate volume of hazardous waste has been accumulated and

arrangements with Shuaiba are made for efficient bulk transport to their facilities for final disposal.

Due to the hazardous nature of the materials, special precautions should be considered in the design of the storage facility to include impermeable ground cover, drain collection area, adequate side walls, segregation of incompatible materials, roof cover, open ventilation and mechanisms to allow for ease of movement of materials as necessary. Due to the inherent health exposure risks and fire/explosion hazards, the hazardous waste storage area should be physically sited at a safe distance from any other structures and actively worked areas.

As waste materials and their holding containers generally decompose over time creating leakage problems, it is imperative the hazardous materials storage area be managed as it was intended to be, with “temporary” being its purpose. With efficiency and practicality in mind, a regular schedule in removal of the stored materials should be established and adhered to.

8.1.7 Maintenance Cleaning Containment Areas (proposed)

In locations where Mechanical Maintenance Division conducts industrial cleaning and degreasing operations, containment areas are required to prevent cleaning material from contacting the ground. These areas should be co-located with worksites or conveniently stationed near the major shops. Installations should be concrete areas protected from stormwater run-on and run-off. Areas should be sloped to facilitate accumulation of fluids at a site where they can be removed by a vacuum tanker. If it is required to install an underground cistern to collect the fluid and protect from stormwater run-on and run-off, the installation shall provide secondary containment for the fluid and ensure that leakage is prevented and detectable. Disposal of this material containing water, detergents, solvents, oil, grease and other materials should be in either the MGC skim oil system or the PMP disposal system. If these locations prove incompatible, alternatives will need to be developed.

8.2 Kuwait Disposal Facilities

8.2.1 Kuwait Municipality

The municipality of Kuwait operates numerous landfill operations primarily for non-hazardous solid waste. Locations include Jahra, Jleeb Al-Shouk, Seventh Ring Road, Sulaibiya and Mina Abdullah. The site nearest Joint Operations is the Mina Abdullah Dumping Area.

8.2.2 Shuaiba Industrial Waste Facility

The Shuaiba Industrial Waste Facility (hereafter “Shuaiba”), established by the Public Authority for Industry and operated under contract by the National Cleaning Company, can handle solid and liquid hazardous and non-hazardous material. Shuaiba is the only facility in Kuwait capable of handling and disposing of hazardous materials and JO should take full advantage in use of the facility for disposing all of its hazardous waste materials. Procedures in use of the facility including packaging, labeling, identification, and manifesting requirements are included in **section 10.6**.

8.2.3 Industrial Liquid Wastewater Treatment Facility (Wafra KM-30) Facility

This facility was recently built by the Kuwait Security Decision Follow Up Committee in 2009 and early 2010 and was able to receive industrial liquid waste from all over Kuwait. The facility treats liquid wastes from the chemical industry, food industries, and slaughterhouses. It contains a pre-treatment plant, a biological cascade system with a special ARS biological regeneration reactor, centrifuge for the biological excess sludge, and an incinerator to burn the sludge from pre-treatment. Currently, JO is temporarily using this facility to dispose of some of the oil-containing sewage wastewater. Efforts are made to discuss with the facility management to potential for other waste streams disposal. A special Industrial Liquid Waste Manifest should be used when sending JO vacuum trucks to this facility or to Mina Abdullah facility mentioned in section 8.2.1 above. See **Appendix 14.10** for a copy of this special form.

9.0 Waste Minimization and Management Responsibilities

Responsibility for proper waste minimization and management is part of everyone's individual duties in the manner they conduct their work. Many teams and individuals support the waste minimization effort through use, re-use, recycling, and disposal decisions.

Waste minimization has been proven to be an effective and beneficial operating procedure. There are many economically and technically feasible waste minimization techniques that can be used in the JO operations. Benefits of waste minimization may include:

- reduced operating and waste management costs;
- increased revenue;
- reduced regulatory compliance concerns;
- reduced potential liability concerns; and
- improved company image and public relations.

Choosing feasible source reduction and recycling options (i.e., waste minimization) is a smart business decision.

Waste minimization is part of the concept of the "Waste Management Hierarchy." The Waste Management Hierarchy sets out a preferred sequence of waste management options. The first and most preferred option is **source reduction**. Source reduction is any activity that reduces or eliminates either the generation of waste at the source or the release of a contaminant from a process. The next preferred option is **recycling**. Recycling is the reclamation of the useful constituents of a waste for reuse, or the use or reuse of a waste as a substitute for a commercial feedstock or as a feedstock in an industrial process. ***Together, source reduction and recycling comprise waste minimization.*** The last two options, and least preferred, of the hierarchy are treatment and disposal.

9.1 EHS Leadership Team (Upper Management)

Upper management has the responsibility for identifying the goals to be achieved and providing the necessary resources to meet them through the establishment of this JOSOP, budgetary support for staff and suitable facilities as outlined in Section 8. Additionally they have a responsibility of leadership with demonstrated visible commitment.

9.2 Division Responsibilities

9.2.1 EHS Division

The Environmental, Health and Safety Division role should be as a focal point in facilitating the development of an overall JO waste strategy and in support of line management implementation providing technical assistance and guidance as needed. Monthly summaries offsite waste recycling and disposal generated by the General Services Division will be reviewed and archived by EHS for use in internal or external reporting as needed. Examples of technical assistance provided might include regulatory interpretation, development and update of JOSOPs (Joint Operations Standard Operating Procedures), Specific Waste Stream Guidance Sheets, assisting in locating appropriate waste sites, identifying optional minimization (use, re-use or disposal options) or disposal methods, and an added layer of oversight monitoring in the form of periodic site audits or inspection.

9.2.2 General Services Division

General Services Division is the focal point for waste recycling, minimization and management efforts as they direct contractors conducting the cleaning and disposal activity through its Industrial Services Section. GSD and contractors should support operational divisions by providing waste gathering, segregation, and disposal coordination as they have historically. They control activity regarding collection and removal of rubbish, kitchen waste, domestic sewage, and garden waste resulting from landscaping.

These services will continue and will be augmented with enhancements outlined in this waste management procedure. Future facilities developed for specialized waste management should be developed, constructed and operated as General Services Assets – hazardous waste staging, oily waste, recyclable materials, solidification/neutralization facilities and drum crushing. It is envisioned that these facilities would be collocated for ease of operation and site security. Monthly summaries offsite waste recycling and disposal activities shall be made by this Division for submittal to the EHS Division. This Division should ensure that contractual relationships are in place for office rubbish and metals recycling services. Coordination with the Purchasing and Warehouse Divisions will be required to ensure recyclable materials are compliant with JO asset control procedures before being recycled. **Appendix 14.11** details JO Waste Recycling program for paper, cardboards, clear plastics and aluminum. (This program was adopted from Saudi Arabian Chevron-SAC).

9.2.3 Contracts Division

The Contracts Division supports waste minimization by ensuring that contractual relationships are in place for recycling services including metals and drums. They can assist by communicating the provisions of this JOSOP to major contractors to JO so they can provide proper waste management services to JO and manage their Camps in compliance. These procedures apply to them to the extent that they support JO operations that generate wastes. Further, many of the provision in this JOSOP are requirement of doing business in the State of Kuwait and apply to their camps, shops and other activities.

9.2.4 MGC Assets Division

Waste minimization measures affected by the Main Gathering Center are central to their mission – the effective separation of crude oil and produced water with minimal cross-contamination or emulsions. The major waste minimization and management assets controlled by the Main Gathering Center Assets Division are the evaporation pits and

the skim oil recovery facility. The evaporation pits will be phased out of operation and eliminated by December 2012. The skim oil facility functions to collect and treat recovery oily fluid and treat it to quality specifications suitable for transfer to MGC shipping systems. This facility is vitally important during the pit closure phase. It also provides waste management support by handling all oily trucked fluids handled by JO. Fluids collected from tank cleaning, spill clean-up, well gauging, and other activities are discharged at the skim oil facility where oil and water are separated, oil sent to further processing and water to PMP or disposal. Trucked fluids will enter the MGC with an accompanying manifest. The MGC will ensure that the receipt of the trucked fluid for processing will be compatible with their treatment and will return the completed manifest to the generating supervisor.

9.2.5 PMP Assets Division

The Pressure Maintenance Plant Assets Division has the major responsibility of operating assets which re-use produced water for reservoir pressure maintenance and several water disposal wells. These assets have facilities which recover oil from the produced water streams for recovery and recycling. These include the Pressure Maintenance Plant, ring main, injection wells, disposal wells, oil recovery and recycling to the MGC. As these assets continue to be developed, this division will operate all disposal wells in the main field tied into the produced water gathering system and the trucked fluid handling and disposal system that will be collocated with the PMP. Disposal wells located at SUG and Sub-Centers that are not connected to the produced water gathering lines will be under the control of the Production Operations Division.

9.2.6 Mechanical Maintenance Division

The Mechanical Maintenance Division is potentially the generator of the most problematic wastes in the operation through their many shops, services, and equipment. Minimization and recycling efforts are supported by this Division through the use of their heavy equipment to collect recyclable metals from around the field to scrap storage yards, Return oily fluid from well testing, well operations, and leak clean-ups to a designated pit or trucked fluid facility.

Performing heavy equipment operations as they relate to oil spill response and clean-up, land treatment of oily soils, and other vital functions in support of Production Operations are critical to the visual appearance of the field and efficient waste management.

9.2.7 Major Projects Division

Major Projects designs and constructs all projects for JO with attention to waste minimization and proper management. A core activity is the design of production and processing facilities that meet the vision of elimination of surface discharges or produced water and oily fluids.

9.2.8 Purchasing & Warehouse Divisions

These divisions perform vital waste minimization and functions by procuring, receiving and dispensing materials. Attention to inventory control principles that ensure that material doesn't expire, spoil or degrade prior to beneficial uses. Attention to product packaging is also important to consider them life-cycle cost of materials including packaging. Packaging can often be a significant portion of waste disposal. Materials received in drums are often problematic for waste management. A separate JOSOP 601 (Appendix 14.9) addresses drums and containers. The Purchasing & Warehouse Divisions takes a lead roll in coordinating periodic drum and scrap metal recycling by managing temporary storage of material and ensuring contractual relationships are in place for metals recycling services.

9.2.9 Production Operations Division

POD ensures that water production is optimized in all producing wells and those facilities and wells are operating leak-free. Ensure the effective operation of waste water disposal wells at sub-centers. Return oily fluid from well testing, well operations, and leak clean-ups to a designated pit or trucked fluid facility.

9.2.10 Drilling & Workover Divisions

These Divisions ensure that waste hazards are minimized by using mud additives that are water-based, low in hazards and are used as intended by the

manufacturers. To the greatest extent possible, reuse and recycle of drilling mud and water ensures waste minimization. Operations pits are closed as directed in JOSOP 600. Oily fluids from well testing, well operations, and leak clean-ups are to a designated disposal facility or trucked fluid facility.

9.2.11 Wafra, SUG, South Fuwaris & Exploration Asset Management Teams

As produced water is our single largest volume waste material, these teams ensure that water production is optimized in all producing wells.

10.0 MANAGEMENT PROCESSES FOR WASTES

10.1 TRAINING

An important part of the overall waste management system is to ensure the involved staff has the appropriate training to safely and competently carry out the duties expected of them.

With the introduction of a new waste program, all staff should be made aware of its existence with a brief overview and their expected role within it. Line supervision personnel will require a more detailed awareness highlighting their increased responsibilities. Staff personnel and contractors directly involved in the various waste practices will require specific training on safety precautions appropriate to their expected job duties. Specific Waste Stream Guidance Sheets are prepared for many waste stream to serve this training and guidance purpose. Additional information regarding personal protective equipment is included in the Hazard Communications JOSOP 505.

Waste management systems are not a steady state. Personnel staff assignments change, facility modifications occur requiring procedural changes, and regulatory requirements may increase. All of these changes contribute toward a need for a regular review of training requirements and updating of them as necessary.

10.2 TESTING AND SAMPLING

The main purpose of testing is to determine if an unknown waste stream is hazardous and how the waste should be handled. Testing may also help to identify which treatment options are appropriate for a particular stream if treatment is required prior to disposal.

Testing is not required for all waste streams. If sufficient information is known about a particular waste stream by those individuals directly involved in the process by which it was generated, then the waste may be classified based on this knowledge. Material Safety Data Sheets (MSDS's) can be useful in determining if a known material is hazardous or non-hazardous.

Waste streams that are generated on an ongoing basis should be sampled and tested at some interval to ensure that the characteristics of the waste have not changed significantly. It is not unusual for a waste stream that once tested as non-hazardous to test later as hazardous due to upstream changes in the process or a change in treating chemicals used.

Care should be exercised when gathering a sample of suspected hazardous material. Proper personal protective equipment (PPE) should be used as well as the proper sample container. If an outside laboratory is being used to conduct the testing, they may have trained personnel available to come on-site and collect the sample as well.

Specific Waste Stream Guidance Sheets are prepared for wastes where significant knowledge about a waste stream exists or where test data has been established. Based on this information, management recommendations are made.

JO is currently maintains a contract with National Petroleum Services Company (NAPESCO) to perform among other things needed sampling for our hazardous wastes.

10.3 Segregation and Storage

In order to ensure proper handling of wastes, it is required to correctly classify, segregate, store and label the waste. Field locations should have areas designated for the accumulation and interim storage of wastes. The following

handling practices should be followed when storing wastes (hazardous or non-hazardous):

- Keep Containers closed
- Avoid mixing wastes
- Provide separation for wastes that may react with one another (refer to MSDS for reactivity/compatibility data)
- Use containers that are compatible with the waste and are in good condition
- Inspect the storage areas periodically for leaking containers

Hazardous waste should be kept segregated from non-hazardous waste. Wastes should be placed in compatible containers that will not react with the waste and will prevent it from leaking out. The use of dented or severely rusted containers should be avoided. Containers should have a lid to prevent rain or other liquids from accidentally entering the container. Consideration should be given to secondary containment in the event of a container failure. If flammable wastes are to be stored, the area should be posted with “No Smoking” signs.

10.4 Labeling Stored Waste

Anytime hazardous waste is first placed into a container, the container should be adequately labeled. The label should indicate the following information:

- The Word “Hazardous Waste”
- The common or chemical name of the waste
- The physical state of the waste (solid or liquid)
- An indication of the hazardous properties of the waste (toxic, corrosive, ignitable, etc).
- Waste accumulation start date
- Emergency contact number
- Basic first aid treatment

Non-hazardous wastes and materials designated for recycling or reuse should also be labeled with at least the common or chemical name of the material. If the material to be recycled or reused is a hazardous material, the label should contain

all of the same information as for a hazardous waste. Material found in a container without a label should be assumed to be hazardous until proven otherwise.

10.5 Shipping and Disposal

The options available for disposal will vary depending on the physical characteristics of the waste. In general, liquid wastes are not acceptable for direct landfill disposal without solidification. Many solid wastes may contain hazardous components which are readily water soluble and could pose a threat to groundwater if directly placed into an unlined landfill. Some of these materials may be treated with binding agents (Portland Cement) prior to disposal that chemically bind the hazardous components and render them insoluble.

Some liquid wastes may be oil soluble and appropriate for blending with the crude oil stream. This includes many of the hydrocarbon based oil treatment chemicals such as emulsion breakers, and some corrosion inhibitors. This may also be an appropriate option for waste lubricating oils.

Some water soluble wastes may be appropriate for blending with the produced water stream. Care must be taken to ensure that materials that would be harmful to the disposal well bore or formation are not blended into these streams (plugging, scaling, swelling, etc.)

Some hazardous waste streams may pose a significant risk to groundwater. These wastes may require special handling such as high temperature incineration, or placement in specially designed landfills with liners and leachate collection systems. Some of these streams may be candidates for turning over to the Public Authority for Industry to be disposed of in their hazardous industrial waste site in Shuaiba.

Good management procedures are required whenever waste is transported within the field or in the public areas regardless of hazardous or non-hazardous classifications. When preparing a waste for shipment the following things should be kept in mind:

Incompatible wastes must be kept segregated - Incompatible wastes should be sent as separate loads where possible. If they must be sent as one load, adequate separation must be maintained.

Proper containers should be used - The container material must be compatible with the waste that it will contain. The container should be structurally sound and have no leaks. Where large bins are used to transport dry materials, they must be covered to prevent loss of material during transport.

Characteristics of waste must be known - To ensure that the proper PPE is used, that incompatible materials are not mixed, and that the proper container materials are used, the characteristics of each waste must be known. One of the most serious risks to waste handlers and transporters is the potential for release of toxic gases/compounds from an uncontrolled reaction of incompatible materials. If little is known about the source or characteristics of a particular waste, sufficient testing should be done to properly characterize the material.

When shipping a hazardous waste from JO to a disposal facility, a waste manifest form should be completed and accompany the shipment. Distribution of the five different duplicates of the manifest form should also be dealt with accordingly. See **Appendix 14.12.**

10.5.1 On-Site Waste Management and Trucked Fluid Transfer Manifest

In general, there is a prohibition of waste dumping and disposal within JO administered areas. This means that construction rubble, debris and rubbish cannot be disposed in the field at any time. Exceptions to this prohibition include:

- Clean drift sand can be deposited in open areas of the field
- Clean concrete rubble can be buried in the field at a depth of over 1.5 meters
- Oily soil can be collected and deposited at the oily soil stockpile areas (such as near the SC-19 roadway near well W-116) in accordance with JOSOP 605
- Produced water and compatible fluids are disposed in on-site disposal wells

All other waste material must be managed through offsite disposal, on-site reuse or recycling.

Waste or recyclable fluids that are transferred around the field in vacuum tankers for processing in disposal wells, skim oil recovery or other processes require special procedures and instruction to ensure proper handling. As some of these fluids change divisional control (e.g. gauge tank oil from POD to the MGC skim oil recovery process) and have constituents that can upset MGC or PMP processes, a special form shall be used for all trucked fluids, **Appendix 14.13**. The form, the JO Truck Fluid Transfer Manifest is required for each truck or group of trucks handling like fluid. It gives specific instruction from the JO supervisor generating the material to the transporter and informs the receiving JO supervisor of its contents. Distribution of the form according to the instructions on the bottom of the form allows tracking and later summary reporting if required. The form is available in the shared drive of the computer network:

O:\ share (\\jopnt3share1)\JOP_Common\WJ60_EHSFSG\WJ63_EHS\Approved JOSOP\JO Truck Fluid Transfer Manifest.

10.5.2 Off-site Waste Management

As discussed in sections above, many materials must leave the JO area for management. Some materials will be reused or recycled by others, while others will be treated and/or disposed by others off-site. Management of most of this work is under the control of the General Services Division with guidance from this JOSOP and Specific Waste Stream Guidance Sheets. As guided by the Specific Waste Stream Guidance Sheets, most material will be transported off-site to one of three locations: the Shuaiba Industrial Waste Facility, the Mina Abdulah Municipal Dumping Site, and other waste recycling facilities. Waste acceptance procedures for the Shuaiba Industrial Waste Facility are outlined below in section 10.5.2.1. Arrangements with the Mina Abdullah Dump Site are not formally established, but waste acceptance is dependent on guards at the site gate and is subject to change at any time.

10.5.2.1 Shuaiba Industrial Waste Facility

The Public Authority for Industry (PAI) established the Industrial Waste Facility in Shuaiba to assist Kuwait industry in managing their wastes. They have established treatment and disposal facilities for many hazardous and listed wastes through their waste sorting facility, drum cleaning/solidification facility, on-site laboratory, incinerator,

truck wash-out facility, lined landfill and unlined landfills. Due to its progressive design and competent operation, this is the preferred site for our wastes that have an inherent hazardous nature. The operator operating the site for the PAI is the National Cleaning Company (NCC). Detailed procedures are established with the NCC and PAI and are available in the shared drive of the computer network and in section 10.6 below.

To initiate waste management through the Shuaiba Industrial Waste Facility, a PAI Work Order form is completed and fax'd to the site. These forms are available with the General Services Division or the EHS Division. A brief outline of the charges can be found below.

- KD 31 per ton- Disposal of Hazardous Solid and Semi Solid wastes
- KD 31per ton- Disposal of Hazardous Liquid and Semi Liquid wastes
- KD 250 per ton- Pre-Treatment (Liquid) cost
- KD 4.5 per ton (non-hazardous) disposal cost
- KD 10 per ton- Transport cost
  (From Joint Operations WAFRA to Shuaiba Solid Waste Treatment Station)
- Further transport distance costs determined on case by case basis
- Site handling charges as needed
- Lab analysis fees by individual analysis

NCC and the PAI will assist in all aspects of the waste stream management from initial hazard and characteristic profiling through final shipping paper manifesting. Manifesting assistance is provided by the staff at the Shuaiba Industrial Waste facility or the EHS Division. Upon successful treatment and/or disposal of the material, the PAI will issue a certificate attesting that all procedures have been followed and they will accept responsibility for the long-term custody of the material.

10.6 Shuaiba Industrial Waste Facility procedures

10.6.1 Initial Notification

A. Shuaiba Industrial Waste Facility (hereafter Shuaiba) requires initial notification of pending waste disposal in the form of a completed Work Order. **(Appendix 14.14)**
B. The requesting Waste Generator Division or General Services Industrial Services Section should complete the form with the following information:

- Date (Date of Request)
- Generator Name (Division, Contact Person, Voice and Fax Number)
- Description of Services Requested (Waste disposal, transport, handling, packaging, sampling, lab analysis, etc.)
- Waste Type Description (General description of contents, packaging condition, and MSDS if available)
- Estimated Waste Quantity (Number of drums, containers, or estimated bulk quantity)
- Hazardous or non-hazardous determination (Using criteria described in JOSOP 602 Section 5)
- Waste Location (where wastes are located)
- Transport Required (Note if transport should begin)
- Transport Date (When transport should begin)
- Chemical Analysis Results (Supply results as available). However, this result is required as part of the primary test analysis
- Financial Commitment Signature (circular appointee)

C. The completed Work Order form should be faxed to Shuaiba Public Authority for Industry office at No. 2476-2605 or 2326-0987. Voice number is 2326-3941(0)

D. Subject to future changes, current hours of operation for Shuaiba are Sat-Wed 7 a.m. to 3 p.m. and Thursday 7 a.m. to 1 p.m.

E. Shuaiba is operated by the contractor National Cleaning Company (NCC). The Executive Director at the site is Mustafa Marrouf at the above voice number or at mobile no. 9982-3789.

10.6.2 Initial Notification Follow-up Discussion

Upon receipt and internal processing of the Work Order Request, Shuaiba-NCC personnel will call the provided Waste Generator's contact to discuss the specific work order and any arrangements necessary to conduct the requested services.

10.6.3 NCC Site Visit and Assessment

A. The above telephone consultation should determine if there is a need for NCC to visit the site to assess the waste material condition or sample it for lab analysis.

B. If a NCC site visit is determined necessary, it is the responsibility of the Waste Generator Division or General Services Industrial Services Section it ensure all security access passes for personnel and vehicles are obtained for NCC's use.

C. Once access passes are provided, NCC personnel will travel to the field site to conduct work as needed.

D. NCC will assess the packaging of the waste materials to determine if additional handling preparation is required. Additionally, NCC will assess safety conditions at the site and determine if special precautions are necessary in handling the waste.

E. As necessary, NCC may obtain a sample of the waste at this time for lab analysis.

10.6.4 Lab Analysis

A. In order to ensure safe disposal of non-compatible hazardous waste, a preliminary laboratory test is required of the waste prior to it entering the facility. Discussions with NCC personnel following initial Work Order submittal should determine if any analysis is required.

B. For a fee, Shuaiba can sample and run most lab analysis as required. Fees should be discussed and agreed to in the preliminary notification discussions.

C. If Shuaiba is requested, they will travel to the site to take the samples and either run them at their lab or have them sent to another lab as needed.

D. Depending on the nature of the lab analysis, results may not be available for a couple of weeks.

E. Once a proper lab analysis is available, arrangements for handling and transport of the wastes can be made.

10.6.5 Packaging

A. Prior to transport, the waste materials need to be maid fit for handling to avoid spills or exposures in route.

B. It is important to keep different materials segregated until lab analysis is available to determine which compatible wastes can be grouped together.

Once known and segregated, like materials should be grouped for efficient transport and off loading.

C. Containers should be in good condition free of leaks, holes, excessive rust, or any other condition that does not fully contain the materials.

D. If containers are not in good condition, a discussion with NCC is needed to determine if the materials need to be repacked in secure containers or if they can suggest an alternative appropriate bulk haul method.

E. NCC, for a fee, can provide manpower and materials to repack the materials as necessary with services request noted on the Work Order request form.

F. If drums are the primary container, they should be placed on wooden pallets and banded to allow secure movement and stacking.

G. Transport vehicle should be loaded prudently within applicable safety transport regulations.

H. Drums should be clearly labeled with contents as known so as not to become miss- identified upon receipt at Shuaiba.

10.6.6 Safety

A. Waste Generator Division or General Services Industrial Services Section requesting the waste service is responsible for ensuring the work is carried out in a safe and environmentally good manner.

B. Many hazardous materials present serious safety concerns and chance of human exposure to them should be minimized.

C. Depending on the nature of the material, special safety precautions in handling the materials may be necessary.

D. As needed Safety personnel should be contacted to assess risks of handling hazardous materials and to make recommendations as necessary.

E. Proper personal protection equipment including gloves, safety glasses and appropriate respirators should be used.

F. Additional standby air packs may be necessary depending on the nature of the material

10.6.7 Transport

A. Depending on the services requested in the initial Work Order request form, NCC personnel can provide transport of materials with trained drivers and properly inspected vehicles.

B. Prior to transport, the necessary access passes need to be obtained and made available to NCC transport personnel.

C. Initial Work Order request discussions need to clarify what specific site support is required by the transporter to assist in loading of the materials.

10.6.8 Manifesting

A. A formal written manifest form noting specific information relative to the waste on board needs to be completed for each truck load of waste bound

for Shuaiba. Requisite forms are established by the Kuwait Environment Public Authority and Kuwait Municipality Industrial Environment Department (phone 2482-1285-9, extension 203. A copy of this form is included in **Appendix 14.12.**

B. It is the responsibility of the Waste Generator Division or General Services Industrial Services Section to complete the form in its entirety and have it signed by an appropriate person knowledgeable of the waste being shipped.

C. Prior to signing the manifest, the Waste Generator Division or General Services Industrial Services Section representative should have field confirmation that the site was left in good order by the transporter.

D. Once the manifest is completed and signed, the form should be given to the truck driver with a copy kept by the Waste Generator Division or General Services Industrial Services Section.

10.6.9 Scale Ticket

A. When the transporter passes through the Shuaiba weigh scales a Scale Ticket with weights and time of entry will be generated.

B. Hauler's driver should return a copy of the Scale Ticket to the Waste Generator Division or General Services Industrial Services Section contact identified on the original Work Order request form.

C. Waste Generator Division or General Services Industrial Services Section should review the scale ticket for accuracy and save for future reference when the associated invoice is sent for payment.

10.6.10 Invoicing

A. The current fee structures are:

- KD 31 per ton- Disposal of Hazardous Solid and Semi Solid wastes
- KD 31per ton- Disposal of Hazardous Liquid and Semi Liquid wastes
- KD 250 per ton- Pre-Treatment (Liquid) cost
- KD 4.5 per ton (non-hazardous) disposal cost
- KD 10 per ton- Transport cost
  (From Joint Operations WAFRA to Shuaiba Solid Waste Treatment Station)
- Further transport distance costs determined on case by case basis
- Site handling charges as needed
- Lab analysis fees by individual analysis
-

B. Shuaiba intends to send out invoices on a monthly basis.
C. Invoices will be of two types:

- Disposal Fees at the Shuaiba landfill site based on per ton charge
- Other Services for all other supplied NCC services to include transport, labor handling, lab analysis, vehicle rental, or other as needed based on service rates charged.

11.0 Program Awareness, Monitoring and Review

11.1 Training and Awareness

Following the final approval of this revised plan, Meetings will be held with different divisions to discuss the components and requirements of this Plan and the preferred management options for their division specific wastes. Proper use of labeling system and completion of proper forms such as waste tracking and manifesting will also be discussed.

Additional awareness sessions should be conducted whenever the plan is revised and new procedures are introduced. When appropriate, the awareness sessions will be accompanied by appropriate training materials such as pamphlets, posters, and relevant quizzes.

11.2 Inventory and Program Monitoring

Ongoing monitoring of the waste minimization and management program will be required to maintain its usefulness. Monitoring includes review of disposal sites through Chevron Third Party Waste Stewardship Program (TWS), minimization options, tracking waste volumes, and internal/external reporting as requested. As stated in Section 9, the majority of these functions fall to the EHS Leadership Team, EHS and General Services Divisions. Routine data gathering from day-to-day waste minimization and management activities will be collected by GSD and summarized monthly to the EHS Division. This data will be held by the EHS Division and monitored for use as needed. A form for this monthly report is available on the shared drive of the computer network.

O:\\ share (\\jopnt3share1)\JOP_common\WJ60_EHSFSG\WJ63_EHS\Approved JOSOP/JO Monthly Waste Management.

This form can be found in **Appendix 14.15.**

11.3 Waste Storage, Recycling and Disposal Facility Visits

The EHS Division will periodically visit the waste storage area though out JO

facilities to ensure the full compliance with the requirements of this Plan. Visits to third part recycling and disposal facilities will be according to the TWS guidelines in terms of visits frequency and other requirements.

11.4 Plan Review and Update

This Plan will be reviewed annually to ensure that the waste management techniques and practices remain in compliance with JO requirements. Furthermore, the JO waste inventory will be reviewed annually to evaluate potential waste reduction, reuse, and recycle opportunities. Feasible improvements will be incorporated in the annual update of Waste Management Plan and implemented as soon as practicable.

The Waste Minimization Plan is already been updated and monitored annually as per Chevron Waste EPS.

12.0 WASTE STREAM GUIDANCE

Individual sheets are prepared for many of our waste streams to guide generators in recommended safe handling and disposal procedures. As these are compiled, they will be available in the shared drive of the computer network and the JO contractor's website.

O:\\jopnt3shared1\WJ60_EHSFSG\WJ63_EHS\pproved JOSOP\JOSOP 602 Waste Stream Guidance sheet.

Also found in **Appendix 14.7** of this document.

These individual sheets will be the key mechanism in communicating the appropriate information to field personnel requiring guidance in dealing with the various generated waste streams. Specific procedures are developed for proper handling and management of individual waste streams. Waste Stream Guidance sheets are concise information regarding a specific waste stream. These will continue to be developed as the waste management system evolves and as field users require specific information on a waste issue. Appropriate procedures will be forwarded on to them for their use as they develop. This section will be added to and amended as needed to meet changing field conditions and disposal options.

Below is a listing of topics that have specific waste stream guidance sheets.

1. Aerosol Cans
2. Kitchen and Green Waste
3. Tires
4. Lead-acid Batteries
5. Fluorescent Bulbs
6. Drum Chemical Rinseate
7. Recyclable Metals
8. Drilling/Completion Fluids
9. Drilling Mud & Cuttings
10. Lube Oil Wastes & Filters
11. Sandblast Media
12. Used Lube Oil
13. Water/Oil-based Paints
14. Solvents & Thinners
15. Used Empty Drums
16. Paint Cans
17. Construction Debris
18. Office Rubbish
19. Water Filters or Filter Media
20. Domestic Sewage
21. Industrial Cleaning Drainage
22. Pipe Dope and Thread Protectors
23. Vehicle Wash Drainage
24. Machine Shop Cutting Oil
25. Asbestos Transite
26. Skim Oil & Well Gauge Fluids
27. Dry Cell Batteries
28. Oily Rags & Oily Debris
29. Oily Soil & Sludge
30. Produced Water
31. Laboratory Waste

13.0 Document Control

Table 1: Document Control Information

Description	J0-Common date posted	JO-Owner
Approval Date	February 1, 2011	
Next Revision Due	February 1, 2012	
Control Number		

Table 2: Document History

Version Number	Date	Notes
0.0	November 4, 2002	Initial Document
0.1	February 1, 2011	Upgrade of 2002 document
1.0		

Table 3: Section Changes

Version Number	Section(s)	Notes
0.0		
0.1		