

2014

**[“EMERGENCY
RESPONSE
FRAMEWORK”]**



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Background and Introduction

Tahrir Petrochemicals Corporation is planning to develop a Petrochemicals Complex in the Economic Zone in Ain Sokhna, Suez, Arab Republic of Egypt. The Main Plant's total area is approximately 2.6 million m² in addition to 800,000 m² storage area located at Sokhna 1 (McDermott) Port. The main components of the Complex are: Ethylene Plant (P1), Polyethylene Plant (P2) and Utilities & Offsite (including but not limited to; seawater intake and outfall, power plant, desalination plant, waste water treatment unit and storage tanks).



The proposed Complex utilizes naphtha as input raw material for the production of the following liquid products in mt/hr (approx.): Ethylene: 180, Propylene: 105, Butadiene: 28.6, Benzene: 40, Hexene-1: 9.5, and Pyrolysis Gas Oil (PGO)/ Pyrolysis Fuel Oil (PFO): 20.5. Furthermore, Polyethylene (171mt/hr) is produced using most of the Ethylene product as input material. A dedicated jetty located at Sokhna 1 (McDermott) Port will be constructed for importing Naphtha feed and Diesel Fuel Oil and other chemicals as well as exporting some of the proposed Complex Liquid products, namely, Benzene, excess Ethylene, Hexene-1, and Propylene. Whereas, the existing Quayside Dolphin will be used for Butadiene product export. Polyethylene product will be exported in solid phase from different ports, including but not limited to DP World Port.

Complex Configuration:

The Complex consists of the following:

- The Ethylene Plant encompasses two major areas: (1) the furnace area and (2) the balance of the ethylene plant, which is inclusive of the Gas Hydrogenation Unit (GHU), Butadiene Unit, Benzene Unit and Hexene-1 Unit.
- The Polyethylene Plant is comprised of the Polyethylene Process areas and the Product Handling and Storage area. The Polyethylene Process areas include Ethylene Treating and Pelletizing. The Product Handling and Storage area includes a conveying and bagging system.
- The Utilities and Offsites (U&O) provide utilities and power to the entire Complex. These facilities include, but are not limited to: Power Generation, Sea Water Intake, Sea Water Supply, Desalination, Waste Water Treatment and Disposal, Water Cooling & Circulation, Storage Tanks & Spheres, Infrastructure & Buildings, Pipelines between the port facility and the complex and the integration scope including the port topside facility.

The Project will be divided to two main Parts

1- Main Plant Side "MPS "

- It includes TPC facilities (Ethylene Cracker, PE Plant, Utilities, Demineralization & Waste Water Treatment and Intermediate Tank Farm)

2- Sokhna-1 (Mcdermott) Port

Includes the following

- Naphtha Storage Tanks, All Liquid Product, Seawater Intake, Desalination Plant, New Jetty with 2 Berths Equipped with Loading/Unloading Arms

Purpose

The TPC Plant has been designed to internationally recognized standards. Nonetheless, TPC recognizes that the risk of an environmental, operational or off site emergency occurring during the operational life of the plant cannot be completely eliminated. TPC has therefore will be established a comprehensive emergency response capability for mitigating emergencies and thus minimizing their impact in the unlikely event of an emergency occurring.

The Emergency Framework provides guidance and actions to be taken during an emergency associated with TPC Operations.

The TPC strategy is based on an in-depth risk assessment of the entire MPS operation that included potential loss of containment of hazardous gases, liquids and solids, fire, explosion and natural disasters. Combined with analysis of potential spill/release movement and the environmental sensitivity of exposed areas the optimum type and location of emergency response resources will be determined.

TPC will supplement dedicated resources with specialized response contractors and personnel through seeking to establish mutual aid agreements with other operators in the region and through coordination with local emergency services and government agencies prior to and during emergencies.

SCOPE

The TPC Facility is fully prepared to respond to an emergency situation, which may threaten TPC Facility property as well as associated Pipelines, Pump Stations, Storage Facilities and Loading Jetty. The facility has been designed and equipped with sufficient emergency response equipment and facilities to ensure the safety of personnel.

This document to give brief guidance for the response to an incident It sets out:

- The interface with the TPC Incident Management System;
- The emergency organization at the TPC Plant;
- The duties of personnel involved in an emergency;
- The actions to be taken in an emergency.
- Procedures to control a release or the threat of a release that may arise from an accident or irregularity in the operation of the plant and associated facilities and therefore minimize the damage caused by an accident or irregularity by timely detection, uniform response and rapid containment.

An emergency response organization will be established and will be trained for the TPC Facility and will be ready to respond, as required, to any potential emergency situation. To ensure that all personnel will be fully aware of the emergency response actions and the facilities available in the event of an emergency situation, induction training, exercises and drills will be regularly held on the facility and will also, at times, include the mobilization of the Unit Incident Management and Business Support Teams.

INCIDENT MANAGEMENT SYSTEM

INCIDENT MANAGEMENT CONCEPTS AND PRINCIPLES

- **Flexibility**

The IMS allows for maximum flexibility by providing an adjustable foundation for all involved parties regardless of incident type. This flexibility applies across all phases of incident management, prevention, preparedness, response, recovery and mitigation.

- **Standardization**

The IMS provides a set of organizational structures such as Incident Command System, multi-agency coordination systems and public information systems. The standardization is intended to increase interoperability among responders in various disciplines.

TPC INCIDENT MANAGEMENT SYSTEM

The Incident Management System (IMS) is directed to all activities conducted by Tahrir Petrochemical Company. It is an overall organizational umbrella that conforms to the American and local National Incident Management System (NIMS) style and structure.

This Incident Management System (IMS) provides the basis for effective management support, and response, to emergency situations occurring in any of the TPC operating centers and also ensures that the ongoing business activities will be maintained. TPC has adopted the ICS (Incident Command System) style of incident management but has adjusted the system to meet the needs of emergency response at the operational level

GOALS AND PERFORMANCE STANDARDS

In response to an emergency the primary objective will be in line with internationally recognized standards which detail the following order of strategic objectives.

- Protection of People
- Protection of the Environment
- Protection of Property
- Protection of the Business

The performance of TPC Facility safety systems during major incidents will be discussed in the scenario specific sections of the

Emergency Response Manual. Where required, performance standards will be set for specific elements of the safety systems.

The demonstration that stated levels of performance are being achieved is critical:

- TPC maintains all emergency equipment in line with local and international standards including but not limited to OSHA, NFPA etc. TPC also maintains a comprehensive record of all tests and inspections carried out, these records are maintained and held by the relevant authority and are made available for inspection as and when requested.
- TPC will established drill matrix detailing drill schedules, record keeping requirements and levels of drills to be carried out, these records are maintained and held be the relevant authority and are made available for inspection as and when required.
- TPC will established a staff training program compatible with local and international standards and monitored by appropriately qualified instructors and assessors. Records of training are maintained by the relevant authority and are made available for inspection as and when required.

TPC FACILITY EMERGENCY RESPONSE ORGANIZATION

The TPC Facility emergency response strategy requires that there will be a rapid response to any alarm on site including a General Alarm with a muster of personnel taking place at various safe Field Muster Points and or a Site Evacuation Point.

The TPC Facility Emergency Response Organization is headed by the Forward Commander (or appointed deputy), who has overall responsibility for the safety of all personnel on the TPC ISBL Facility and

neighborhood during an emergency.

The TPC Facility Emergency Response personnel operate within a well-defined structure comprising the following teams:

- Incident Management Team
- Emergency Response Teams – Fire Rescue Team and Auxiliary Fire Team
- Site Support Team including logistics and transportation and technical support
- Medical Response Team including Doctor, Paramedic, Ambulance Driver and First Aiders
- Muster and Evacuation Control Personnel.
- The TPC Facility Emergency Response Communications
- Depending on the extent of the emergency situation, the TPC Plant Emergency Response personnel will be supported by the TPC Incident Management Team (IMT) who in turn will be supported by the TPC Facility Business Support Team (BST)
- Incident Management Team (facility) is located in the Emergency Response Room within the Central Control Building. The team is comprised of the Incident Coordinator (Production Superintendent or Engineer)
- Deputy Incident Coordinator (Production Superintendent or Engineer)
- Site Liaison Officer (Operations Manager)
- Link Person (Appointed Operator)
- TPC Plant Muster Coordinator (Security Supervisor)

An Incident Coordinator and Deputy Incident Coordinator will be utilized to ensure that these two roles are always fulfilled by an Production Superintendent or Production Shift Supervisor in order to ensure that

Sufficient expertise exists within the Incident Control Team regarding all TPC Facility operations. The Forward Commander's roll will be fulfilled in the first instance by a TPC Production Shift Superintendent. Area Control Room Technicians, including Control Room Technician for affected area, remain in the Central Control Room and liaise directly with the Incident Coordinator.

The ER Service and the MRT muster in the Fire Station.

The Site Support Team and Technical Support Personnel will be formed on an "as needed basis" from personnel at the Field Muster Points. Technical Support personnel will be directed, when needed, to locations on the TPC Facility property to assist the Forward Commander or perform actions necessary to ensure the safety of TPC Facility Personnel. The Site Support Team Leader will form in the Emergency Support Conference Room, adjacent to the Emergency Response Room when directed by the Incident Coordinator or his deputy and will provide direct assistance to the Incident Control Team.

The Fire Station is utilized as a rendezvous point for on-site emergency teams and external emergency services. The Fire Station Watch Officer acts as a Staging Officer in coordinating movement of on-site emergency teams and external emergency services staged at the fire station under direction of the Incident Coordinator.

CONTROL OF EMERGENCIES

Detailed procedures for personnel will be involved in emergency response and their responsibilities during emergency situations. All personnel will be briefed on the emergency procedures and advised of their responsibilities whilst attending the TPC Induction course or during their departmental induction process.

Mitigation measures are employed to protect personnel on the TPC Facility from the effects of fire and explosion. These are the fixed firefighting systems e.g. deluge systems, grade level monitors, hose reels, portable first aid firefighting equipment and passive fire protection in the form of fire, heat and gas detection. Additionally, wherever possible, hazardous areas have been segregated by distance which mitigates against escalation from one location to another.

CONTROL

This is mainly concerned with major accident hazards and the control measures employed to limit or prevent the escalation of an emergency.

Control measures are either:

- Remotely operated equipment such as Emergency Shutdown (ESD) systems, will be described in of the TPC Operations Manual specific to the site.
- ERS will only respond to the immediate incident area once mobilized by the Forward Commander through the Incident Coordinator. The ERS will, if it is safe to do so, manually operate fixed and portable equipment in order to directly control the incident.
- Remote operation of equipment such as process controlled valves, are controlled by the TPC central control room operators. Process operations will be monitored by the Incident Coordinator at all times. Any process control operated remotely in order to mitigate the incident must be recorder in the Incident Action Plan.

Performance standards of control equipment will be described in TPC Plant Operations.

ESCAPE AND MUSTER

OBJECTIVE

The TPC Facility is committed to providing adequate facilities, arrangements, resources and training to facilitate the safe evacuation and escape of personnel from a hazardous area or situation in the event of any emergency that poses a threat to the safety or health of any TPC Facility personnel.

As part of this objective the TPC ISBL Plant will provide various safe Field Muster Points throughout the facility and along its perimeter.

In the event of an incident in any area of the facility that has the potential to impact on aParticular Field Muster Point, the Incident Coordinator will direct the Muster Coordinator to organize the relocation of personnel from that affected Muster Point.

ESCAPE

Consideration has been given to where personnel work, on both the plant and the offices and how they would escape to a place of safety following an alarm or the discovery of an incident.

NON-EMERGENCY PERSONNEL MUSTER LOCATIONS

In the event of an emergency all non-essential personnel, in response to the General Alarm or upon instruction, will be initially required to report to their nearest Muster Point.

The various Muster Points have been sited with due consideration to the hazards and potential incidents that could possibly occur on the TPC Facility and the extent to which escalation from the point of origin is thought to be credible.

MUSTER (ACCOUNTING FOR PERSONNEL)

All personnel on entering the TPC Facility will utilize a personnel electronic Identification system to record the fact that they have entered the facility. The identification system, fingerprint or card will be detected by a reader and the individual's details will be recorded on a central data base in the facility Security Department.

All non-emergency personnel must report on foot to their nearest muster Point on hearing the General Alarm, unless instructed to do otherwise via the public address system or a radio announcement. They must then ensure that their personal electronic identification card or finger print is read by the reader at the muster location and await instructions. The personnel on the TPC Plant will then be accounted for utilizing the central data base; the results of which will be directly available to the facility Incident Coordinator via the TPC Plant Muster Controller.

No vehicles will be utilized after a General Alarm has been initiated unless under the direct Instructions of the Incident Coordinator or his designated team member. Vehicles will be parked off the road, the engines stopped and the keys left in the ignition.

EVACUATION**DECISION TO EVACUATE**

As with the relocation of personnel at muster points, the IMT will decide if the facility will be initiating a partial or full evacuation. This will depend on the nature and extent of the incident.

CONTROL OF EVACUATION OF PLANT

The IMT may decide to evacuate all or some of the personnel on the facility during an incident, if the continued safety and welfare of personnel who remain cannot be guaranteed. This will be carried out by informing the muster point controller. Any evacuation will be carried out in a controlled manner via the safest facility gate, personnel will be directed to the TPC Plant Main Gate where the personnel electronic identification cards of each individual will be utilized to record when they arrive at the main gate and to perform a second muster.

FIRE FIGHTING AND RESCUE

A Fire Station will be constructed on TPC Facility that will be equipped with fire trucks; these trucks will be manned by a professional Fire Rescue Team, ERS (ERS) under the command of a Team of experienced Senior ERS Officers. When responding to an incident the most senior ERS Officer responding will establish the ERS Forward Control Point at the Forward Commander's location. All ERS personnel will be solely assigned to emergency response duties and ensure that all fire protection equipment is in an operationally ready status. The ERS will respond to all emergencies affecting the TPC Facility and offices. They will operate under the control of the Forward Commander.

The TPC Plant is also equipped with a medical clinic which is manned by a doctor and additional medical staff. The medical clinic is equipped with ambulances which will be maintained by the ERS for site emergency medical response. In addition to the day-to-day duties for the care of all TPC ISBL Facility and construction personnel, the medical staff will form in to MRT. The MRT muster point will be at the Clinic and information of team members passed on to the Fire Station Watch Officer who in turn will pass the information on to the Muster Coordinator.

The Doctor will have the final authority for all medical decisions regarding casualties and patients and will advise the Incident Coordinator of his decisions. However, if for any reason the Doctor is required to respond to the Medical Staging Area the Doctor and medical team will act under the overall control of the Forward Commander who is responsible for the safety of all personnel at that location. Additionally the Doctor will only respond to a Medical Staging Area when directed by the Forward Commander via the Incident Coordinator.

EMERGENCY COMMUNICATIONS

Extensive communications facilities will be available for use during an emergency situation and enable communications to be made throughout the facility, bulk storage facility, jetty and the TPC head office Cairo. The main communications centre on the facility, which is utilized during an emergency is the Emergency Response Room, located within the Central Control Building. The secondary communications centre is situated in the fire station, which forms a secondary Emergency Response Room, should a fire in the TPC Control Building render normal facilities unsafe. Communications facilities available include the following:

- Audible alarm signals, which are set off automatically or by manual intervention
- Visual alarm signals such as illuminated signs or flashing lights
- Radio transmitter and hand held radios
- The Public Address (PA) System
- Telephone System & Hot Lines
- Mobile telephones

The General Alarm may be sounded manually or automatically in the event of an emergency and will be sounded until the muster has been completed.

Control Room Technicians who will provide information over the public address system will be appropriately trained and have clear instructions on the information to be provided. Instructions on how to use the telephone system – emergency numbers etc will be given during the facility safety induction training.

All communication systems, which may have to be used during an emergency, are designed, so far as reasonably practicable, to remain available for as long as they could be required. This is achieved by using the appropriate design and performance standards, diversity and redundancy including the installation of a dedicated uninterruptible power supply system.

DRILLS AND EXERCISES

INTRODUCTION

TPC Facility workforce will be practiced in reacting to any reasonably foreseeable event which could occur on the facility, associated construction site or roadways e.g. road traffic accident, fire, explosion, structural damage, gas release etc.

The reasonably foreseeable events will be identified and Incident Management Guidelines (IMGs) will be developed. The IMGs will contain up-to-date information on the potential hazards and procedures to be followed for all reasonably foreseeable events.

DRILLS

Each department within the facility will conduct a Department Level Fire drill at least once per quarter. The drill will be supervised by the department fire warden and department manager.

Regular musters, drills and training exercises will be carried out on the TPC Facility to ensure that all personnel are familiar with the actions to be taken in the event of an emergency situation occurring.

DEPARTMENT LEVEL FIRE DRILLS.

The procedure for conducting a department level fire drill is as follows:

A fire drill is an exercise in command and control. It should be conducted in an atmosphere of calm controlled efficiency. Each person involved in a drill should be aware of their duties and responsibilities at all times during a drill. Although time is an important factor in any drill, it is not the most important factor.

Before a drill is initiated, the designated fire warden for the department involved in the drill is advised of the schedule of drills through the department head/manager

A programme of musters and drills will be developed on an annual basis; these will be based on the most significant risk and set out the objectives of the drill or exercise. The Emergency Response Team Leader will maintain an annual training schedule for various drills and exercises.

On completion of every drill a debrief meeting will be held to identify areas of concern and agree on any appropriate remedial action.

EXERCISES

Emergency scenarios will be enacted to familiarise all personnel with their responsibilities to give them a full understanding of the TPC Plant Emergency Response Manual and its implementation. In addition, emergency response exercises will be held involving the TPC Plant personnel, Incident Management Team, Business Support Team, Medical personnel and the local Emergency Services as per the drill matrix .

All drills and training exercises will be monitored to assess the effectiveness of the procedures and the personnel involved and, if relevant, corrective actions will be implemented. These corrective actions may involve revisions to plans, implementation of further training for personnel or improvement of safety equipment or facilities.

ORGANIZATION AND ARRANGEMENTS

ORGANIZATION

To ensure that there is no conflict between the roles of personnel performing multi-functions, the roles of individuals are clearly identified in their individual roles and responsibilities.

ARRANGEMENTS

In all foreseeable circumstances the prior arrangements provided for emergency response, and the management of these arrangements, will ensure, as far as is reasonably practicable, the safety of all persons on the TPC ISBL Plant, or involved in activities connected with the TPC Plant. These arrangements include:

- Planning for emergencies.
- The prevention, detection, control and mitigation of incidents.
- Manual intervention.
- Informing all personnel of what their response to emergencies should be.
- Informing all personnel of hazardous conditions; their response, and accounting for all personnel following an incident.
- Partial or Full TPC ISBL Plant Evacuation.

- Fire Fighting and Rescue.
- Co-ordination of the response and the co-operation of all those involved.
- External support and response.

As part of the planning and consultation process, arrangements will be in place with TPC Head Office Cairo Incident Management and Business Support Teams so that they will respond promptly if additional logistical, medical, and environmental; media or business continuity assistance is required.

PREPARATION AND PLANNING

TPC Head Office Cairo Management have an obligation under various regulations to identify, so far as is reasonably practicable, all hazards and their risks which could affect activities and personnel on or connected with the TPC Plant and put in place measures which will reduce these risks to levels considered to be 'As Low As Reasonably Practicable' (ALARP). However, this process recognises that there will be residual risks and that emergencies may still arise which could endanger personnel.

By recognising and assessing these residual risks and what the potential results of incidents could be, adequate prior arrangements - preparation and planning - can be put in place so that if there is an incident, there will be an immediate and appropriate response.

The safety of personnel including those directly responding to the incident will always take priority over environmental, property and business considerations and the actions described in the Incident Management Guidelines, incorporated in this manual, will continue to reflect this.

SUFFICIENT COMPETENT PERSONNEL

Personnel on the TPC ISBL Plant will be competent to respond, as appropriate, to emergencies. This can vary from responding to alarms and simple instructions and going to a muster location to assessing complex situations, taking correct decisions and allocating tasks.

SELECTION AND ASSESSMENT

Selections for positions where personnel will fulfil a critical role when responding to emergencies ensures that such duties are considered and that the personnel selected are suitable. This selection process may include a formal assessment of competency.

INSTRUCTION AND TRAINING

All personnel nominated for emergency duties will be provided with specific training, coaching and assessment commensurate with their duties and responsibilities.

All personnel will receive appropriate instruction and training on how they will respond to emergencies and on any emergency equipment they may have to use. The TPC Plant Installation Safety Induction, Operating procedures and training on

TPC Plant in the operation of safety critical Equipments are elements in this training process.

DETECTION OF INCIDENTS

Incidents and potential incidents are detected primarily by:

- Fire and Gas Detection System

- Automatic detection of process deviations or leaks
- Personnel at the TPC ISBL Plant

LEVELS OF RESPONSE

The TPC ISBL Plant Emergency Response Manual requires that a uniform response to an emergency be adopted whereby no matter the nature of an incident all incidents will start in the same way. To that end three levels of response have been developed.

LEVEL 1

- Effects of the incident are limited to the immediate confines of the property.
- Have no impact on the neighboring community.
- Only on site, on shift resources are used to manage the incident.

LEVEL 2

- Effects of the incident are impacting on the surrounding community at a level not likely to cause injury or illness.
- There have been injuries to personnel.
- Off duty emergency response, operations, support or logistics personnel have been called in.

LEVEL 3

- Effects of the incident are impacting on the surrounding community at sufficient levels that injury or illness could occur.
- Mutual aid and/or government agencies have or are being called.

MONITORING AND REVIEW

There is a TPC Head Office (Cairo) Strategic Performance Unit obligation to test the

Emergency Response Manual by organizing verification exercises and reporting on the results these achieve.

In addition, if circumstances on the TPC Plant which affect the response to Emergencies change, then the Emergency Response Manual will be reviewed and amended as appropriate.

As part of competence assessments, feedback from those being assessed on the applicability of the Emergency Response Manual should be considered and acted upon if appropriate. Operation of the Emergency Response Manual will be included in the TPC Plant Management of Safety audit program.

ENVIRONMENTAL RESPONSE

The incident management guidelines will primarily concern with emergency response; however, many of the actions associated with gas incidents, such as isolation and depressurization, also militate against environmental damage. Where appropriate, reference is made in the IMGs to the potential environmental impact of a particular incident type or location.

Gas leaks which impact on areas off site will be monitored by trained Environmental Control Officers under the direct supervision of the TPC Plant HSE manager.

Remedial response regarding the clean-up and removal of environmentally damaging Materials will be provided by a specialist contractor.

Further information is provided by the TPC Plant Spill Response Plan a copy of which will be held in the Fire Station Watch Office.

SECURITY INCIDENTS

All security incidents, e.g. an unauthorized entry on to the TPC Plant or a bomb threat will be covered by TPC Plant Security Emergency Response Manual. At the moment a bomb threat is addressed by the TPC Head Office Cairo Strategic Performance Unit Bomb Threat Procedure. A copy of the procedure will be located in the TPC ISBL Plant Control Room.

EXTERNAL SUPPORT

The Administrative Incident Management Team (IMT) located at TPC Head Office Cairo provides support, in the event of an emergency occurring at the TPC ISBL Plant requiring assistance from outside sources.

Response procedures are provided in the TPC Head Office Cairo Performance Unit Operations Incident Management System, which details the involvement and actions Performed by the IMT and Business Support Team in such aspects as the involvement of external emergency services i.e. Police, Medical Services etc. In addition other procedures are provided for the handling of such issues as public and media enquiries.

TEMPORARY CONDITIONS

At times circumstances may occur where temporary conditions exist that provide an additional hazard that is present for a relatively short period of time. Under such circumstances initiating a full review and amendment of the Emergency Response Manual would be impractical, therefore additional temporary procedures will be developed in order to describe and facilitate the emergency response for the additional hazard.



TAHRIR
PETROCHEMICALS

Site Security Framework

For

**Tahrir Petrochemicals
Complex**

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Background and Introduction

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Complex Configuration

The Complex consists of the following:

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- The Polyethylene Plant is comprised of the Polyethylene Process areas and the Product Handling and Storage area. The Polyethylene Process areas include Ethylene Treating and Pelletizing. The Product Handling and Storage area includes a conveying and bagging system.
- The Utilities and Offsites (U&O) provide utilities and power to the entire Complex. These facilities include, but are not limited to: Power Generation, Sea Water Intake, Sea Water Supply, Desalination, Waste Water Treatment and Disposal, Water Cooling & Circulation, Storage Tanks & Spheres, Infrastructure & Buildings, Pipelines between the port facility and the complex and the integration scope including the port topside facility.

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Scope

Attention to security is a natural corollary to the Petrochemicals industry’s safety culture. By reducing the risk of a wide range of threats and mitigating the effects of such incidents as vandalism, sabotage, workplace violence, and even terrorism, security measures can serve the goals of process safety management, risk management.

This Framework addresses security at fixed facilities and is intended to be a resource to help managers at individual facilities makes decisions on appropriate security measures based on risk.

In general, a security management effort, could, according to the company’s needs, consist of the following elements:

- Risk assessment and prevention Strategies
- Security policies
- Collaboration with other corporate departments and with local, state, and national law enforcement agencies, local emergency planning committees, etc.
- Incident reporting systems
- Employee training and security awareness
- Incident investigations
- Emergency response and crisis management
- Periodic reassessment of the security plan for physical security, including access control, perimeter protection, intrusion detection, security officers, ongoing testing and maintenance, and backup systems
- Information, computer, and network security

Purpose

- Safeguards employees, the community, and the environment Maintains the integrity and effectiveness of operations Reduces litigation risk, insurance costs, and theft
- Reduces the risk of vandalism and sabotage by employees and non- employees
- Protects trade secrets
- Improves relationships with local authorities and surrounding communities

Risk Assessment and Prevention Strategies

The first step in constructing a solid security program is to conduct a risk assessment in other words, to take stock of the assets that need to be protected the threats that may be posed against those assets, and the likelihood and consequences of attacks against those assets.

A. Assets

In security terms, assets are broadly defined as people, information, and property. At Tahrir Complex, the people include employees, visitors, contractors, haulers, nearby community members, and others. Information includes trade secrets (such as recipes, formulas, prices, and processes), other confidential business information, employee information, computer passwords, and other proprietary information. The range of property that a security effort might wish to protect includes the following:

- Buildings
- Vehicles
- Production equipment
- Storage tanks and process vessels
- Control systems Telephone and data lines Raw materials
- Finished product Electrical power lines Backup power systems
- Automated production equipment, such as digital control systems and programmable logic controllers
- Hazardous materials
- Boilers
- Water supply
- Sewer lines
- Waste treatment facilities and equipment
- pipelines
- Rail lines (If Any)
- Office equipment
- Supplies
- Tools
- Personal possessions

B. Threats, Vulnerabilities, and Consequences

Once assets have been evaluated, a security manager may want to consider which assets may be vulnerable. This procedure helps identify and prioritize likely targets and save companies from expending resources where the likelihood of attack is remote.

Step 1: Chemical Hazards Evaluation

Chemical hazards evaluations are routinely performed in the petrochemical industry, chemical hazards evaluations are designed to answer this two-part question: How likely is a chemical release, and how harmful would it be?

Step 2: Process Hazard Analysis (PHA)

PHAs may be a good place to begin a vulnerability assessment for Petrochemicals and processes of security concern.

Step 3: Consequence Assessment

Economics and common sense dictate that potential threats and consequences (as well as the actions to counter them) be prioritized.

Step 4: Physical Factors Assessment

After assessing the hazards and the likelihood that something could cause harm, it may be useful to address the physical factors that could affect the attractiveness of a potential target.

Step 5: Mitigation Assessment

The information in risk management and emergency response plans can help managers assess factors that could mitigate the effects of a chemical release.

Step 6: Security Assessment/Gap Analysis

After identifying potential vulnerabilities, threats, and countermeasures, the manager could then turn to a security assessment. This assessment helps identify whether the security policies and measures in place are appropriate for meeting the potential threat.

The following list identifies some of the potential threats that a Petrochemical facility may wish to address:

- Loss of containment
- Sabotage Cyber-attack
- Workplace violence Theft
- Fraud
- Product contamination Infiltration by adversaries Attack on a complex as a part of chemical and biological terrorism
- Assault
- Trespassers committing vandalism or setting fires for fun
- Thieves looking for precursor chemicals to use in illegal drug manufacture; break-in can also result in valves being left open, causing a chemical release
- Protesters disrupting plant operations through trespassing, vigils, assemblies, rallies, intimidation of employees, chaining selves to plant, or blocking traffic
- Bomb threats
- Workplace drug crime
- Theft of confidential information
- Hacking into information systems to disrupt computer-controlled equipment, causing an unplanned release
- Product tampering
- “Hands-off” threats, such as cutting off electricity, telephone, or computer network, or else contaminating or cutting off water
- Vandalism of control rooms and equipment, and destruction of system documentation to make repair more difficult
- Disruption of cooling systems for electronic equipment rooms
- Creation of destructive or hazardous conditions through modification of fail-safe mechanisms or tampering with valves (done in person or electronically from a distance)

C. Prevention Strategies

Security tends to emphasize “protection,” meaning that, if possible, the most important or most vulnerable assets should be placed in the center of concentric levels of increasingly stringent security measures.

Another prevention strategy involves cooperation with law enforcement agencies, security staff in other companies, and fellow members of trade associations in order to share threat information.

That will be executed through the following:

- Lighting fences gates, bollards walls, trenches intrusion detection, sensors, guards on patrol and posted at property line, and access points.
- Locked doors, receptionist badge checks access control system , window bars parcel inspection and turnstiles
- Alert personnel door and cabinet locks, network firewalls and password controls visitor escort policies, document shredding, access control devices, emergency communications systems, secure computer room motion-activated closed-circuit television

Management Issues

At a particular Petrochemical facility, security management responsibility generally should be assigned to one person. That person may or may not be called “security manager,” but some person should be in charge of the security effort, even if he or she has other responsibilities.

A. Policy

Security policies can be established on the site level, and they can address a wide range of topics which will be detailed later in the main study, such as the following:

- Access control
- Drug and alcohol use
- Workplace violence, threats, intimidation, and other mis conduct
- Weapons-carrying by employees
- Pre-employment screening
- Information protection
- Locker searches
- Reporting of incidents and threats
- Response to bomb threats and suspicious packages
- Response to civil disturbances (including protest demonstrations)
- Ethics (requirement to report violations, etc.)

B. Collaboration

Managers will consider establishing partnerships or enhancing relationships with local, state, and law enforcement and other public safety agencies. On the other side and to be effective in a security leadership role, a manager must be proactive and be able to plan for and manage risk. Knowledge of whether and when the risks may change is critical. Other company departments can be a source of such information

C. Incident Reporting and Analysis

By keeping detailed records of security incidents, managers may be able to spot trends and piece together facts that lead to successful investigations.

D. Employee and Contractor Training and Security Awareness

It is axiomatic in security that employees and contractors can serve as the eyes and ears of a company-wide security effort. Employees and contractors see much that occurs in and around a Complex facility and are in a good position to notice when something or someone does not seem quite right. Training and awareness measures can transform employees and contractors into a natural surveillance system.

E. Investigations

Suspicious incidents and security breaches (of company policies) should be investigated by trained professionals.

F. Emergency Response and Crisis Management

Emergency response and crisis management are natural functions that security- responsible managers may perform for their companies.

G. Periodic Reassessment

Managers should review their security measures periodically, as well as when- ever facilities or other conditions change significantly.

Physical Security

The term “physical security” refers to equipment, building and grounds design, and security practices designed to prevent physical attacks against a facility’s people, property, or information. It is distinguished from cyber or network security. Elements of a physical security effort may include access control, perimeter protection, intrusion detection, security officers, and other measures.

A. Access Control

The term “access control” generally refers to physical or behavioral measures for managing the passage of personnel and vehicles into, out of, and within a facility. An access control plan strives to exert enough control to protect the facility while still allowing employees enough freedom of movement to work effectively.

The following are just a few of the measures that managers may wish to consider for the purpose of controlling access into, within, and out of a Complex facility:

- Post “No Trespassing” and “Authorized Access Only” signs, along with signs stating that vehicles and visitors are subject to search.
- To the extent feasible, employ natural surveillance by arranging reception, production, and office space so unescorted visitors can be noticed easily.
- Install appropriate locks on exterior and interior doors.
- Keep publicly accessible restroom doors locked and set up a key control system.
- If there is a combination lock, only office personnel should open the lock for visitors. Keep closets locked.
- Require visitor sign-in logs and escorts.
- Pay close attention to access control at loading and unloading areas.
- Install appropriate, penetration-resistant doors and security hinges.
- Install secure windows with appropriate locks, perhaps using unbreakable plastics instead of glass and employing window bars.
- Install a system of employee and contractor photo ID badges. Train employees to challenge persons who are not wearing badges.
- Establish a system for determining which cars, trucks, rail cars (If Any), marine vessels, and other vehicles may enter the site, through which gates, docks, or other entrances, and under what conditions. Such a system may be part of the pedestrian access control system, relying on key cards carried by vehicle operators, or it may be an independent system relying on staffed security posts.
- Install an electronic access control system that requires the use of key cards at main entrances and on other appropriate doors and that provides an audit trail of ingress and egress. Consider electronic access control for entry to motor control centers, rack rooms, server rooms, telecommunication rooms, and control rooms.
- Install a closed-circuit television system to monitor key areas of the facility. Where appropriate, employ motion sensors that mark the video recording and alert security staff when someone enters a restricted area.

- Institute a system of parcel inspection (using magnetometers, X-ray screening, or explosives detectors). Require the use of property passes for removal of property from the site.

B. Perimeter Protection

Controlling the movement of people within a facility is important, but it is far better to stop intruders whether they are terrorists, saboteurs, vandals, thieves, protesters, or disgruntled former employees at the edge of a facility's property, long before they reach vital assets and operational areas.

Perimeter protection includes such measures as these, which managers can consider and implement as appropriate:

- Fences and exterior walls that make it difficult for intruders to enter the site
- Bollards and trenches that prevent vehicles from driving into the site at points other than official entrances
- Vehicle gates with retractable barriers
- Personnel gates and turnstiles
- Setbacks and clear zones that eliminate hiding places near the site's perimeter, making it difficult for intruders to approach the site unnoticed
- Lighting that makes it easier for employees and even passersby to observe and possibly identify intruders

C. Security Officers

Security officers can provide a range of useful security services, such as touring a site to look for intruders or irregularities, staffing site entrances to check IDs, maintaining entry and exit logs, handing out trucker safety lists, reminding employees and contractors of security and safety policies, and assisting in emergencies.

D. Backup Systems

Key resources as control centers, rack rooms, computer servers, and telecommunications equipment may warrant a backup power source, such as a generator.

E. Other Considerations

For example, closed-circuit television cameras and access control card readers may need to be specially selected so they are safe and effective in corrosive or flammable areas.

In addition, any site redesigns should be done with security in mind. For example, plants should generally be laid out so that the most vulnerable or important locations are hardest for adversaries to reach.

Information, Computer, and Network Security

In a Complex facility, protecting information and computer networks means more than safeguarding a company's proprietary information and keeping the business running, as important as those goals are. It also means protecting Complex processes from hazardous disruptions and preventing unwanted releases.

A. Operations Security

It is vital to protect information that could be useful to criminals, demonstrators, and terrorists who wish to plan attacks on a site or obtain hazardous materials for weapon-building. Examples of such information include these:

- Process flow diagrams
- Piping and instrument design diagrams
- Formulations
- Recipes
- Client and supplier lists
- Site maps
- Other information that describes the workings of a Petrochemical facility

B. Spoken-Information Security

Depending on the threat level, managers may wish to consider the following measures:

- Prohibit radio conversations about sensitive topics.
- Conduct the most sensitive conversations in person.
- Prohibit employees from giving out potentially risky information over the phone, as one may not be sure to whom one is speaking.

C. Document Security

Depending on the threat level, managers can consider taking some of the following steps:

- Shred documents.
- Lock file cabinets and trash bins.
- Mark sensitive documents as "confidential."
- Provide employee training and reminders about document security practices.

D. Computer and Network Security

Managers can choose from a wide range of measures for enhancing computer and network security. Options include the following:

- Physically secure computer rooms, motor control centers, rack rooms, server rooms, telecommunications rooms, and control rooms, ideally with electronic or biometric access control systems that record ingress and egress.

- Employ firewalls, virus protection, encryption, user identification, and message and user authentication to protect both the main computer network and any subsidiary networks, such as access control systems, that are connected to it or to the outside.
- Teach employees to beware of ruses to obtain their computer passwords.
- Require systems administrator to disable all Internet connection software that may be prepackaged in operating systems.
- Allow the principles of “least access,” “need to know,” and “separation of functions” guide the determination of user authorizations, rather than position or precedent.
- If possible, place the computer room above the first floor of the building to reduce the likelihood of theft. The computer room should not be adjacent to an exterior building wall.
- Do not post signs indicating the location of the computing facility.
- Equip the computer room with adequate communications capabilities to facilitate prompt reporting of emergencies.
- Allow only authorized personnel to have physical access to central computer rooms. Supervise any visitors.
- Do not give keys or lock combinations to visitors.
- Require employees to notify management in advance if they wish to gain entry to the computing facility during hours when they are not scheduled to be working.

E. Audits and Investigations

To detect computer intrusions, managers can make sure that computer systems maintain an audit trail of access to system resources.

References

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- 2- Carbon Holdings Previous Projects