

THESIS WRITING:  
IDENTIFY HAZARDS AND BARRIERS IN A PETROLEUM COMPANY FOR  
IMPLEMENTATION OF THE OHSAS 18001 OCCUPATIONAL HEALTH AND SAFETY  
MANAGEMENT SYSTEM

by

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I dedicate this research to my mother, father, brother, grandmother and my future husband, Hasan. I love all of you very much.

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## **ABSTRACT**

Turkish Petroleum Corporation (TPAO) has exploration, drilling, production and well completion, natural gas storage, oil and natural gas pipeline project activities in the oil sector. There are critical hazards in the petroleum industry. Identifying the hazards and implementing the Occupational Health and Safety Management System (OHSMS) to minimize the risks and prevent the accidents/injuries are effective methods to control hazards. This research was focused on the hazard identification, risk assessment and employee awareness and competence following the voluntary standard, OHSAS 18001 Occupational Health and Safety Management Standard. These risk assessments were related especially to working at height and emergency preparedness on the processes. The purpose of this study was to identify the improvements and/or changes and measure the employee's perception of their current safety and health system with surveys to identify the barriers which would prevent the changes in the safety management system. Through interpretation of the hazards and surveys, the researcher gives recommendations to the TPAO to implement the OHSAS 18001 OHSMS effectively.

*Keywords:* OHSAS 18001, risk assessment, safety barriers, working at heights, emergency preparedness

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## **CHAPTER ONE**

### **Topic Importance**

The petroleum industry has high risks that affect employee's health and safety dramatically. Occupational Health Safety Management System (OHSMS) is one of the effective ways to prevent these risks and create a safety culture in the company. In this study, hazard assessment in specific areas and employee views were used to determine the effectiveness of current safety programs and barriers that prevent the implementation of OHSAS 18001 OHSMS ("Ohsas 18001:2007 occupational," 2007). OHSAS 18001 OHSMS is the internationally recognized assessment specification for occupational health and safety management systems ("Health & safety ohsas 18001"). Defining the barriers gave a clearer picture of lack of the safety management systems for management. Moreover, defining the current risks, which were not identified working at height and emergency situations helped take precautions, and implement more effective OHSMS in the TPAO.



## **Research Questions**

The questions this research seeks to answer are:

1. Are there hazards that are not identified in current risk assessments of working at height and emergency preparedness at TPAO?
2. What are the barriers that prevent the implementation of OHSAS 18001 OHSMS?
3. Are the employees satisfied with the TPAO's current safety culture based on surveys?

## **Background**

### **Occupational Health and Safety Management Systems**

Occupational Health and Safety Management Systems (OHSMS) have been defined by Gallagher (2000) as "...a combination of the planning and review, the management organizational arrangements, the consultative arrangements, and the specific program elements that work together in an integrated way to improve health and safety performance" (p. 1). OHSMS implementation has four primary components. These are safety policy (policy statement, organizational structure, procedures), safety risk management (hazard identification, risk assessment, risk mitigation and tracking), safety assurance (internal audits, external audits, corrective action), and safety promotion (culture, training, communication) (Ludwig, 2007).

Over the past decade OHSMS has been used by many industries as a proactive process to avoid injuries and loss of life, and reduce several costs. Safety regulations have been reactive and prescriptive because they generally occur after a significant safety failure (Ludwig, 2007). However, today most industries such as aviation, petroleum, nuclear, railroad, marine, and chemical have complex production processes. Prescriptive regulations are not effective for improvements so these industries have replaced the prescriptive approach with OHSMS processes (Ludwig, 2007; Alli, 2008). Management leadership and employee participation have been found to be the most important components to be successful on OHSMS (Manuele, 2008).

The British Standard Institute (BSI) is the business standard company which assists organizations in improving performance, reducing risks and achieving sustainable

growth all over the world (The British Standards Institution (BSI)). International Organization for Standardization (ISO) is the world's largest developer of voluntary International Standards. These standards ensure that products and services are safe, reliable and of good quality and make industry more efficient and effective (International Organization for Standardization (ISO)). OHSAS 18001 Standard was first published in 1999 by BSI as compatible with ISO 9001 and ISO 14001 Management system standards in order to facilitate an integration of the three systems. OHSAS 18001 defines the minimum requirements for the best practice of occupational health and safety management.

International Labour Office (ILO) is the international organization responsible for drawing up and overseeing international labor standards. The ILO Guidelines on OSHMS (ILO-OSH 2001) were created by ILO for the same purposes as the other organizations (International Labour Office (ILO), 2001). The Occupational Safety and Health Act of 1970 (OSH Act) created OSHA, which issues safety and health standards and program management guidelines and provides information, training, and assistance to employers and employees to prevent work-related injuries and illnesses in the United States ("Safety and health," 1989; "At a glance,").

In 1982, OSHA announced the Voluntary Protection Program (VPP) and approved it ("All about voluntary,"). OSH Act of 1970 is the legal basis of VPP. The VPP encourages private and federal agencies to keep work-related accident and illness rates below National Bureau of Labor Statistics averages and allows workplaces to implement safety and health management systems. OSHA also issued voluntary Safety

and Health Program Management Guidelines on January 26, 1989 in 54:3904-3916 Federal Register to encourage employers to do more to protect their employees ("OSHA factsheet: Voluntary," 2005; "Safety and health," 1989).

American National Standards Institute (ANSI) is an administrator and a coordinator of the United States private sector voluntary standardization system, which is a nonprofit organization founded in 1918. The ANSI/AIHA Z10-2012 Standard contains management principles and systems to improve the health and safety performance that is published by ANSI ("ANSI/AIHA Z10,") and is compatible with other standards such as ISO 9001, 14001 like the OHSAS 18001 Standard.

In the United States, the National Institute for Occupational Safety and Health (NIOSH) is the federal agency responsible for conducting scientific research, developing guidance, making recommendations, and responding to requests for workplace health hazard evaluations to prevent work-related injuries and illnesses ("About national institute," 2013). NIOSH developed the Health Hazard Evaluation (HHE) program and the HHE is implemented to determine if workers are exposed to hazardous materials or harmful conditions. This program evaluates the workplace environment and the health of employees, but it does not include the entire management system ("Health hazard," 2012). In Australia and New Zealand, there are many standards and guidelines related to occupational health and safety such as AS/NZS 4804 and 4801 Occupational Health and Safety Management Systems, Victory SafetyMAP, Australian Federal Government Safety-Wise, Western Australia WorkSafe Plan, South Australia Safety Achiever

Business Scheme, and Queensland Tri-Safe (Makin & Winder, 2009; "AS/NZS 4804:2001,") .

The common aim of the organizations: OSHA, ANSI, VPP, NIOSH, BSI, ISO and etc. assists private and federal agencies to prevent work-related accident and illnesses in the workplace and implement effective safety and health management systems. ISO 9001 and ISO 14001 management system standards are not directly related to OHS, however, ISO 9001 helps organizations to implement quality management system and ISO 14001 helps implement environmental management system. These standards are models for continual improvement, satisfying internal and external customers and other stakeholders. Therefore, the goal of ISO 9001 and ISO 14001 is to improve the product quality and work environment. These can be implemented by the companies easily with other safety based standards.

The best OHSMS involves every level of the organization, creates a safety culture that decreases accidents and injuries and improves the bottom line for managers ("Safety & Health Management,"). When safety and health culture is in the organization, everyone wins. Other benefits are the reduction of the direct and indirect costs of accidents, avoiding incident investigation costs and increasing employee morale and productivity, establishing a marketable safety record, compliance with legal responsibilities for safety, more efficient maintenance scheduling, and continuous improvement of operational processes (Ludwig, 2007). OHSMS are used in many industries. Management systems have been implemented to prevent accident costs and loss of life. Piper Alpha Oil Rig was a North Sea oil production platform operated by Occidental Petroleum

(Caledonia) Ltd. On 6 July 1988, there was an explosion, and oil and gas fires started in an offshore platform. Approximately 225 men were working on the rig; unfortunately, 167 people died in the incident, which was the worst offshore oil disaster in the world. It also caused loss of oil production, and about \$2.8 billion insurance cost. At the time of the disaster, the platform accounted for approximately 10% of the UK's North Sea oil and gas production. The public investigation found the company's management directly responsible for lack of preventive actions. The report suggested changing the prescriptive safety system with a safety risk management/assessment approach that is the main structure of the safety management system (Ludwig, 2007). The OHSAS is an example of this kind of management system.

### **OHSAS 18001 Occupational Health and Safety Management System**

OHSAS 18001 (Occupational Health and Safety Assessment Series) is an internationally recognized assessment specification for occupational health and safety management systems. The OHSAS 18001 was developed by the OHSAS Project Group, a consortium of 43 organizations from 28 countries, which consisted of national standards bodies, accreditation bodies, certification bodies and OSH institutions with the UK's national standards body, BSI Group, providing the secretariat.

OHSAS 18001 is designed to help organizations formulate occupational health and safety policies and objectives. It was first released in 1999 by the OHSAS Project Group and revised in 2007. It is applicable to all kind of organizations, large or small, and any business sector. OHSAS 18001 is largely aligned with the structure of ISO 14001 and is based on the two concepts of continual improvement and regulatory

compliance. The OHSAS 18001 Specification follows the Plan-Do-Check-Review cycle; this model fits in other management system documents such as ISO 9001 and 14001 and allows implementation of Integrated Management Systems ("Health & safety ohsas 18001," 2007; Gallagher, Underhill & Rimmer, 2001).

By setting up systems that are assessed by a third party certification body, organizations prove to their staff, suppliers and customers that they take health and safety seriously. OHSAS 18001 accreditation provides a framework to help organizations meet their legal obligations to Health and Safety in the workplace. The OHSAS approach utilizes a risk management system to enable organizations to identify their hazards and determine risks that are not acceptable and need to be controlled.

The OHSAS 18000 series has two publications: OHSAS 18001 Occupational Health and Safety Management Systems - Requirements and OHSAS 18002 Occupational Health and Safety Management Systems - Guidelines for the Implementation of OHSAS 18001:2007. The OHSAS 18001 specifies requirements, which are shown in Table 1 for an OHSMS to enable an organization to develop and implement a policy and objectives and improve their OSH performance ("Ohsas 18001:2007 occupational," 2007). The OHSAS 18002, as a non-certifiable guideline, quotes the specific requirements from OHSAS 18001 and follows with generic assistance to an organization for establishing, implementing or improving OHSMS. Corporations can continuously improve health and safety issues, enact prevention as a priority in their organization, support entrepreneurial responsibility, involve staff in decision-making, motivate managers and employees, reduce costs, synergize with other management

systems, and demonstrate organization transparency following the objectives of the OHSMS.

### **Safety Barriers**

In organizations, there are different kinds of factors or barriers that prevent the achievement of a positive safety culture or climate (Clisscold & Sohal, 2006). The potential barriers and ways to overcome those barriers should be identified to implement an effective OHSMS. The barriers can be related to management, workers, authority and accountability, training, workplace environment, organizational communication and diversity in the workplace (Safety Culture Workgroup). The possible barriers and/or objectives causing barriers are: ("Workplace health and," 2010; Safety Culture Workgroup; Gallagher, Underhill & Rimmer, 2001).

- Lack of management attendance to safety programs
- Ignorance of the continuous process improvement
- Lack of employee involvement to OHSMS
- Insufficient government regulations and guidelines
- Lack of the Government audits and/or inspections
- Ignorance of the psychosocial issues in the workplace
- Audit culture which focus on paper rather than behavior
- Inappropriate audit tools unrelated to standards and management objectives
- Inadequate resources (for example, inadequate training of workers and job tools and/or facilities, inefficient old procedures, etc.)



- Small business structures with limited resources and unfamiliarity with OHSMS concept
- Perfunctory application by the management or customer force, ignoring health and safety
- Excessive working hours
- Multi-employers in the workplace
- Misunderstanding between local and foreign employees during an emergency, creating additional anxieties
- Poor literacy and language skills
- Avoidance of safety investment without considering work-related accident costs
- Inadequate workplace illness and injury records which do not include detailed information

### **Working at Heights**

The biggest cause of deaths and major injuries in workplaces is falls from height, constituting approximately 16% of all reported work-related accidents ("Health & safety ohsas 18001," 2007). Working at height is defined as a condition where work is conducted above ground level, where a fall could result in injury or death. It is common not only in the construction industry ("Fall protection,"), but also in oil and gas industries where employees generally work at height. Employees work long hours outdoors or underground, lifting heavy objects, wearing a lot of Personal Protection Equipment (PPE) as well as working at height. These conditions increase the risk of accidents (Krishnamurthy, 2010). While performing a risk assessment to define hazards in a

workplace, the distance from floor, working duration, weather conditions, physical limitations, access and entry ways, whether the workplace requires working at height or not, emergency actions plans, and the workers' abilities and training should be considered ("Guide to working," 2006).

Personal protection equipment (PPE) can be used to reduce accidents from falling from heights. Guards rails, catch netting, barriers (Krishnamurthy, 2010), rail systems and retractable lifeline systems ("Fall protection information,") are collective controls; shock absorbers and various types of lanyards (Fall protection information,"; Salentine, 2011) are examples of PPE. In addition to these controls, equipment cradles, mobile towers and ladders are used to make the operations easy and safe ("Guide to working," 2006).

### **Emergency Preparedness**

According to Lewis and Payant (2003), an emergency is “an unforeseen combination of circumstances or the resulting state that calls for immediate action” (p. 2). Floods earthquakes, tornados/high winds, landslides, fires, explosions, bomb threats, hazardous material spills, toxic gas releases ("How to plan," 2001) and radiological accidents are emergencies in workplaces.

Management support and involvement of all workers are basic parts of effective emergency preparedness. Primarily, the potential emergency situations must be defined in the facility and then the emergency action plans are prepared. OSHA standard 29 CFR 1910.38(a) requires these plans to identify the employer and employee actions during emergencies ("Evacuation plans and,"). Emergency action plans include reporting

emergencies, evacuation, rescue and medical duties procedures ("Principal emergency response," 2004), escape procedures and route assignment such as meeting points, exit routes, floor plans and workplace maps ("How to plan," 2001). They also include names and phone numbers of people who are within and outside the company ("How to plan," 2001) to contact to receive help or give information about emergency situations. Team member's duties play a vital role in protecting people and reducing damage to the facilities (Kay, 2006) in case of emergency situations ("Emergency preparedness and,").

Emergency response teams are trained for each possible emergency situation ("OSHA factsheet: Planning," 2004). The trainings may be related to team members' roles and responsibilities ("How to plan," 2001), emergency response and shutdown procedures, use of different kinds of fire extinguishers and other emergency equipment, chemical spill controls, search and emergency rescue, hazardous materials emergency response, first-aiding, blood borne pathogens ("OSHA factsheet: Planning," 2004).

After completion of the emergency action plan and training of the employees', drills of the emergency plan keeps everybody prepared. When necessary, the company can get support from outside resources such as fire or police departments. Doing these kinds of drills gives companies a chance to evaluate their action plans' effectiveness and improve them.

As a conclusion, establishing emergency action plans, training workers, providing necessary PPE and engaging in organized response operations are the key elements of successful emergency preparedness ("Getting started ,"; Lewis & Payant, 2003).

## **TPAO Processes**

TPAO, Turkey's sole national oil company was founded in 1954. It has undertaken a number of oil and natural gas exploration projects both onshore and offshore and. TPAO has exploration, drilling, production (domestic crude oil, domestic natural gas and international production), crude oil and natural gas marketing and natural gas storing activities.

The General Directorate of TPAO is in Ankara, the capital city of Turkey. There are also three districts that are located in Thrace, Batman and Adıyaman, and most of exploration activities are embodied in those three districts. In addition to core departments such as Human Resources, Health, Safety and Environment and Finance; Departments of Exploration, Drilling, Construction, Production, Supply, and Well Completion Service are engaged in main processes in each of the districts.

The goal of the Department of Exploration is to identify the possible crude oil and gas reservoirs. First, this department searches oil reserves in sedimentary rocks that are source of hydrocarbons, because the petroleum, oil or gas reservoirs are subsurface pool of hydrocarbons that are contained in porous or fractured rock formations. Then a field geological assessment and aerial photography can be used to identify the drilling area. After identifying a possible geological structure, the Department of Drilling confirms the presence of hydrocarbons. The Department of Well Construction Services aims to extract the hydrocarbons effectively. To extract the crude oil or natural gas, this service applies different methods for each one. If crude oil is in the well, the service constructs valves on the surface. However, if the well contains natural gas, different types of pump systems

are placed into the well or surface depending on the quality of oil. The Department of Well Construction Services also constructs pipelines to transfer the hydrocarbons from a well to a production site. Then quantities of crude oil or natural gas reservoirs and their manufacturability levels are determined. According to the producible crude oil or natural gas amount, a sufficient number of wells are opened by the Department of Production. If the crude oil reservoir' pressure is sufficient, it comes out by itself from the well. However, if there is not enough pressure, crude oil is extracted by the pumps. On the other hand, the natural gas comes with its own pressure. The Department of Construction assembles and disassembles the drilling towers and the platform that includes a waste treatment plant, a mud pit in which waste sludge and mud are collected, container prefabricated houses, welding areas, generators, and chemical storage areas; construction of pumps and pipelines. The role of the Department of Supply is to supply and deliver all the necessary materials to all departments.

## **CHAPTER TWO**

### **Methodology**

These studies were conducted at Ceylan 01 Location that had a natural gas land rig platform in the TPAO's Thrace District Management. There were three main purposes of this study. The first purpose was to identify the hazards that were not specified on previous risk assessments by the TPAO, which were related to working at height and emergency preparedness for the processes. The second purpose was to identify barriers which affect the effectiveness of Occupational Health and Safety Management System and prevent changes in the TPAO. The third one was to identify whether the employees were satisfied with the TPAO's current safety culture based on surveys or not. The literature reviews helped to determine possible safety barriers and the hazards that were not previously assessed. In this research, information was gathered through the analysis of previous risk assessments and work-related accidents, walkthroughs with checklists, and surveys that were filled out by employees who worked in Thrace District Management.

### **Sample Selection**

This research included the specific high risk working areas and situations including working at height and emergency preparedness. The Thrace District Management was chosen to be the place where this study would be conducted by considering the results of each TPAO's districts incident rate. The highest incident rate was in the Thrace District Management, which can be seen in Figure 2. The Department of Health, Safety and Environment (HSE) that is a part of the TPAO supplied accident

records, number of employees, and training types of each district. Total number of employees in each district; Thrace, Batman and Adiyaman was determined at the end of 2012, which can be seen in Figure 1. First, the district with the highest incident rates was determined. Incident rates were calculated using the OSHA Incident Rate formula (Evinger) and all incident rates are shown in Figure 2.

**OSHA Incident Rate** = [(Total number of deaths + Total number of cases with days away from work + total number of job transfer or restriction + Total number of other recordable cases) / Total hours worked] \* 200000

**Total Hours Worked:** To determine the company's OSHA Incident Rate, the general estimated annual working hours is 2000 hours, which a worker works 40 hours for 50 weeks in a year (Zaidman, 2010; Hanson)

As shown in Figure 2, the highest incident rate belonged to Thrace District Management. The second step was to determine the accident numbers of each department of the Drilling, Construction, Supply, and Well Completion Services in Thrace District Management. Most accidents occurred in the Department of Drilling as seen in Figure 3. As a result of the incidents in departments, the drilling operation was chosen to be subject to further research. In the summer of 2013, Thrace District Management had a natural gas land rig platform at Ceylan 01 Location. The researcher walked around the location with checklists to define the hazards.

For the same reason, the employees of Thrace District Management volunteered to complete the survey to identify the safety barriers which prevent the implementation of OHSAS 18001 Occupational Health Safety Management System.

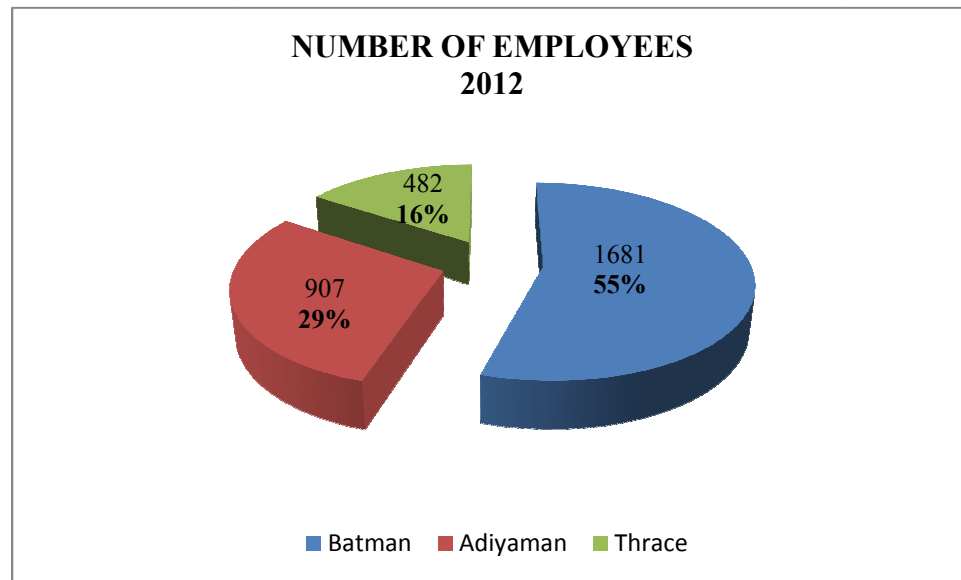


Figure 1: 2012 Number of Employees by District



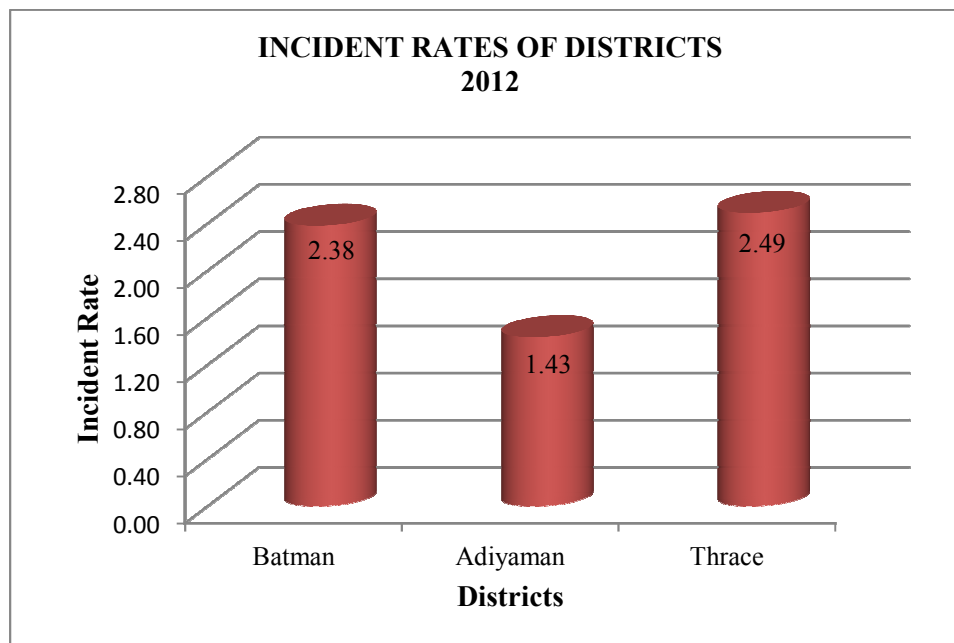


Figure 2: Incident Rates of Districts

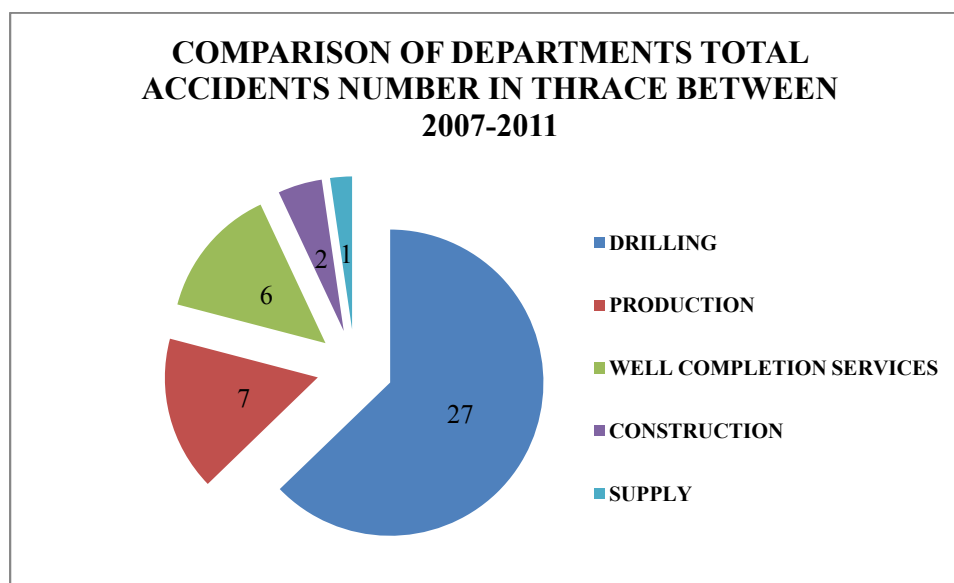


Figure 3: Comparison of Department Total Accidents Number in Thrace  
between 2007-2011

## **Tools and Data Collection**

### Walkthrough Checklists

The walkthrough checklists were prepared to evaluate the health and safety hazards in the natural gas land rig platform in the Thrace by using different sources ("Working at height,"; "Safety management system,"; "Accident prevention,"; 2003; "Compliance assistance checklist,"). Hazards were related to only employee's health and safety in this research. The checklist categories were related to nine main subjects: 1) general work environment, 2) working at heights, 3) emergency action plan, 4) fire protection, 5) first aid, 6) hand and portable tools & equipment, 7) chemical hazards, 8) compressed gas and cylinders, 9) personal protection equipment and clothing ("Working at height,"; "Safety management system,"; "Accident prevention,"; 2003; "Compliance assistance checklist,"). These checklists were compiled from different sources are shown in Appendix C, D, E, F, G, H, I, J, K ("Working at height,"; "Safety management system,"; "Accident prevention,"; 2003; "Compliance assistance checklist,") Each subject was administered close-ended questions, and these were evaluated during walkthrough by the researcher. Emergency situations and preparations were assessed in the natural gas land rig platform where employees usually worked at height.

The researcher evaluated the current situations and hazards using the checklists and by talking with the company safety engineers, supervisors, and employees. The Department of Drilling was informed about the walkthrough. The researcher met a safety engineer from Department of Health, Safety and Environment (HSE) of Thrace, and went to the natural oil land rig platform with her. They met a supervisor who was responsible

for the drilling operations at Ceylan 01 location. The safety engineer accompanied the researcher in all areas; occasionally the supervisor also assisted the researcher.

### Survey

A questionnaire was developed using “Safety Culture Enablers and Barriers Survey” that was prepared by the company of Canso (Safety Culture Workgroup) for employees who volunteered to complete this survey in Thrace District Management. The questionnaire’s purpose was to measure the employee’s perception of their current safety and health programs to identify the barriers which could prevent the implementation of OHSMS. The researcher evaluated the hazards at the Ceylan 01 Location at the drilling process. However, the survey was carried out by the other departments’ employees as well as Ceylan 01 Location’ employees.

The researcher sent an official letter to Human Resource of Thrace District Management to request volunteer employees from each department to participate in the survey to specify possible safety barriers. The survey was the same for supervisors and employees. The surveys were sent to the volunteer employees by HR, and then the completed surveys were sent directly to the researcher by HR. The researcher did not have information about the employees who completed the survey.

The survey in Appendix B measured 10 major constructs:

1. Employee Involvement & Organizational Communication
2. Teamwork
3. Trust Between Employees and Management
4. Change Management

5. Organizational Approach to Safety
6. Hazard Identification
7. Checking and Corrective Actions
8. Training, Awareness and Competence
9. Authority and Accountability
10. Emergency Preparedness and Response

(Safety Culture Workgroup,; "Ohsas 18001:2007 occupational," 2007). Major subject had different propositions to evaluate the main safety barriers.

Each major construct was related to OHSAS 18001 Occupational Health and Safety Management Standard's clauses. The connection between them:

1. Employee Involvement & Organizational Communication - *OHSAS 18001 4.4.3 Consultation and Communication*
2. Teamwork - *OHSAS 18001 4.4.3 Consultation and Communication*
3. Trust Between Employees and Management - *OHSAS 18001 4.4.3 Consultation and Communication,*
4. Change Management - *OHSAS 18001 4.4.3 Consultation and Communication*
5. Organizational Approach to Safety - *OHSAS 18001 4.2 Occupational Safety and Health Policy*
6. Hazard Identification - *OHSAS 18001 4.3.1 Planning for Hazard Identification, Risk Assessment and Risk Control*
7. Checking and Corrective Actions - *OHSAS 18001 4.5 Checking and Corrective Action*

8. Training, Awareness and Competence - *OHSAS 18001 4.4.2 Training, Awareness and Competence*
9. Authority and Accountability - *OHSAS 18001 4.4.1 Structure and Responsibilities*
10. Emergency Preparedness and Response (Safety Culture Workgroup; "Ohsas 18001:2007 occupational," 2007) - *OHSAS 18001 4.4.7 Emergency Preparedness and Response.*

The surveys evaluated the safety barriers which were associated with the OHSAS 18001 OHSMS clauses. Additionally, the survey results defined which clauses of the standards should be implemented to improve the effectiveness of OHSAS 18001 OHSMS.

The 10 major constructs had different proposals focusing on evaluating the employee perceptions about specific subjects. These proposals are in the "Safety Barriers Survey" that is in Appendix B. There were three options in the survey for the employees. According to their opinions, they could choose "totally disagree", "somewhat agree" or "totally agree" options.

## CHAPTER THREE

### Results

#### **Survey Data Analysis**

The researcher sent an official letter to Human Resource of Thrace District Management to request volunteer employees from each department to participate in the survey, and HR of Thrace asked employees if they agreed to participate in the survey. If the employees agreed to complete the survey, HR sent the survey to him/her. After completion of the surveys, HR sent them to the researcher. The researcher did not have any knowledge about the participants such as their age, gender, departments, education, title, and etc. Thrace District Management had 482 employees that included both white-collar and blue-collar workers. There were 93 of 482 (19%) participants who agreed to complete the survey. The percentage of participants' answers can be seen in Appendix B.

#### Employee Involvement & Organizational Communication

In the first section of the survey, there were seven propositions. According to the answers of participants, “most of participants believed that they could have access to safety documents whenever they want, they weren't afraid to report injuries, incidents or hazards.”

#### Teamwork

The goal of this section was to evaluate the relation between departments. The results showed that “employees believed that the TPAO gave late responses to the safety issues, and the employees did not feel any negative forces which affect their positive safety perception from their supervisors.”

### Trust between Employees and Management

This section focused on the confidence between employees from each step and their managers and/or the top management. “Employees do not trust the management” was the first proposal that 39% of the participants gave “Somewhat agree” answer to it. 39% was not the lowest rate, so that “the employees had some doubt about their management.” The other answers showed that “some employees did not trust their management and preferred to keep some information to themselves and they thought that the TPAO’s culture was based on punishment.”

### Change Management

This section’s purposes were to define the safety barriers which were related to communication and notification of changes. The results showed that “the employees had enough information about the changes on safety; otherwise they believed that the TPAO needed to spend more time to implement the new processes, procedures, and etc.”

### Organizational Approach to Safety

The goal of this section was to identify the safety barriers which were related to general approach to safety and safety culture of the TPAO. It could be seen that “there were some problems in practice of documentation, and some of employees thought that the TPAO’s safety documentation were missing. The employees believed that the safety responsibilities were not shared within the departments, and some of employees had doubts about just focusing on safety metrics, because they may hide faults, accident, injuries, and etc.”

### Hazard Identification

This section focused on identifying the employees' perception of the hazard assessment. Another purpose of this section was to identify whether the employees participated the risk assessments or not. The results showed that "generally the TPAO did risk assessments for each process and employees put input into the analysis for their jobs, and the TPAO's management was able to manage the hazards."

### Checking and Corrective Actions

Organizations need an audit mechanism and continuous improvement to manage the systems, and this sections goal was to identify if the TPAO's processes were managed effectively or not. "46% of employees totally agreed and 39% of employees somewhat agreed that the TPAO managed the systems with the belief of continuous improvement." "There is a tendency to focus on individual incidents and accidents instead of identifying trends" was the second proposition; but 47% of employees' answers were "somewhat agree" and the 39% of participants totally agreed with it. These answers showed that "the approach of the TPAO caused important hazards to be missed and issues which may affect the employees' life." The employees believed that "if the TPAO is not aware of the hazards, the company would not prevent the accidents, and only 18% of employees thought that the accidents' investigation and communication within the company were not enough to inform the employees."

### Training, Awareness and Competence

This section focused on the career opportunities and development within the TPAO by evaluating the employees' perception. The rates showed that "most of the



participants believed that the TPAO could not lead the employees with good career opportunities, and it seemed that the employees were not satisfied with the planning of the trainings and some of the social rights.” In addition, “the employees had some doubts that the TPAO gave enough information about their work related hazards.”

### Authority and Accountability

This section’ purpose was to define if employees have appropriate authority for their responsibilities or not. Authority was viewed as one of the most important parts of the job to perform the task. “The results showed that “the TPAO need to define the each employee’s responsibilities clearly, and also the participants believed that they did not have enough authority to perform their responsibilities; so that the TPAO needed to share the safety responsibilities to each department and the responsibilities were arranged again by considering the emergency situations.”

### Emergency Preparedness and Response

This section goal was to evaluate the emergency preparedness in the TPAO. All of the rates showed that “the employees were satisfied with the emergency plans, actions, and trainings.”

### **Walkthrough Data Analysis**

As mentioned earlier, these risk assessments were conducted at Ceylan 01 Location that had a natural gas land rig platform in TPAO’s Thrace District Management. The purpose of doing risk assessment was to identify hazards that were related to working at height and emergency preparedness. The location was evaluated to identify

the presence of hazards via the walkthrough checklists that can be seen in Appendix C, D, E, F, G, H, I, J, K (“Working at height,”; "Safety management system,"; “Accident prevention,”, 2003; "Compliance assistance checklist,").

#### General Work Environment Assessment

The potential of injury from slips, trips, or falls, spilled liquids, undefined walkways was in the natural gas land rig platform at Ceylan 01 Location. There were 16 questions in the checklist, but 1 of them was not applicable to the working area. 10 of 16 questions’ answer were “No”, so these nonconformities identified during the walkthrough were as follows:

- There were floor holes on the metal floor coverings.
- Most of guardrails located on the mud treatment system where waste sludge was treated were broken or missing.
- The stairway with ramp’s security chain usually was not used to prevent falls from there.
- The platform was disorganized; open cans, hand tools, chains, and etc could be seen anywhere on the platform.
- There was not safe clearance for walking where vehicles were operating.

#### Working at Height Assessment

At this location almost each employee works at height as well as in other oil rig platforms. 7 of 23 questions in the checklist were not applicable to the land rig platform. 5 questions’ answer were “No”, the hazards observed at that location were:

- The TPAO had only a draft of working at height procedure which was not up-to-date. The employees did not follow written safety related procedures.
- There were not any written instructions which were about safe working, safe use of hand tools or machines in the working areas.
- There was a vertical life line for a derrickmen who “worked on a platform attached to the mast, typically 85 ft (26 m) above the rig floor” (“Oilfield glossary, derrickman,”). However, there were many unnecessary materials above the life line that was attached to the fixed derrick ladder. The life line can be seen in Figure 4.



Figure 4: The Vertical Life Line

- The derrick escape device was not installed. That escape device can be seen in Figure 5.

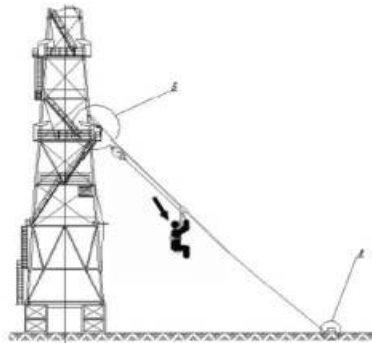


Figure 5: A Derrick Escape Device

- The forklifts were used to move long pipes without attached the pipes safely to the forklift.
- Some of the guardrails did not have any baseboards, and some of them were broken or old, indicating they have a potential for failing.

#### Emergency Action Plan Assessment

The TPAO had the HSE Handbook which was prepared by the Department of HSE of the TPAO; but it was not followed, and the emergency action plans were mentioned in the book. However, the handbook was a very old version, and the employees were not trained according to this handbook. In practice, the researcher could see just one emergency assembly point which was between two container prefabricated

houses, but there was not any space to employees at the location. The inappropriate emergency assembly point can be seen in Figure 6.



Figure 6: The Emergency Assembly Point

There were 7 questions in the checklist. 5 of 7 questions' answer were "No", and these issues identified concerning the emergency action plans were as follows:

- There were not any written emergency action plans on the information boards at Ceylan 01 Location.
- The derrick escape device was not in use.
- Emergency escape routes were not developed or introduced periodically to all employees.
- Some of the employees were unaware of their responsibilities they would have to take into account in case of an emergency.
- There was no exit signage on the platform.

### Fire Protection Assessment

13 questions were in the checklist, but 1 of them was not applicable to the working area. 3 of 13 question's answer showed that there were some nonconformities. There was not an up-to-date written and published fire protection or action plan. However, fire fighting team's responsibilities, fire emergency action plan, fire extinguisher location map and signs were on the platform boards where all the employees could see them easily. On the other hand, lack of the derrick escape device would be a problem in case of any blow-out or a fire.

According to the Building Regulations on Fire Safety in Turkey, annual inspection of extinguishers by qualified technicians is required, and at the end of every four years hydrostatic pressure testing for all types of extinguishers is required and then the extinguisher is re-filled. Recharging of the extinguishers evaluated via this checklist, and it was identified that all the inspections and tests of extinguishers are performed periodically by the TPAO according to related regulations.

### First Aid Assessment

By using the checklist, it was identified that 4 of 5 question's answer were "No". According to the First Aid Regulation of Turkey one of every 10 employees, who works in heavy and dangerous work has to get First Aid Certificate. The TPAO followed this regulation, and gave courses to the employees to have them receive their certificate. However, the first aid kit and stretcher were not easily accessible to the employees. The first aid kit was in the container where employees usually take their breaks, which was

not close to the working platform. The stretcher was in one of the containers but nobody knew where it was. In addition, emergency phone numbers were not posted on any board.

#### Hand and Portable Tools & Equipment Assessment

Portable tools like grinders or saws; hand tools such as chisels, punches, or bits were used during the processes on the platform. There were 18 questions in this checklist, and all of the answer' were "Yes"; showing that there was not any nonconformity, which was directly related to tools and equipment safety. Every tool and machine had safety guards, and employees knew how to use them with their guards. On the other hand, tools and equipment were in inappropriate places on the platform and were disorganized. Furthermore, the TPAO did not have up-to-date instructions that described how the employees had to use these tools and machines safely.

#### Hazardous Chemicals Assessment

Different kinds of chemicals that were irritants, toxic, explosive, or otherwise hazardous were used, and stored within the platform. EHS Department prepared a summary of Safety Data Sheet (SDS) of each chemical and placed them near the chemicals, and where the chemicals were used. The EHS Department also trained the employees about related chemicals. There were 9 questions in the checklist, and only 1 of 9 questions' answer was "No". Some problems identified by using checklist during the walkthrough were:

- The TPAO did not have an up-to-date written procedure dealing with chemicals.
- There was no defined storage area for chemicals. They could be stored near the generator, or welding operations.

### Compressed Gas & Cylinders Assessment

Welding operations were necessary during the assembly and disassembly operations of the platform; therefore, compressed gas & cylinders were stored there. There were 9 questions in the checklist, but 1 of them was inapplicable to the working area. Most of (7) questions' answer were "Yes". Some hazards observed:

- The TPAO did not have an up-to-date written procedure dealing with storage, handling, or usage of compressed cylinders.
- Most of cylinders were in good physical condition; but oxygen and acetylene cylinders were located in the same areas posing an explosive hazard.

### Personal Protection Equipment & Clothing Assessment

EHS Department was responsible for providing new PPE & clothing to the new employees, and replacing them when PPE were damaged. The supervisor of each department was also responsible for ensuring that employees properly use and maintain their PPE. It was seen that all the employees knowledgeable on the correct methods to use the PPE, and they always wore their PPE. 1 of 14 questions was inapplicable to the land rig platform. Only 1 of 14 questions' answer was "No" and it was identified that there were no eyewash facilities or quick-drench showers on the platform.



## CHAPTER FOUR

### Conclusion and Recommendations

In this study, hazard assessments at Ceylan 01 Location and employee views who worked in the Thrace District were used to determine the effectiveness of current safety programs and barriers that prevent the implementation of OHSAS 18001 OHSMS ("Ohsas 18001:2007 occupational," 2007). Defining the barriers provided a clearer picture of the lack of the safety management systems for management. Moreover, defining the current risks, which were not identified working at height and emergency situations will help determine appropriate precautions, and implement more effective OHSMS in the TPAO.

#### Recommendations from Performed Risk Assessments

The researcher' *first research question* asked, "*Are there hazards that are not identified in current risk assessments of working at height and emergency preparedness at TPAO?*" The TPAO carried out another risk assessment in other oil rig platforms in 2012. Ceylan 01 Location was also an oil rig platform; therefore, the processes were similar to others. The previous risk assessment could be a reference for Ceylan 01 Location. The TPAO had also a "Inspection Checklist for Drilling Processes", the safety engineer and supervisor who was responsible for the drilling operations at the location evaluated all parts and machines of the process after all the installation was completed. As a result of walkthrough data analysis this researcher has concluded that, some risks were not identified at that location. The researcher identified the risk assessment's results in "Results" section of this thesis.

According to the results of the general work environment risk assessments checklist, more than half nonconformities were identified. The TPAO should inspect all the guardrails that were on the mud system and floor covering after the installation of a land rig. The TPAO should also define the walking ways or vehicle operating ways to protect the employees. The other improper situation was about the disorganized platform; therefore, the TPAO should prepare a checklist and identify the specification of appropriate conditions to decide whether the working area's is acceptable or not. Then the supervisors need to audit the working areas with the checklist. All the occupational health and safety related documents must be documented in accordance with 4.1 General Requirement and 4.4.4 Documentation clauses of the OHSAS 18001 Standard. Therefore, the TPAO must prepare and publish procedure and daily checklists for monitoring the workplace environment.

The second risk assessment checklist was about the working at height and 31% of nonconformities were identified in the oil rig platform. The results showed that all employees had working at height trainings, and these trainings have been done periodically; however, the TPAO should prepare a working at height procedure to define these strict rules. Another risk is the lack of a derrick escape device. It was not installed at the location, because the installation of this escape device takes a long time, the supervisors did not want to spend time dealing with it. The TPAO safety department should not allow the derrickman to work without the escape device. This situation can be prevented by publishing a permit-to-work procedure which is related to working at height, and then this permit-to-work should be obtained before working at height. The

broken guardrails can allow falls from height because most of working areas were at least 2.5 meter from ground level. Therefore, the guardrails conditions must be also mentioned within the permit-to-work procedure. If missing and/or broken guardrails are in the workplace, the safety engineer or supervisor cannot allow employees to start work.

The researcher evaluated the emergency action plans with the checklist and more than half questions' answer showed that there were nonconformities. As a result of this third assessment, the TPAO's written emergency action plans and procedures were found to be missing. According to the 4.3.2 Legal and Other Requirements and 4.4.7 Emergency Preparedness and Response clauses of the OHSAS 18001 Standard, the TPAO should establish a procedure to identify the potential emergency situations and respond these situations. The TPAO should test the effectiveness of the procedure periodically, and if it does not respond the emergency situations the company should revise the procedure. The company should also publish emergency plans and inform the employees about the escape routes and responsibilities of them.

According to the fourth risk assessment for fire protection, a very small amount (3 of 13) of answers identified the nonconformities. The most important missing part was an up-to-date written procedure. Fire is an emergency situation, so that the TPAO must consider 4.4.7 Emergency Preparedness and Response clause of the OHSAS 18001 Standard. This procedure which concerns the emergency situations and responses must also include fire protection. To have clear and understandable communication, the TPAO must publish the procedure. There were not any inappropriate situations concerning the fire extinguishers or their inspections. The TPAO should continue these inspections

periodically. The TPAO must record all the inspections reports in accordance to 4.5.4 Control of Records clause of the OHSAS 18001 Standard. Otherwise, the derrick escape device was a problem in case of any blow-out or fire; it must be installed in each land rig, and controlled with the work-permit procedure.

As a result of first aid assessment, almost each questions' answer (4 of 5) of checklist showed the nonconformities. The researcher concluded that there were some gaps about the first aid kit and stretcher locations. However, the TPAO should implement all the systems according to 4.3.2 Legal and Other Requirement clause of the OHSAS 18001. This clause means that the TPAO must follow the Regulations of Turkey. According to the Workers Health and Safety Regulation of Turkey, if number of employees is more than 10 but less than 50, the company must have a first aid cabinet, a stretcher and a blanket.

Hand and portable tool & equipment assessment was done via sixth checklist. There were not any safety issues about tools and equipment identified with checklist. During the walkthrough the researcher saw that all the portable tools and machines had safety guards. But, the hand tools were disorganized within the location, the supervisor should take into account during his audits. The other nonconformity was the missing up-to-date instructions that describe how the employees should use these tools and machines safely. Daily checklists for evaluating the workplace can be implemented to control and record the situations. Every safety related issues and situations must be documented and recorded according to the OHSAS 18001 Standard.

During the hazardous chemical assessment, the researcher encountered unexpected situations. The petroleum industry can be a dangerous workplace, so the researcher expected to see well-organized chemical storage and usage. Unfortunately, there were no defined storage areas for chemicals. For example explosive chemicals were located near the generator or welding operations. A very small amount (1 of 9) of answers identified the nonconformities. The TPAO should conduct detailed research in the land rig, and identify the usage, storage, and handling procedures of chemicals clearly.

As a result of compressed gas & cylinders assessment, the researcher concluded that, there were no up-to-date written procedures for the storage and handling of cylinders, and nonconformity identified with checklist that some of the oxygen and acetylene cylinders were located in the same area. It is an oil rig platform, so the TPAO must take it more seriously. The TPAO should follow not only 4.4.4 Documentation clause but also 4.3.1 Hazard Identification, Risk Assessment, and Determining Controls clause of the OHSAS 18001 Standard.

The last risk assessment checklist evaluated the personal protection equipment and clothing. The researcher saw that all the employees wore their PPEs. The TPAO organized them well. On the other hand, one risky situation was identified with checklist; therefore, the TPAO should assess the eyewash facilities and quick-drench showers, because there were not any of them at the location. The TPAO must publish procedure and/or instructions to identify the correct use of PPE, frequency and necessity of PPE change, appropriate PPE for each task, and necessary eyewash and showers point.

According to 4.5.3.2 Nonconformity, Corrective Action and Preventive Action clause of the OHSAS 18001 Standard, the TPAO must establish and implement a procedure related to actual and potential nonconformities, and taking corrective and preventive action. This procedure should define requirements for investigating nonconformities, identifying their causes, taking actions in order to prevent their recurrence, recording the results of nonconformities, and reviewing the effectiveness of corrective and preventive actions. By following this procedure the TPAO can prevent the above nonconformities which were identified during the walkthrough.

### Survey Results

The researcher' *second research question* asked, "***What are the barriers that prevent the implementation of OHSAS 18001 OHSMS?***" In organizations, there are different factors or barriers that prevent the achievement of a positive safety culture or climate (Clisscold & Sohal, 2006).

The data from the "Employee Involvement & Organizational Communication" section of survey indicated, some of the employees (35%) were not satisfied with safety information sharing between departments, but it was not a safety barrier, which would prevent the implementation of OHSMS. It was seen that there were no safety barriers which were related to lack of employee involvement to OHSMS. However the TPAO might train the employees to let each employee know the published safety documents such as procedures, instructions, new policies, etc and latest revision of them. Furthermore, the TPAO must identify the communication methods with a procedure in accordance to 4.4.3.1 Communication clause of the OHSAS 18001 Standard.

The second section of the survey was “Teamwork.” According to the evaluation of this section, many employees (47%) thought that excessive bureaucracy caused late responses to safety problems. The bureaucracy was a safety barrier. Workplace bureaucracy can be eliminated by changing the authority and accountability of all levels of workers; therefore, doing these kinds of reorganizations is HR’s duties. A worker’s job title should include definitions and limits of his/her authority and responsibility. In addition, the bureaucracy can also be decreased by using a computer program to reduce the paperwork. Supervisors and managers do not have to fill out papers, they can just fill them an online form which save time. Behind the organizational improvements, the TPAO should train all levels of employees about the importance and urgency of the safety issues. The TPAO can build a real safety culture by using different methods such as safety related trainings and safety awards programs.

“Trust between Employees and Management” was the third section of the survey. As a result of this section, some of the employees (41%) believed that there was punitive cultures while some of them (31%) not. It was a kind of safety barrier which decreases the employee’s morale, thus the TPAO need to satisfy more employees. The TPAO could develop an effective, behavior-based incentive program that rewards workers for achieving a certain performance on safe work conditions and motivating them.

The fourth section was “Change Management” in the survey. It was seen that the employees were generally satisfied with the management approach to safety related changes.

According to the results of “Organizational Approach to Safety” which was fifth section, many employees (47%) considered that only the Safety Department was responsible for safety issues. It was a safety barrier that has prevented the other department’s attendance to the safety related subjects. However, implementing a safety management system is a team process, so the TPAO could require attendance the all employees. According to 4.2 O&S Policy clause of the OHSAS 18001 Standard, the O&S policy must be defined by the top management of the TPAO. When employees feel the management attendance and support, they would like to be a part of this big team.

“Hazard Identification” was the sixth section of the survey. The employees were generally satisfied with the risk assessment and hazard controls. Because 44% of participants believed that risk assessment were contained each process and jobs. The TPAO should keep this approach to the hazard identification, and the management can try to improve the risk assessment methods to be more effective in process evaluation. Different kinds of assessment methods can be used for different kinds of tasks. These methods must be defined in a procedure in accordance to 4.3.1 Hazard Identification, Risk Assessment and Determining Controls clause of the OHSAS 18001.

The seventh one was “Checking and Corrective Actions.” According to the survey results, 44% of employees thought that safety issues were not identified proactively, 39% of participant totally agreed, and 47% of participants somewhat agreed that the management generally focused on the individual accidents instead of identifying a whole picture. The reactive approach and the poor root cause analysis appeared to be the safety barriers which prevented the effective OHSMS implementation. The TPAO could



consider the corrective action methods and documented them in accordance to 4.5.3.2 Nonconformity, Corrective Action and Preventive Action clause during the implementation of the OHSAS 18001.

“Training, Awareness and Competence” was the eighth section of the survey. The results showed that employees were dissatisfied with the career development programs. Because 53% of participants thought that there were no career development programs, 53% of participant believed that training needs, retirement, growth, and/or etc were not considered, and also 49% of participants totally agreed there were limited career opportunities within the TPAO. These safety barriers affected the employee’s morale and prevented their desire to work. The TPAO must amend promotion regulations by considering the employee’s expectations. The big duties belong to the Department of Human Resources to improve the career opportunities.

The ninth section was “Authority and Accountability.” As a result of the survey evaluation, employee’s safety related responsibilities without appropriate authority was sort of a safety barrier, because 44% of employees believed that they did not have appropriate authority. In addition, 47% of participants’ thoughts showed that lack of the ownership of safety except the Safety Department was another safety barrier which caused the lack of safety culture within the company. In accordance to 4.4.1 Resources, Roles, Responsibility, Accountability and Authority clause of the OHSAS 18001 Standard, the TPAO must document and communicate clearly all employees’ safety related responsibilities with appropriate accountability, roles, and authorities which lead other departments to adopt the safety subjects.

The last section of the survey was “Emergency Preparedness and Response.” The researcher did not identify any safety barriers according to employee’s perception. The employees believed that the TPAO had effective emergency plans, adequate training, and sufficient emergency equipment in the facility. Because 39% of participants totally agreed and 41% of them somewhat agreed that the TPAO had an effective emergency response plan, 57% of employees believed that the TPAO had adequate equipment for emergency situations, and 47% of employees totally agreed that employees knew the usage of emergency equipment.

#### Employees Satisfaction with Survey

The researcher’ *third research question* asked, “*Are the employees satisfied with the TPAO’s current safety culture based on surveys?*” As a result of the survey, it was seen that the employees were unsatisfied with some practices of the TPAO. Through the evaluation of second research question, 10 safety barriers were identified according to the employees’ answers. These safety barriers were excessive bureaucracy, punitive culture, considering only the Safety Department responsible for safety, poor root cause accident investigation, reactive approach, lacking of career development program, limited career growth opportunity, inadequate planning for employee requirements, employee’s safety related responsibilities without authority, lack of ownership of safety expect the Safety Department. Except the safety barriers, the employees were satisfied with the organizational communication, safety related changes and their declaration, hazard identification in processes and emergency preparedness. The TPAO does not need to

spend more time improving these satisfied points during the implementation of the OHSAS 18001 OHSMS.

### **Suggestions for Future Research**

Overall this research has showed the TPAO's strengths and weaknesses that were related to implementation of the OHSAS 18001 OHSMS. The results were specific to this company but could be a starting point for future research.

The researcher performed the risk assessment using the checklists. These checklists might have restricted the identification of risks. More effective risk assessment methods which are appropriate to specific hazards could be used in future research.

The other limitations were about the survey and participants. The researcher did not have knowledge about the volunteer employees such as their age, gender, departments, education, title, and etc. Another limitation was that only the TPAO's Thrace District Management employees participated in the survey; there were no attendance from other districts. The other districts' workers could have attended to the survey to get more reliable results. However, this was not performed due to the limited time. More participants in the survey and long data collection time would be beneficial to the future research.

A big piece of future is to redo the same assessment and survey after the TPAO make the recommended changes. This would indicate whether implementation of the researcher's recommendations were effective or not.

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**APPENDICES****Appendix A: OHSAS 18001 Occupational Health and Safety Management Systems - Requirements****OHSAS 18001 Occupational Health and Safety Management Systems – Requirements**

- 1 Scope
- 2 Reference Publications
- 3 Terms and Definitions
- 4 OH&S Management System Elements
  - 4.1. General Requirements
  - 4.2 OH&S Policy
  - 4.3 Planning
    - 4.3.1 Planning for hazard identification, risk assessment, and risk control
    - 4.3.2 Legal and other requirements
    - 4.3.3 Objectives
    - 4.3.4 OH&S management program(s)
  - 4.4 Implementation and Operation
    - 4.4.1 Structure and responsibility
    - 4.4.2 Training, awareness and competence
    - 4.4.3 Consultation and communication
    - 4.4.4 Documentation
    - 4.4.5 Document and data control
    - 4.4.6 Operational control
    - 4.4.7 Emergency preparedness and response
  - 4.5 Checking and Corrective Actions
    - 4.5.1 Performance measuring and monitoring
    - 4.5.2 Accidents, incidents, non-conformances and corrective and preventive action

## Continued Appendix A: OHSAS 18001 Occupational Health and Safety Management

## Systems - Requirements

4.5.3 Records and record management

4.5.4 Audit

4.6 Management Review

Annex A (informative) Correspondence between OHSAS 18001, ISO 14001:1996, and ISO 9001:1994

("Ohsas 18001:2007 occupational," 2007)

## Appendix B: Evaluation of the Safety Barriers Survey

(Safety Culture Workgroup; “Ohsas 18001:2007 occupational, 2007)

Evaluation of the Safety Barriers Survey					
TD: Totally disagree SA: Somewhat agree TA: Totally agree					
			<i>Percent of Employees (%)</i>		
<b>1</b>	<b>Employee Involvement &amp; Organizational Communication - OHSAS 18001 4.4.3</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>	
a	TPAO has a S&H policy and all employees can explain, and fully understand it.	22	48	30	
b	Managers follow the rules and usually address the safety behavior of others.	20	43	37	
c	Employees who report the accidents or any hazards are ignored, or punished by the management.	29	40	31	
d	Safety information is not easily, readily, or openly shared across departments.	31	33	35	
e	Employees do not report hazards, safety issues, or operational incidents for fear of reprisal from their peers.	44	31	25	
f	Employees do not know where to go to get the safety related information that they need.	34	38	28	
g	Company climate does not encourage or allow an honest and open communication/dialogue.	32	44	24	
<b>2</b>	<b>Teamwork - OHSAS 18001 4.4.3</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>	
a	Responses to safety problems are delayed due to excessive bureaucracy or excuses.	18	34	47	
b	There is an “us versus them” mentality in the organization. For example, the operational department may react in a protective manner to changes and recommendations from the safety department, thus resisting change.	30	52	18	
c	Operational line management creates a negative perception of the safety department, which influences employees’ perceptions of the safety culture.	39	40	22	



## Continued Appendix B: Evaluation of the Safety Barriers Survey

d	Employees have limited or no input in the identification of problems and/or the development of solutions.	33	37	30
<b>3</b>	<b>Trust Between Employees and Management - OHSAS 18001 4.4.3</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>
a	Employees do not trust the management.	28	39	33
b	Information is not shared with management, due to a lack of trust.	32	37	31
c	There is a punitive culture.	31	28	41
<b>4</b>	<b>Change Management - OHSAS 18001 4.4.3</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>
a	Employees are not effectively included in the safety related change management process.	24	39	38
b	The rationale for, and benefits of, the safety related change are not clearly communicated.	49	25	26
c	Safety related change is enacted without applying a change management process.	26	48	26
<b>5</b>	<b>Organizational Approach to Safety - OHSAS 18001 4.2</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>
a	Documented safety policies and procedures are not followed in day-to-day operations.	27	43	30
b	Safety rules and procedures are applied to tasks, even though some of the rules and procedures are insufficient and/or ineffective.	23	45	32
c	Employees consider only one party (such as the Safety Department) responsible for safety.	24	29	47
d	The focus on reducing safety metrics associated with negative outcomes, i.e. operational errors inhibits reporting.	32	42	26
<b>6</b>	<b>Hazard Identification - OHSAS 18001 4.3.1</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>
a	Every planned or new facility, process, material, or equipment is fully reviewed by a competent team for safety, along with affected workers.	27	49	24
b	A current hazard analysis exists for all jobs, processes, and material; it is understood by all employees; and employees have had input into the analysis for their jobs.	23	33	44
c	Hazard controls are fully in place, with concentration on engineering controls and safe work procedures.	16	48	35
<b>7</b>	<b>Checking and Corrective Actions - OHSAS 18001 4.5</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>
a	The organization does not apply continuous process improvement.	46	39	15

## Continued Appendix B: Evaluation of the Safety Barriers Survey

b	There is a tendency to focus on individual incidents and accidents instead of identifying trends.	14	47	39
c	Safety issues are identified and addressed reactively instead of proactively.	29	27	44
d	Local “quick” fixes are implemented, but system-wide deficiencies are not addressed.	29	43	28
e	Most loss-producing incidents and near-misses are investigated for root cause with effective prevention.	24	51	26
f	Safety data are fully analyzed and displayed, common causes are communicated, management ensures prevention; and employees are fully aware of causes and means of prevention.	18	45	37
<b>8</b>	<b>Training, Awareness and Competence - OHSAS 18001 4.4.2</b>	<b>TD</b>	<b>SA</b>	<b>TA</b>
a	Management does not adequately address employee performance issues.	37	33	30
b	There are no career development programs.	14	33	53
c	There are limited career growth opportunities within the organization.	17	33	49
d	Planning for staffing requirements is inadequate. (For example, training needs, retirement, or growth are not adequately considered.)	18	29	53
e	Employee are trained about all the hazards which are related their job.	23	43	34
<b>9</b>	<b>Authority and Accountability - OHSAS 18001 4.4.1</b>	<b>TD</b>	<b>SA</b>	<b>TA</b>
a	Employee roles are safety related unclear and may overlap, or be misunderstood.	27	44	29
b	Employees are assigned safety related responsibility without appropriate authority.	25	31	44
c	There is no ownership of safety, which employees believe is the job of only the Safety Department.	16	37	47
d	Employee roles and responsibilities are inflexible, particularly during unusual circumstances.	22	44	34
e	Inflexibility in the organization prevents decision making at the appropriate level for the situation.	25	46	29

## Continued Appendix B: Evaluation of the Safety Barriers Survey

<b>10</b>	<b>Emergency Preparedness and Response - OHSAS 18001 4.4.7</b>	<b><i>TD</i></b>	<b><i>SA</i></b>	<b><i>TA</i></b>
a	There is an effective emergency response plan and employees know immediately how to respond as a result of effective planning, training, and drills.	20	41	39
b	Facility is fully equipped for emergencies; all systems and equipment are in place and regularly tested.	11	32	57
c	Employees know how to use emergency equipment and communicate during emergencies.	19	39	42

Note. From Barriers & Enablers Questionnaire, *CANSO*, Safety Culture Workgroup.

### Appendix C: General Work Environment Assessment Checklist

Questions	Yes	No	NA
Are floor holes or openings guarded by a cover, guardrail, or equivalent on all sides (except at entrance to stairways or ladders)?		X	
Are toe boards installed around the edges of a permanent floor opening (where persons may pass below the opening)?		X	
Are unused portions of service pits and pits not actually in use either covered or protected by guardrails or equivalent?		X	
Are all work sites clean and orderly?		X	
Are work surfaces kept dry or appropriate means taken to assure the surfaces are slip-resistant?		X	
Are all spilled materials or liquids cleaned up immediately?	X		
Is combustible scrap, debris, and waste stored safely and removed from the work site promptly?		X	
Are covered metal waste cans used for oily and paint-soaked waste?	X		
Are the minimum number of toilets and washing facilities provided?	X		
Are all toilets and washing facilities clean and sanitary?	X		
Are all work areas adequately lighted?	X		
Are aisles and walkways appropriately marked?		X	
Is there safe clearance for walking and aisles where vehicles are operating?		X	
Are materials or equipment stored so sharp objects can not obstruct the walkway?		X	
Are changes of direction or elevations readily identifiable?		X	
Are aisles or walkways that pass near moving or operating machinery, welding operations, or similar operations arranged so employees will not be subjected to potential hazards?			X

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;

"Compliance assistance checklist,")

### Appendix D: Working at Height Assessment Checklist

Questions	Yes	No	NA
Do workers have working at height trainings?	X		
Does the company have a written working at height procedure?		X	
Are ladders only used when other equipment is not justified in view of short duration and low risk?	X		
Is the ladder in good condition and suitable for the type and height of work?	X		
Have workers been instructed in the safe use of ladders?		X	
Are ladders well maintained and inspected regularly?		X	
Is the platform for use with a lift truck provided with guardrails; safety harness anchorage; protection from moving parts?	X		
Is the scaffold erected on a firm foundation?			X
Are all guardrails in position at the correct height?			X
Is the height of the tower scaffold no more than 3 times the minimum base dimension?			X
Are harnesses used?			X
Are anchorage points and supporting structures, lanyards and harnesses compatible, identifiable, regularly inspected?			X
Do workers check all scaffold elements for safety before starting work?			X
Do workers inspect ladders before climbing to ensure they are good condition and securely positioned?		X	
Are safety belt/safety harness, life lines and all devices for the attachment of life lines tested and approved by a testing body?	X		
Are safety belts/safety harnesses, life lines available and adequate to any person for his personnel protection?	X		
Do safety belts/safety harnesses attach to an anchorage or to a life line securely attach to one point or more points of an anchorage?	X		
Do workers know the instructions which include the proper method of wearing and using a safety belt/harness, as well as attaching them to the life line?	X		
Are there any padding, wrapping to protect life lines from contact with edges or objects which may cut or severely abrade them?	X		
Do every safety belt/safety harness and life line inspect by a designated person before use by an employee?	X		

## Continued Appendix D: Working at Height Assessment Checklist

Are safety nets used?		X	
Are safety nets tested and approved by a testing body?			X
Are safety method statements required from contractors?	X		

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;  
"Compliance assistance checklist,")

**Appendix E: Emergency Action Plan Assessment Checklist**

<b>Questions</b>	<b>Yes</b>	<b>No</b>	<b>NA</b>
Has an emergency action plan been developed?		X	
Have emergency escape procedures and routes been developed and communicated to all employees?		X	
Do employees who must remain to operate critical plant operations before evacuating know the proper procedures?		X	
Is the employee alarm system that provides warning for emergency action recognizable and perceptible above ambient conditions?	X		
Are alarm systems properly maintained and tested regularly?	X		
Is the emergency action plan reviewed and revised periodically?		X	
Do employees know their responsibilities for reporting emergencies, actions during an emergency, and for performing rescue and medical duties?		X	

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;  
"Compliance assistance checklist,")

### Appendix F: Fire Protection Assessment Checklist

Questions	Yes	No	NA
Does the company have a written fire prevention plan?		X	
Does the plan describe the type of fire protection equipment and/or systems used?		X	
Have practices and procedures been established to control potential fire hazards and ignition sources?		X	
Are employees aware of the fire hazards of the materials and processes to which they are exposed?	X		
Is the local fire department well acquainted with company facilities, location, and specific hazards?	X		
Is the fire alarm system tested as required?	X		
Are sprinkler heads protected by metal guards when exposed to physical damage?			X
Are portable fire extinguishers mounted in readily assessable locations?	X		
Are fire extinguishers mounted in readily assessable locations?	X		
Are fire extinguishers recharged regularly and then noted on the inspection tag?	X		
Are employees trained in the use of extinguishers and fire protection procedures?	X		
Are "No Smoking" plates placed in necessity locations?	X		
Are there CO2 fire extinguishers for power control and energy distribution room?	X		

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;  
"Compliance assistance checklist,")



### Appendix G: First Aid Assessment Checklist

Questions	Yes	No	NA
Has an emergency medical plan been developed?		X	
Are emergency phone numbers posted?		X	
Are first aid kits easily accessible to each work area, with necessary supplies available, periodically inspected and replenished as needed?		X	
Are means provided for quick drenching or flushing of the eyes and body in areas where caustic or corrosive liquids or materials are handled?		X	
According to First Aid Regulations of Turkey, do workers have First Aid Certificate?	X		

("Working at height,;" "Safety management system,;" "Accident prevention,;" 2003;  
"Compliance assistance checklist,")

### Appendix H: Hand and Portable Tools & Equipment Assessment Checklist

Questions	Yes	No	NA
Are all tools and equipment (both company and employee-owned) in good working condition?	X		
Are hand tools such as chisels or punches (which develop mushroomed heads during use) conditioned or replaced as necessary?	X		
Are broken or fractured handles on hammers, axes, or similar equipment replaced promptly?	X		
Are appropriate handles used on files and similar tools?	X		
Are appropriate safety glasses, face shields, and similar equipment used while using hand tools or equipment which might produce flying materials or be subject to breakage?	X		
Are jacks checked periodically to assure that they are in good operating condition?	X		
Are tool handles wedged tightly in the head of all tools?	X		
Are tool-cutting edges kept sharp so the tool will move smoothly without binding or skipping?	X		
Is eye and face protection used when driving hardened or tempered tools, bits, or nails?	X		
Are grinders, saws, and similar equipment provided with appropriate safety guards?	X		
Are power tools used with the shield or guard recommended by the manufacturer?	X		
Are portable circular saws equipped with guards above and below the base shoe?	X		
Are circular saw guards checked to assure guarding of the lower blade portion?	X		
Are rotating or moving parts of equipment guarded to prevent physical contact?	X		
Are all cord-connected, electrically-operated tools and equipment effectively grounded or of the approved double-insulated type?	X		
Are effective guards in place over belts, pulleys, chains, and sprockets on equipment such as concrete mixers, air compressors, and the like?	X		
Is hoisting equipment available and used for lifting heavy objects, and are hoist ratings and characteristics appropriate for the task?	X		

## Continued Appendix H: Hand and Portable Tools &amp; Equipment Assessment Checklist

Are pneumatic and hydraulic hoses on power-operated tools checked regularly for deterioration or damage?	X		
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("Working at height,"; "Safety management system,"; "Accident prevention,"; 2003;  
"Compliance assistance checklist,")

### Appendix I: Chemical Hazard Assessment Checklist

Questions	Yes	No	NA
Have you compiled a list of hazardous substances that are use in your workplace?	X		
Is there a written hazard procedures or instructions dealing with Material Safety Data Sheets (MSDS), labeling, and employee training?	X		
Is there a person designated responsible for MSDSs, container labeling, and employee training?	X		
Is each container for hazardous substances (vat, bottles, and storage tanks) labeled with product identity and an appropriate hazard warning (communicating the specific health hazard and physical hazards)?		X	
Is there an MSDS readily available for each hazardous substance used?	X		
Are employees of other employers (contractors, etc.) informed of hazardous substances and labeling etc.?	X		
Is a hazard training in place?	X		
Are employees familiar with the hazardous chemicals they use daily, including emergency procedures?	X		
Are MSDSs placed and made readily available in a central location where most of the work is being accomplished?	X		

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;  
"Compliance assistance checklist,")

### Appendix J: Compressed Gas & Cylinders Assessment Checklist

Questions	Yes	No	NA
Are cylinders legibly marked to clearly identify the gas contained?	X		
Are compressed gas cylinders located or stored in areas where they will not be damaged by passing or falling objects or be subject to tampering by unauthorized persons?	X		
Are oxygen and acetylene cylinders located in different areas?		X	
Are cylinders containing liquefied fuel gas stored or transported in a position so that the safety relief device is always in direct contact with the vapor space in the cylinder?			X
Are valve protectors always placed on cylinders when the cylinders are not in use or connected for use?	X		
Are all valves closed off before a cylinder is moved, when the cylinder is empty, and at the completion of each job?	X		
Are low-pressure fuel-gas cylinders checked periodically for corrosion, general distortion, cracks, or any other defect that might indicate a weakness or render them unfit for service?	X		
Do gas cylinder' hoses secure?	X		
Do welder operators have welder certificate?	X		

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;  
"Compliance assistance checklist,")

### Appendix K: Personal Protection Equipment & Clothing Assessment Checklist

Questions	Yes	No	NA
Are jobs or tasks assessed for hazards that require personal protective equipment?	X		
Are hazard assessments properly certified?	X		
Is training on the use, care and disposal of PPE conducted and documented?	X		
Are protective goggles or face shields provided and worn where there is any danger of flying particles or corrosive materials?	X		
Are approved safety glasses required to be worn at all times in areas where there is risk of eye injury such as punctures, abrasions, contusions, or burns?	X		
Are protective gloves, aprons, shields or other protection provided against cuts, corrosive liquids, and chemicals?	X		
Are hard hats provided and worn where danger of flying or falling objects exists?	X		
Are hard hats inspected periodically for damage to the shell and suspension system?	X		
Is appropriate foot protection required where there is risk of foot injury from hot, corrosive, poisonous substances, falling objects, crushing, or penetrating actions?	X		
Are approved respirators provided for regular or emergency use where needed?	X		
Is all protective equipment maintained in a sanitary condition and ready for use?	X		
Are eyewash facilities and quick-drench showers within a work area where employees are exposed to caustic or corrosive materials?		X	
When lunches are eaten on the premises, are they eaten in areas where there is no exposure to toxic materials or other health hazards?	X		
Is protection against the effects of occupational noise exposure provided when sound levels exceed those of the noise regulation of Turkey?	X		

("Working at height,"; "Safety management system,"; "Accident prevention," 2003;

"Compliance assistance checklist,")

## Appendix L: Institutional Review Board (IRB) Approval

April 21, 2013

Selin Aras, Carol Boraiko

Department of Occupational Health & Safety Department of Engineering Technology

[sa4q@mtmail.mtsu.edu](mailto:sa4q@mtmail.mtsu.edu), [carol.boraiko@mts.edu](mailto:carol.boraiko@mts.edu)



Protocol Title: "Identify Hazards and Barriers in the Petroleum Company for Implement the ISO 18001 Occupational Health and Safety Management System"

**Protocol Number: 13-298**

Dear Investigator(s),

The exemption is pursuant to 45 CFR 46.101(b) (2). This is because the research being conducted involves the use of survey materials, interviews or observation of public behavior.

You will need to submit an end-of-project report to the Compliance Office upon completion of your research. Complete research means that you have finished collecting data and you are ready to submit your thesis and/or publish your findings. Should you not finish your research within the three (3) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires on **April 21, 2016**.

Any change to the protocol must be submitted to the IRB before implementing this change. According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the project. **Once your research is completed, please send us a copy of the final report questionnaire to the Office of Compliance.** This form can be located at [www.mtsu.edu/irb](http://www.mtsu.edu/irb) on the forms page.

Also, all research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

*Andrew W. Jones*

Compliance Office

615-494-8918

[Compliance@mts.edu](mailto:Compliance@mts.edu)