

# Exploration of HSE Standardized Training Management System in Oil and Gas Enterprises

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## Abstract

**Oil and gas mining operations are complex, there are all kinds of safety hazards, coupled with the difficult natural environment, the professional quality of employees and HSE (health, safety, environmental protection) awareness requirements are extremely high, effective HSE training is to ensure safe production and prevent accidents the key measures. At present, HSE training management system has been implemented in oil and gas enterprises for many years, but there are still problems such as lack of rationality of training process and lack of pertinency of training work, and there is still a large room for improvement. Based on the problem-oriented and standardized management concepts and methods, this paper focuses on the five standards of "standardized management system, standardized operating process, standardized teaching content, standardized teacher management and standardized information platform", builds the HSE standardized training system of oil and gas enterprises, and establishes and improves the normal working mechanism of training management. The aim is to better promote the HSE training level of oil and gas enterprises.**

## Keywords

**Oil and Gas Enterprises; Training Level; Standardized Training System.**

## 1. Necessity of Construction of HSE Standardized Training Management System

Standardization is an act of social practice in economics, technology, science and management, whose purpose is to unify repetitive things and concepts through the development, publication and implementation of standards to achieve the best order and social benefits. In the process of reforming and establishing modern enterprise system in our country, standardized enterprise management is indispensable and the inevitable result of realizing scientific enterprise management gradually. The standardization of enterprise management is very important to promote scientific management of enterprises. Scientific management cannot be separated from standardized management. In fact, the scientific process of enterprise management is the process of constantly understanding the characteristics of the enterprise and summing up management experience, and the essence of this process is to gradually standardize enterprise activities. This is a gradual process that requires continuous accumulation and deepening of experience. The standardized management system includes the rules and regulations of various departments, work processes and post operation manuals, as well as the forms and agreements matching the system processes. Enterprises need to conduct standardized training for employees of different ages, genders, professions, experiences and positions, and establish an effective knowledge system as a support. Whether it is the needs of employees to improve their skills and lifelong learning, or the strategic deployment of

enterprises, the implementation of reform measures, the upgrading of standardization systems and the cultivation of corporate culture, effective training is needed as a guarantee. Therefore, standardized training has become a very important part of standardized management.

HSE management system is an advanced enterprise Safety management method, which integrates the management of Health, safety and Environment in three aspects, aiming to ensure the safety and health of employees and society, and reduce the risks of enterprises in these three aspects. The core of HSE management system is prevention. Through the formulation and implementation of a series of standards, systems and processes, enterprises can carry out comprehensive risk management and improve the safety performance and management level of enterprises. HSE training management is an important part of HSE management, and building a first-class HSE training institution in the industry is an important part of the company's development strategy. The standardization construction of HSE training plays an important role in developing high-quality training courses, building an excellent lecturer team, cultivating excellent enterprise students, improving the scientific and standardized level of training management, establishing a learning enterprise, and enhancing the core strength of the company.

For oil and gas enterprises, the importance of HSE standardized training management system construction is self-evident:

First of all, the production process of oil and gas enterprises involves a large number of dangerous goods and high temperature and high pressure and other risk factors. Once an accident occurs, it will not only cause casualties and property losses, but also cause serious pollution to the environment. Therefore, the establishment and implementation of HSE standardized training management system can help oil and gas enterprises to better manage risks, improve the quality of the staff, enhance the degree of matching between personal characteristics and positions, enhance the competitive advantages of individuals and organizations, prevent accidents, ensure the safety and health of employees and society, and improve the social image and market competitiveness of enterprises.

Secondly, HSE standardization training is a realistic need to achieve training innovation. In order for oil and gas enterprises to obtain and maintain competitive advantages in the fierce competition, it is inevitable that individuals in the organization become innovative individuals and organizations become the focus of continuous development of intellectual resources. Therefore, continuous innovation of training concepts, training methods and models is the core driving force and competitive basis for the continuous growth and development of individuals and organizations.

Third, HSE standardization training is an objective need to enhance the training effect. Specifically, it is necessary to realize the transformation from infusion type to ability enhancement type, from satisfaction type to guidance type and from new knowledge type to intelligent enhancement type. HSE standardized training process is not only to transfer knowledge to employees, but to guide and stimulate employees' learning interest and initiative, so that they can become autonomous learners. Heuristic teaching method is adopted to stimulate employees' thinking and learning interest and cultivate their active learning habit and ability by asking questions, guiding discussion and interactive communication. Trainers act as facilitators and mentors to promote employee engagement and thinking deepening, making the training process more targeted and effective.

## 2. Problems of HSE Training Management System of Oil and Gas Enterprises at the Present Stage

### 2.1. Lack of Soundness of Training Mechanism

First of all, there is a lack of scientific planning in the training work, and various management systems and assessment mechanisms are not perfect, resulting in the lack of effective incentive mechanisms. In this case, it is difficult to stimulate the learning enthusiasm and initiative of employees. Second, there are systemic deficiencies in training teachers[1] For example, in many training activities, the training teachers are mainly composed of internal employees of the enterprise. This kind of teacher structure is not sound enough to absorb advanced external technology and working methods. This mode limits the scope of training to internal learning, and in the long run, employees generally lack a sense of identity to training. Third, due to the lack of perfect training evaluation mechanism, it is difficult to effectively evaluate the previous training work, and it is difficult to achieve the expected goal of the transformation of training results. Fourth, due to the lack of effective communication and supervision, the training work lacks discipline for a long time, and the training effect is difficult to maximize. In addition, the HSE training documents of some oil and gas companies are generally not targeted. In the early stage of building the HSE management system, the company lacked experience and directly applied the documents of other companies without conducting research in combination with the development objectives of its own company, resulting in a serious disconnect between the prepared HSE documents and the actual situation of the company. These documents become formalized written materials and cannot effectively guide the good operation of the HSE management system.

### 2.2. Lack of Targeted Training

China's oil and gas enterprises attach great importance to safety production, and carry out a series of professional training around HSE standardization training, including safety accident lectures, safety knowledge lectures, three-level safety education lectures for new employees, etc. In recent years, with the continuous improvement of the enterprise's emphasis on HSE training, the relevant internal training work has become more systematic and diversified, but at the same time, some problems have been exposed:

First, the needs of employees at different levels are not fully understood before the training, and the same knowledge is always instilled in the training process, the training content deviates from the actual production needs, and the training needs are not analyzed according to the job responsibilities and ability evaluation results of employees, so as to realize hierarchical teaching[2]. The training content is mainly focused on how to improve professional knowledge, so that the training content appears general and empty, lack of pertinence, and practical ability training is not deep enough to land.

Second, oil and gas enterprises do not have a deep understanding of the connotation of HSE training management system, resulting in the systematic and comprehensive safety training content is not strong, and the development of high-quality courses is relatively small. HSE training management system is the core framework for oil and gas enterprises to ensure the health and safety of employees and environmental protection. However, some oil and gas companies may only have a superficial understanding of the HSE training management system, lacking in-depth exploration and understanding of its connotation, often focusing only on the communication of basic regulations and standards, while ignoring the importance of the overall framework, principles and best practices[3]. This limitation makes the content of safety training lack of systematization and cannot combine all aspects and elements organically. For example, training may only focus on individual safety operation procedures, while ignoring risk assessment, accident prevention, emergency response and other aspects of the content,

resulting in employees' understanding of the overall safety management system is not comprehensive and consistent.

In addition, due to the lack of in-depth understanding of the HSE management system, oil and gas companies have also faced challenges in developing high-quality courses. Quality courses are high-quality training courses designed for specific target groups according to actual work scenarios and needs. Due to the lack of a comprehensive grasp of the connotation of HSE management system, enterprises may not be able to accurately grasp the key elements and risks in the work scene, so as to be unable to develop targeted and highly practical high-quality courses.

Third, the management of trainee teachers involves the selection, training, management and evaluation of trainee teachers, etc. For example, the theoretical training of trainee teachers is mostly carried out in the form of a single lecture, with empty content and lack of quality control, which makes it difficult to ensure the effectiveness of training, and the lack of effective management mechanism and system for the management of trainee teachers makes it difficult to supervise and guide the work of teachers. The lack of clear management process and division of responsibilities leads to the inability to get timely feedback and improvement of teachers' performance, which affects the quality and effect of training.

### **2.3. Lack of Rationality in the Training Process**

The proper process should take into account the actual situation and needs, and meet the objectives and requirements of the training. In the actual situation of oil and gas enterprises, the lack of rationality in the training process is reflected in the following aspects: First, unnecessary repeated training is not avoided. In the oil and gas industry, some training courses may be repeated, resulting in students receiving the same or similar training content multiple times, wasting time and resources, and reducing students' motivation and efficiency. Second, the training program is not personalized and customized according to the roles, responsibilities and development needs of employees. Employees in an organization have different backgrounds, responsibilities, and learning needs[4]. The training process may lack personalization and customization considerations, placing all participants in the same training plan, resulting in participants potentially receiving unnecessary training content that others may not be able to meet their specific needs. Third, the lack of practical application and situational training. The training process is too theoretical and lacks training content and practical opportunities related to the actual working environment and situation. Students may not be able to directly apply the knowledge and skills acquired in practical work, resulting in the effectiveness and sustainability of the training. Fourth, the lack of effective evaluation and feedback mechanisms in the training process makes it impossible for students to accurately assess their learning progress and ability level. The lack of assessment and feedback hampers the growth and improvement of trainees and prevents the training process from being adjusted and improved in a timely manner.

## **3. Construction of HSE Standardized Training Management System Framework for Oil and Gas Enterprises**

### **3.1. Construction Objectives**

#### **3.1.1. Establish a Training System Covering All Staff and the Whole Life Cycle**

A hierarchical and classified HSE training course system covering exploration, drilling, oil production, storage and transportation, processing and other business links, covering new employees, on-the-job operators, managers, contractors and other personnel shall be established. The training runs through the various stages of employees' pre-entry, post-entry, post transition, promotion, etc., to achieve the whole life cycle training.

### 3.1.2. Establish a Refined Training Assessment Index System

Establish a multi-dimensional assessment system combining knowledge, skill and attitude. Implement a strict certification system for special operators to ensure that the certification personnel master the necessary professional knowledge and operational skills.

### 3.1.3. Build a High-level Teaching Staff

Through the combination of internal selection and external introduction, a team of HSE teachers with excellent professional skills and excellent teaching ability is established to lay the foundation for the quality of training.

## 3.2. Construction of HSE Standardized Training System based on Competency Model Objectives

### 3.2.1. Overview of Competency Model

David McClelland, a professor at Harvard University in the United States, proposed the concept of competency in the 1970s to build a competency model. A competency model is a framework used to describe and assess the key competencies and skills required of an individual in a particular field or career. Based on research and practical experience in successful performance, it aims to help organizations identify and develop the core qualities needed by employees to improve performance and promote personal career development. Specifically, it refers to the combination of knowledge, skills and behaviors used to perform well in a job or occupation. Spencer, LM (1993) et al. put forward the competency iceberg model and described the competency characteristics into two parts. The first is the surface characteristics, including knowledge and skills. The second is the deep characteristics, including attitudes, values and so on. Competency model provides an effective model for the specific work level and job role of an organization. It is an important link in the construction of enterprise business performance, the starting point of human resource management and training, and an important basis for a series of human resource management.

### 3.2.2. Construction of HSE Standardized Training System

Problem-oriented, competency model as the goal, the use of standardized management concepts and methods, focusing on "standardized management system, standardized operating process, standardized teaching content, standardized teacher management, standardized information platform" five standardization, the construction of oil and gas enterprises HSE standardization training system, establish and improve the training management normal working mechanism. Explore the standardized operation and management mode of the whole chain of "behavior -- process -- link -- result" to improve the pertinence, practicability and effectiveness of training[5].

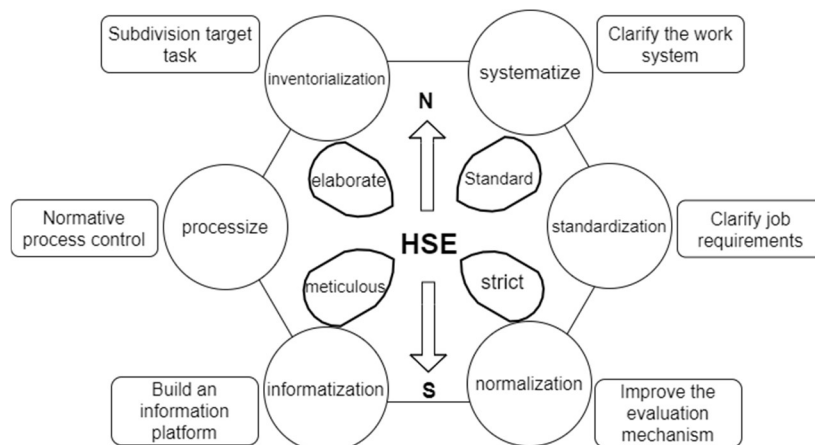


Fig. 1 HSE standardization management

(1) Standardized management system. Starting from the four key points of "precision, precision, fine and strict", and taking the six angles of checklist, systematization, standardization, normalization, informatization and process as the direction, formulate comprehensive management guidelines, compile detailed management guidance manuals, sort out each key link and training work content in detail, and clarify the promotion of training objectives, tasks and implementation paths. Standardize the daily affairs management of HSE training base, improve the quality of running school, and ensure the training effect.

(2) Standardized operation process. Emphasize the whole process closed-loop traceable work process control, for the typical and regular training work to achieve a standardized level; For personalized training needs, combined with the actual adjustment of training content and methods, the base has a unique competitive advantage in the training field.

From the pre-training needs research, notice distribution, to the course schedule, etiquette norms, course Settings, to the training ceremony, are strictly in accordance with the established procedures to operate. The training content has been adjusted from the original "large and complete" to "basic coverage, prominent focus", and targeted training on the quality of the senior management team based on the competency model. Through the HSE standardized training system, we pay attention to both theoretical learning and practical application, so that the senior management team can break through themselves and effectively improve their personal quality and ability. The construction of HSE standardized training process needs to go through four stages: overall planning, communication and sharing, online learning and joint construction (as shown in Fig. 2), aiming at guiding and cultivating employees' professional knowledge, behavioral values, characteristics and drive.

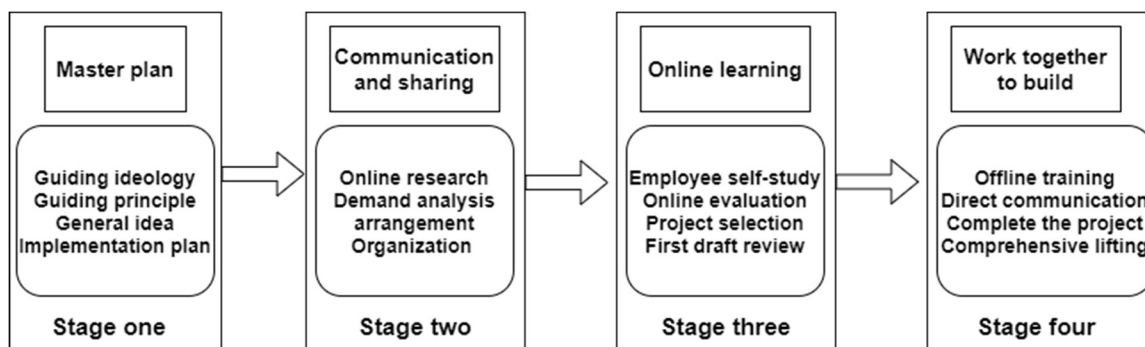


Fig. 2 Four stages of HSE standardization training

(3) Standardized teaching content. Actively promote the information and intelligent construction of training content to improve training quality and management efficiency. Develop standardized teaching content, teaching materials and course content, and realize the whole process of training, systematic and traceable management through intelligent tools.

The standardization construction of quality courses is an important part of the high quality development of HSE standardization training center. HSE standardized training system, adhering to the concept of innovative teaching, adopts a variety of teaching means and tools, such as online learning platform, virtual reality technology and distance education, to provide students with flexible and convenient learning methods. Strictly comply with relevant laws, regulations and industry standards to ensure that the course content provided is accurate, comprehensive and keeps pace with the latest HSE trends. The construction process of quality courses mainly includes: establishment of expert group, planning and project approval, construction of teaching staff, construction of teaching materials, mid-term inspection, evaluation and acceptance, as shown in the following figure, aiming at standardizing teaching content and providing basic guarantee for staff knowledge and skills improvement.

(4) Standardized teacher management. Establish a teacher library, grade and classify the trainers, and establish a teacher file for each teacher. Use quantitative and qualitative assessment methods to monitor and evaluate teachers' teaching performance, including feedback evaluation of students and regular review of teaching results, and encourage teachers to continuously improve teaching methods. Through the establishment of a high-level teacher pool, we will ensure that teachers have the required training experience and professional knowledge to meet training needs. At the same time, improve the management efficiency and transparency of the teacher library, rationalize and standardize the selection, training, assessment, entry and exit procedures of the trained teachers, promote the continuous learning and development of the teachers, and constantly improve their training and teaching level and professional quality.

HSE standardized training system set up teacher database and establish teacher files. First, increase the standard process of teacher pool management. The author designs the standard process of teacher library management from the process of teacher library, teacher use, teacher management, teacher dismissal and so on, and points out the key nodes. Based on the principles of "selective entry, reasonable structure, combination of professional and professional, dynamic management and resource sharing", the management method of teacher database is formulated in detail from the aspects of entry conditions and methods, use and management, rights and obligations. Second, the establishment of teacher database, trainer classification, professional classification, for each teacher to establish a teacher file. According to the specific situation of the trainers, the training teacher database is classified according to the profession and level, and a comprehensive file construction is carried out for each teacher to ensure the integrity, accuracy and timeliness of the teacher files, improve the efficiency of teacher management, and promote the development of the training teacher team.

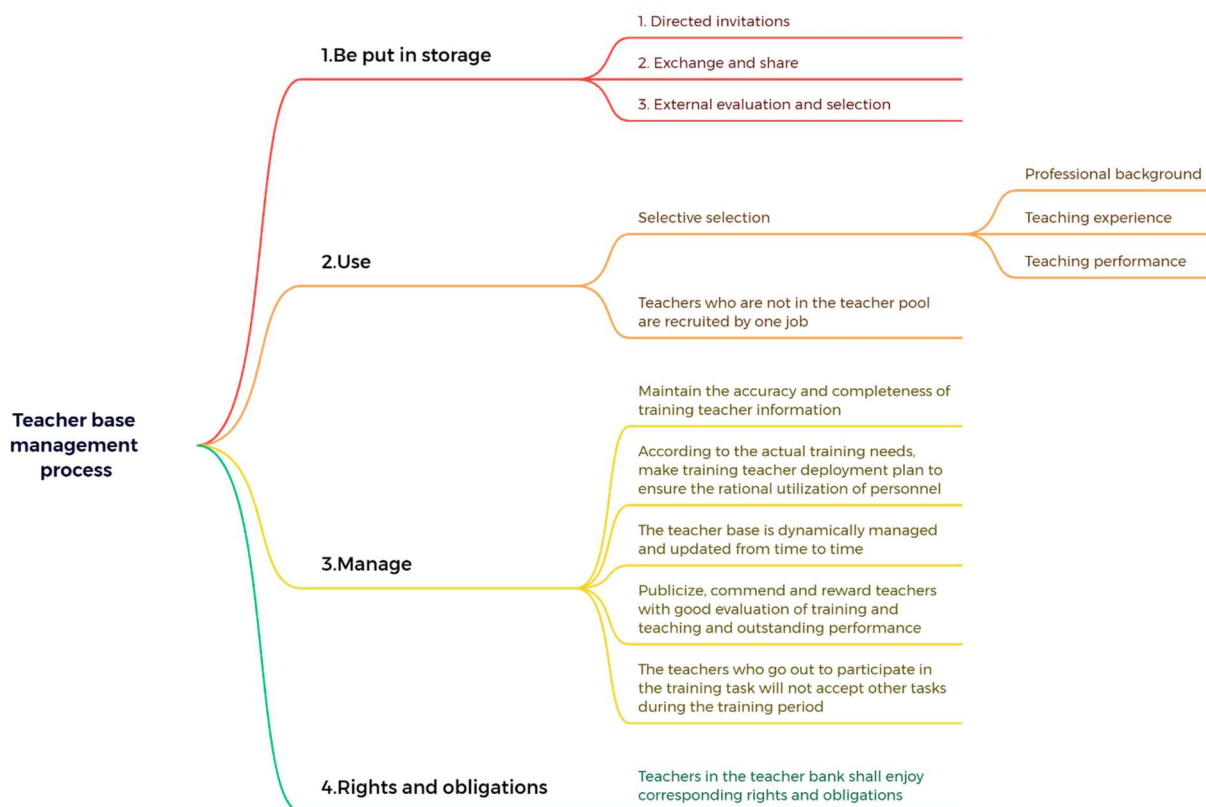


Fig. 3 Teacher library management process

The management process of constructing HSE standardized training teacher database should mainly include: teacher entry, teacher database use, teacher database management and teacher rights and obligations of teacher database, as shown in Fig.3.

(5) Standardized information platform. Build a modern "smart classroom" to provide high-quality teaching experience through automatic tracking live broadcast, virtual playback, diversified courseware production and other functions; Carry out the construction of digital intelligence, build a digital training management platform, realize "online + offline" training with the help of wechat public account and compliance training management system, provide the whole process of training management information, in order to provide the best learning experience.

## **4. Safeguard Measures for the Construction of HSE Standardized Training Management System for Oil and Gas Enterprises**

### **4.1. Incentive Guarantee**

#### **4.1.1. Incentive and Constraint Management Trinity**

In the process of HSE standardization training for oil and gas enterprises, a trinity of incentive, constraint and management is formed. In the formulation of constraints and incentive measures, management by objectives should be applied, information management should be introduced, people who make significant contributions to HSE standardization training should be rewarded, and leaders who do not pay attention to HSE standardization training and lead to the deterioration of enterprise economic benefits should be punished. Secondly, training measures combining "training, assessment, use, salary and promotion" will be implemented for employees. Develop a "three noes" program, that is, no training is allowed to post, can not be identified, can not be promoted. Finally, incentives need to be embedded in the hearts and minds of oil and gas employees, enabling them to take the initiative, and in the training process, the performance of the best employees to promote the position, increase the salary, so that their motivation is significantly increased.

#### **4.1.2. Incentive Measures and Execution are Closely Integrated**

The incentive measures of HSE standardization training in oil and gas enterprises are closely combined with the execution force. Incentive measures should be attractive and seductive, so that employees clearly know what level of work to achieve, what kind of reward will be received, full of hope for work, so that HSE standardization training work can be better executed. Reward instructors and individuals who participate in the training. For example, the introduction of teaching time rewards makes full-time teachers more willing to earn higher rewards by accumulating teaching hours, and combined with the promotion system, the salary of lecturers of higher levels can be upgraded to a certain level, and under strict evaluation conditions, it can be comparable to the management, so that the teaching of actual teachers is closely linked to the promotion and income, so that the career and treatment can be retained.

#### **4.1.3. Smooth Channels for Talent Growth**

In the HSE standardization training of oil and gas enterprises, it is necessary to establish an integrated management channel of training, selection, assessment, promotion, reserve and use to promote the growth of talents, extend the employment growth chain, and broaden the growth space for employees. The focus should be on scientific research and engineering projects as the core, on the basis of positions, with performance appraisal as the main means, and the full implementation of the responsible person system. At the same time, improve fair competition, open recruitment, job rotation and temporary employment and other management methods, market-oriented, select special training project team members, and constantly stimulate the enthusiasm and vitality of professionals. High-end technology should

be seen as recognition of important talent. Create an environment that values labor, respects knowledge, values innovation and focuses on talent ability, rather than just age, education, social status and professional title. Establish a "green channel" for personnel training and development based on knowledge, skills and performance, and establish a technical personnel development path that combines personnel training, classified training, on-the-job training and self-improvement. In the selection of talents, adhere to the principle of "first training before post". Focus on training and rewarding key talents and outstanding talents. Formulate scientific and reasonable training programs, focus on cultivating highly skilled personnel, technical and management backbone, and cultivate a group of knowledge-based, skill-based and comprehensive core personnel through exit training, skill competition, mentor guidance, scientific and technological research, professional training and other means.

## **4.2. Organizational Culture Guarantee**

### **4.2.1. Integration into Corporate Culture**

Oil and gas enterprises in the development of relying on the spirit of perseverance, continuous exploration and gradually grow up. In the organization of HSE standardized training work, the enterprise should carry out this spirit into the cultural publicity. The development of enterprises cannot be separated from the promotion of employees, and the growth of employees is the key. The company guides employees to integrate the corporate culture of "safety, environmental protection, efficiency and exploration" into the training work, so that this spirit is deeply rooted in the hearts of the people.

### **4.2.2. Establish a Learning Organization**

Oil and gas enterprises need to establish a learning organization and form a good learning atmosphere, which is conducive to improving the importance of enterprise HSE standardization training. The completion of HSE standardization training requires the cooperation and support of managers and employees. Management attaches importance to training, encourages employees to participate in training, gives timely guidance in training, and gives effective training evaluation after training, which can not only improve the enthusiasm of employees to participate in training, but also greatly improve the efficiency of training. In cultural construction and activity organization, it is necessary to create a strong learning atmosphere, provide and create more learning opportunities for employees, and establish more resource sharing centers and learning centers.

### **4.2.3. Inherit Good Training Culture**

Corporate culture is the spiritual pillar and soul of the enterprise, is the ideological basis of employees' hard work, and is the internal driving force for the development of the enterprise. The construction of excellent HSE standardized training culture plays an important role in ensuring the optimization of training management.

First of all, we need to deliver the oil and gas enterprise culture strategy. Adhere to the original intention and mission of "refueling for a better life", recognize the core values of oil and gas enterprise culture, expand the value chain of employee training, interpret and disseminate the core values of the enterprise, standardize the code of conduct of employees, recognize the corporate ethical standards, organically integrate with the development strategy, and provide HSE standardized training services through management output and cultural output. Gradually enhance the training concept of enterprise employees to provide value guidance and spiritual support for technical work. Second, a unique training culture needs to be created. Extract the practical training culture with oil and gas characteristics, carry out text description, design publicity symbols, use unique creativity to make the practical training culture three-dimensional, make the practical training culture internalized in the mind, externalized in the real and solidified in the system, carry out vivid demonstration, practice and auxiliary

explanation for students in different practical training places and offices, combine comprehensive display and publicity, and build HSE standardized training brand. Shape the image of enterprise training.

### **4.3. Guarantee of Training Funds**

Training funds are the basic guarantee to ensure the smooth implementation of HSE standardized training. The investment of training funds is not actually an expense, but an investment in the development of oil and gas enterprises. Enterprises need to clarify the proportion of training funds in the total expenditure and the per capita ceiling of employee training funds. Training funds need to increase year by year with the development and growth of enterprises, one is to ensure the training of teachers, the second is to ensure the development of excellent courses, the third is to ensure the equipment related to training, only in this way can ensure the effect and function of training.

#### **4.3.1. Personnel Training Fund Guarantee**

Ensure full funding for HSE standardization training. Provide training funds for petroleum engineering companies, oil field branch companies and exploration bureaus, and provide training funds for employees with "full withdrawal and special funds". For the employees of labor dispatching units, do a good job of timely payment of labor training funds, and urge the implementation of the situation.

#### **4.3.2. Fund Guarantee for Course Development**

The development expenses of training resources shall be separately allocated in the HSE standardized training budget, including the development expenses of training courses, the development expenses of teaching materials, the development expenses of examination question bank, etc., so that the development of training courses with special costs can be guaranteed. Curriculum development as the most important content of training, full-time teachers still play a leading role in it, there is a separate cost to ensure that full-time and part-time teachers jointly invested in the enthusiasm of training course development, to ensure that curriculum development in the training activities of the important position[6].

#### **4.3.3. Fund Guarantee for Equipment and Facilities**

Oil and gas enterprises can adopt the "721" principle, of which 70% shall be used for the construction of HSE standardization training resources, 20% shall be used for the implementation cost of HSE standardization training, and 10% shall be used for other expenses. Enterprises can make plans according to the actual situation of their own HSE standardization training, and constantly improve the distribution standards to ensure that more funds are used in the needed places. Annual special fund investment can be set up, training funds for training projects, security special fund investment, etc., to take a variety of measures to broaden the source of funds channels to ensure that the training base needs to improve construction. For example, it can be paid in the unit safety production costs for the hardware construction of security forensics projects. Organize and coordinate the training center, human resources Department, finance, operation, budget estimate center and other units, make reference to the training quota situation of other oilfield training institutions, analyze various factors in detail, and moderately increase the training quota cost standard, so as to adapt the HSE standardized training cost to the requirements of market economy development. For the investment in new projects, new technology development projects and new product research and development projects, major technological transformation projects and other projects, personnel training costs and training facilities construction support costs shall be separately included to ensure the financial guarantee for the development of new training projects.

## 5. Conclusion

To sum up, in view of the risk of oil and gas engineering and the complexity of production mode, enterprises to strengthen HSE standardization training, both for employees and social stability has far-reaching significance. HSE training management system is the practical result of the oil and gas industry after years of development, summed up in countless experiences and lessons, fully embodies the integration of modern enterprise management thought. The operation of HSE training management system of oil and gas enterprises in China still has some shortcomings. Enterprises should, based on their actual conditions, build HSE standardized training system of oil and gas enterprises, continuously improve HSE standardized training, establish and improve the normal working mechanism of training management, and better promote the improvement of HSE training level of oil and gas enterprises. To promote the long-term development of oil and gas engineering in China.

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