Nondestructive Testing: Ensuring Quality Assurance in Oil and Gas Industry

Student's Name

Institution

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Quality assurance is vital in the twenty first century. Nondestructive testing (NDT) involves inspections meant to detect alongside verifying quality of items. Organizations providing NDT services are essential in ensuring correctness along with accuracy of test results. Oil and gas industry is one of many industries that need to carry out quality assurance especially on operations and equipment used. The point is in the dangers that might occur from outdated utilization of equipment such as used pipes rather than new ones acquired from a trusted manufacturer (Dingus, Haven & Austin, 2002). In this case, the used pipe should be inspected through the NDT methods in order to avoid its failure during oil extraction or refinery. Quality assurance is crucial in addressing quality issues in oil and gas industry and it can be done through nondestructive testing methods that detect and verify quality of items in the industry.

The oil and gas industry is usually governed by guidelines outlined by the American Petroleum Institute (API). The API is the biggest oil and gas trade association. It is involved in advocacy and negotiations with governmental, regulatory and legal agencies. The standards stipulated by the API are to be followed since they address methods of drilling and manufacturing of the drilled products. The guidelines stipulated in the API recommend limits to be addressed in drilling tools as well as procedures utilized in the field. The document also covers all required inspection levels that are applied to qualify people that inspect the equipment (Paipetis, Matikas, Aggelis & Hemelrijck, 2012). In this case, such person is required to cover three levels to qualify to be able to inspect the drilling tools used in the oil and gas industry. NDT can be the best method of ensuring quality assurance in the above-pointed sphere. Most industries use the technique to ensure that processes in the field run smoothly and safely and that products are manufactured with high degrees of integrity. NDT may be used to test without

destroying the equipment in the oil and gas industry. It can be applied to detect any internal or external flaws. The NDT is usually used in practical ways with the performance of a test piece to indicate how long that piece can stay altogether and when it requires being checked (Dingus, Haven & Austin, 2002). Tools in the oil and gas industry may be detected in terms of variations in structure, presence of cracks, minute changes in the surface finish and any other physical discontinuities.

The most important, the NDT can be applied in the given industry in ensuring integrity and reliability of tools used, avoiding failures, saving lives and preventing accidents in the fields of extraction. Ensuring product reliability in the analyzed area is vital since it indicates a general increase in the performance expectancy from the public. Those people that use oil and gas products will be assured of their quality which offers uninterrupted services. The NDT method also ascertains readiness of operations in the industry. Reliability to protect lives of human beings and animals is a valuable action enhanced through the NDT (Paipetis et. al, 2012). Therefore, the NDT ensures efficient and safe operations of assets and equipment through the detection of defects. This is usually possible before they lead to severe damages alongside ensuring compliance with the international standards. NDT has played a huge role in exploration, transportation of both oil and gas through pipelines altogether with other processes of production in the field. It ensures detection of change in thickness of corroded together with eroded parts and pressure changes in vessels, pipes among other components. In this case, almost all welding on containers, pipelines, vessels and pipes are done through the NDT methods, such as ultrasonic testing (Grant Prideco, 2004).

Moreover, NDT provides the flaw detection services in the oil and gas industry because it enhances the movable detection procedures and installation of the portable equipment. These

operations make it possible for testing all drilling tools and equipment. Furthermore, there is a flow detection of the threaded joints in all drilling pipes that makes it possible towards detection of exploitation and work defects. It also identifies corrosion along with fatigue cracks. Most importantly, the NDT ensures flaw detection of the smooth parts of pipes and equipment that makes detection of the cross and length-based defects possible. The wall thickness testing of all drilling pipes and equipment is possible through the NDT as well. In this way, there is a reduction of accident rates from 60% to 18%. All these failures are attributable to organizing errors and poor rate of error detection by specialists altogether with unsatisfactory organization of both tools and equipment inspection (Paipetis et. al, 2012). In addition, correction of any errors helps to adhere to standards set by the API concerning the oil and gas industry.

NDT specialists are also able to provide companies with informed, complete and useful data that allows them to make the sound asset management decisions. This helps to save time as well as money through the development of quick and effective testing of industrial assets throughout the stages of asset lifespan (Dingus, Haven & Austin, 2002). This begins from the manufacturing to the on-site operations in the oil and gas industrial equipment and tools. In this way, the NDT ensures that all tools and equipment can be used reliably by the companies in the industry and enhance time-saving and financial effectiveness. The businesses would incur huge losses from the poor detection of flaws and defects in the industrial tools and equipment, including pipes and drilling equipment. It is vital to note that the proper break-in has emerged as the most crucial factor which affects life of tool joint connection in the drilling pipes. NDT ensures that proper make-up torque has been followed through the connection type ID and OD found on the torque labels. The methods in NDT also make sure staggering of breaks on every trip to prove that every connection is checked, dropped altogether with being made up each

second or even third trip (Grant Prideco, 2004). This depends on the length of the drill pipe and the size of the rig.

In addition, the NDT gives a way for the nondestructive evaluation (NDE). The latter is used in describing measurement of a more qualitative nature than the NDT. A NDE technique would perform more tasks than the NDT. It would not only determine the defect in equipment and tools in the oil and gas industry, but also measure the defect in terms of shape, orientation and size and its influence to the remaining life structure and components of tools and equipment (Paipetis et. al, 2012). The NDE is an additional service offered by the NDT to ensure quality assurance in most industries, especially in the oil and gas industry. It is used to determine the material properties, including fracture toughness, and formability among other physical characteristics of tools and equipment.

Besides, the industry enjoys the ever-growing technology in the two quality control methods. It has emerged that more advanced techniques in component inspection and processing continue to grow and upgrade every day. Methods, such as visual inspection, magnetic particle testing, liquid penetrates testing, electromagnetic current testing, ultrasonic testing and radiography have played a significant part in the quality assurance in the oil and gas industry helping it to save costs and many lives. The NDT assists the analyzed field to understand that safety is always a prime driver into the plants' operating process. This entangles safeties for both those working in the industry and those that can be affected by plant failures (Paipetis et. al, 2012). An appropriate inspection through the NDT methods is a way of ensuring safety in industrial operations.

Furthermore, NDT has introduced the inspection qualifications and performance demonstration that is vital in the oil and gas industry in terms of quality assurance in the 21st

century. The concept requires inspection to be able to meet all stated objectives. These objectives are mostly endorsed by the independent body. In this case, plant owners require agreeing with requirements for qualifications with the relevant regulatory body. The plant owner will then be required to work closely together with the NDT specialist in order to enhance performance of qualification in the most cost-effective manner. The most importantly, the NDT provides careful assessments of components in the oil and gas industry to identify all risks and effects of failure of every component through a risk-based inspection. Therefore, the maintenance interval is usually determined based on these risks (Dingus, Haven & Austin, 2002). Thus, effective applications of NDT are vital in mitigation of risks in the sphere discussed.

In conclusion, quality assurance and control is critical in the oil and gas industry. This is usually done through the nondestructive testing methods to determine internal and external flaws without interrupting the integrity and suitability of services, which are provided through the tools and equipment. NDT plays significant role the industry in terms of quality assurance since it helps to ensure reliability of tools and equipment in the industry and cost effectiveness. It also aids in adherence of the standards set by the American Petroleum Institution (API) that establishes rules and regulations to control the use of tools and equipment in oil and gas industry. In this way, NDT contributes immensely to that the aforementioned means are free from flaws and defects in order to enhance the smooth plant operations (Dingus, Haven & Austin, 2002). Consequently, quality assurance is crucial in the 21st century in addressing quality issues in oil and gas industry and it can be done through nondestructive testing methods that detect and verify quality of items in the industry.

References

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