Guidelines for Certification of Pipeline Operators

REGIONAL ASSOCIATION OF OIL, GAS AND BIOFUELS SECTOR COMPANIES IN LATIN AMERICA AND THE CARIBBEAN

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1. Introduction

The transportation of hydrocarbons and their derivatives entails high risk activities due to the hazardous substances transported and the risks they pose to the integrity of persons, the environment or the facilities.

Ensuring the knowledge and skills of the personnel who operate the transportation systems helps to decrease the probability of incidents or accidents that could cause the loss of primary containment of hazardous materials.

In addition, standardized Qualification and Certification processes allow owners of pipelines and their operators to establish an important reference point for defining the levels of competence and skills required for the implementation of pipeline operations.

The Qualification and Certification of pipeline operators bring about the following benefits, both for the owners of pipelines, and for operating companies and their personnel:

- Improving the corporate image at the national and the international level - international recognition
- Allowing the organization to have "world class" human talent (employees trained and certified under an international benchmark)
- Strengthening the compliance with requirements that generate a competitive advantage when participating in potential pipeline transportation business at the national and international level
- Strengthening the priorities in the implementation of activities associated with pipeline operations:
  - People safety
  - Environmental protection
  - Facilities safety
  - Satisfaction of internal and external customers
  - Effectiveness in operations
- Improving the quality of transportation services
- Motivating and committing the operations personnel who participate in the Qualification and Certification processes, as a result of the structured development plans for improvement of their skills and abilities
- Standardizing processes under an international benchmark that improves productivity and therefore increases the profitability of the business

This document has been prepared to provide general guidelines to ARPEL member companies about the different steps to take in order to perform the International Qualification and Certification of their international pipeline operators.

2. Objective

The general objective of this document is to provide ARPEL member companies with a roadmap to plan and conduct the processes of Qualification and Certification of local and remote operators properly under the reference of the DOT.

3. Scope

These Guidelines provide ARPEL member companies with the most important criteria that must be taken into consideration when planning and conducting processes of Qualification and International Certification of pipeline operators under the reference of the DOT.

The Guidelines cover aspects that help to conduct the Qualification and obtain the Certification, and provide relevant criteria to implement training of local and/or remote operators participating in these processes:

1. Definition of Training/Certification team
2. Review of documents
3. Qualification of operators
4. Certification of operators
5. Management of change
6. Measurement of process effectiveness

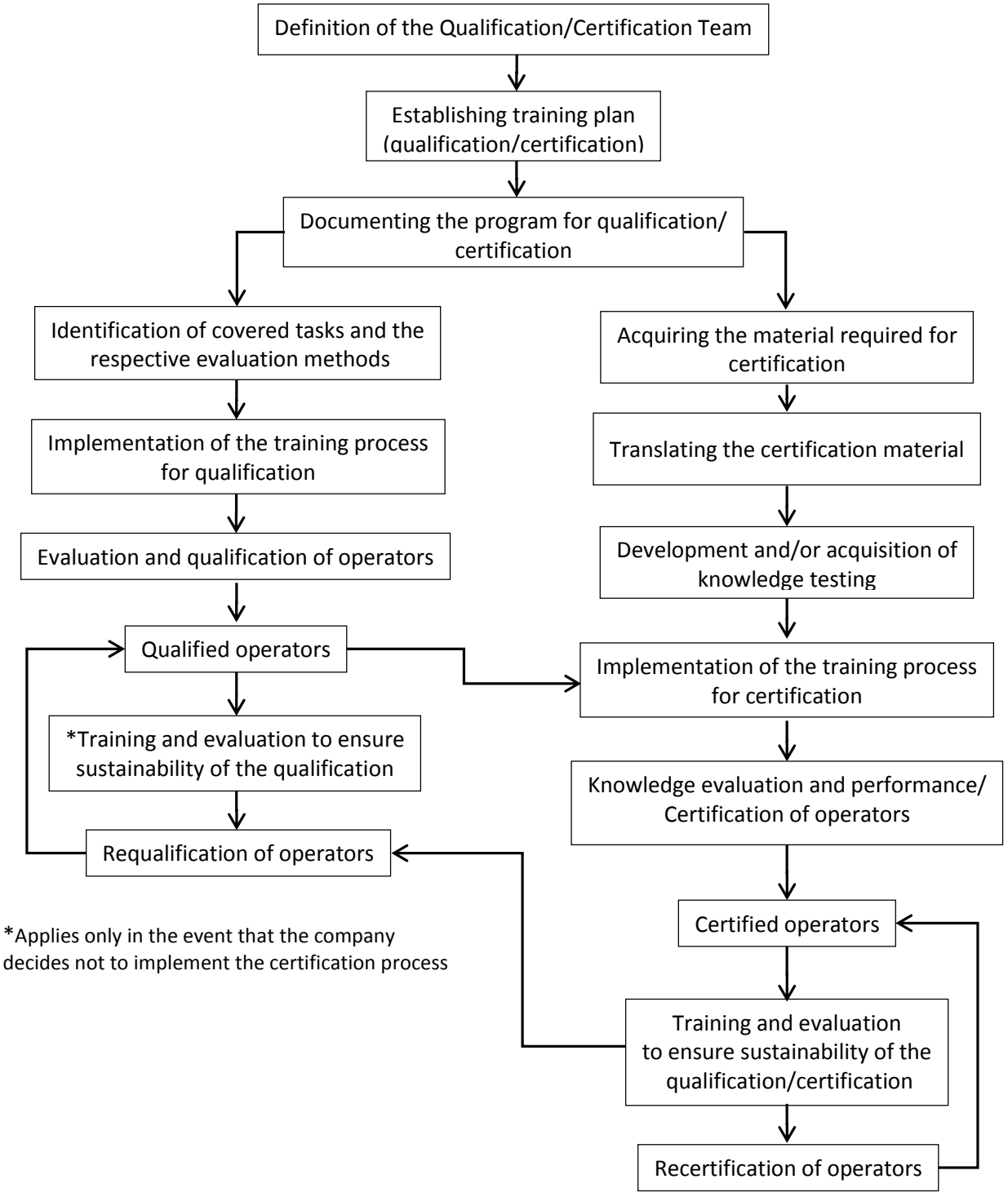
It is important to consider that:

1. The qualification programs for pipeline operators aim to ensure their competence to carry out covered tasks that have been established by each company and are based on ASME B31Q, API 1161 and NCCER.
2. International Certification processes provide operators with formal certification on theoretical and practical knowledge regarding the performance of covered tasks and issues associated with the operation of pipelines according to the standards of reference, and the performance of such tasks is evaluated by the certifying institution selected.

The above implies that the program for Qualification of Operators and the Certification of Operators are complementary processes whose final objective is to ensure the safe performance of covered tasks related to the various activities that are carried out in the operation of pipelines.

The flowchart below shows the activities to be carried out for the development of the processes of Qualification and Certification of Operators:

Process flowchart:



The contents of these guidelines must be reviewed on a yearly basis or every time one of the documents referenced in its development is subject to substantial changes that could alter their objective, scope and contents.

4. Glossary

Targeted training: training for individuals through materials designed to communicate the skills and knowledge required to perform a particular task.

Abnormal operating conditions: Any condition identified by the operator that can indicate a malfunction of a component or a form of diversion from the normal operations that may:

- indicate a condition exceeding the design limits; or
- create hazard to persons, the environment or the infrastructure.

DOT: U.S. Department of Transportation. It is a government entity responsible for ensuring a fast, safe, efficient, accessible and convenient transportation system.

MAOP: Maximum Allowable Operating Pressure.

Span of control: The maximum number of non qualified individuals that a qualified individual can direct and observe performing a covered task.

MOC: Management of change.

NCCER: The National Center for Construction Education and Research. It is a non-profit educational foundation created by the largest construction companies in the world and trade associations.

Abnormal operation: Exceeding the operating design limits, including:

- unintentional closure of valves or turnarounds;
- increase or decrease in the flow speed beyond the normal operating limits;
- loss of communications;
- activation of any safety device; and
- any other predictable faulty operation of a component, deviation from the normal operation, or error by the personnel that may result in hazard to persons, the environment or the infrastructure.

Qualified operator: A person who has been trained and evaluated, and is able to:

- perform the tasks assigned
- recognize and react to abnormal operating conditions.

Certified operators: A person who has been trained and evaluated, and is able to:

- perform the tasks assigned
- recognize and react to abnormal operating conditions.
- In addition, a national or international institution formally certifies that this person has the skills required to perform the tasks on which he/she has been evaluated.

CHAPTER 1: Terms of reference and definition of the management team of the Qualification and Certification Program

The operating company must form a multidisciplinary team that will be responsible for the Qualification and Certification Program, including at least the following roles:

- **Operational Leader of the Program**: Responsible for leading and coordinating the Qualification and Certification Program and managing the resources required therefor.
- **One member of the Human Management or Human Resources Division:** Responsible for all labor processes, for the implementation of psychological assessments, and for operator selection skills. Annex A of these Guidelines presents some recommendations related to important aspects in the psychological profile of a pipeline operator.
- **Engineer:** Expert of the company who will support the training of the operators in terms of the subjects addressed in the training process (hydraulics, pumps, valves and other equipment to be operated by the operator).
- **Mentor**: Engineer of the certification or qualification program, who has the authority to evaluate operators, grant their qualification or disqualify them, evaluate them if the result of a root cause analysis shows that they have participated in the pipeline operation incident, and express his/her opinion on whether they are able to continue performing operation- related functions.
- **Trainer:** Responsible for training operators, guide them, correct them and prepare them for qualification and certification.

Any member of the group may assume one or more roles and responsibilities, depending on the guidelines of the operating company.

The team described above has the following responsibilities:

- Selecting the operators required for the operation, performing technical evaluation and psychological assessments to the candidates to be hired or promoted
- Training, evaluating and qualifying or certifying the operators selected. Leading plans to close the gaps identified to achieve the certification
- Leading or participating in the investigation of all the incidents involving the operators

The team must hold meetings with a pre-established frequency to follow-up the program or when an operational incident occurs.

The company must formalize the management team and assign to it the resources required to develop the program.

CHAPTER 2: Documentary review

The company must document the training, qualification and certification process of all the operators through a procedure establishing:

a) The objective and scope of the training, qualification and certification process.
b) A training plan determining responsibilities for the training activities, containing at least:

Training programs

List of tasks related to the qualification and certification

Training periods

A training guide for operators with references to the NCCER modules associated with the skills to train.

c) The structure and responsibilities of the Evaluation Team and containing:
- About the qualification method: The Evaluation Team must establish in the procedure an assessment methods to attest to the compliance with the requirements to validate the qualification in the tasks through:

Knowledge testing

Simulation testing

Practice assessment (performance)

- About the candidate: Evaluation records evidencing compliance with the requirements regarding the skills determined in the task qualification process:

Training records

Practice assessment records

Physical, physiological and psychological fitness records

Written examination records

Work performance history records

Academic achievement records

d) The Evaluation Team must have the technical documentation about the transportation system (pipeline) concerning the tasks on which the candidate wishes to be certified. Such documentation must establish at least the following:

Design specifications of the transportation system

Operational context of the transportation system

Operation manuals, procedures and instructions of the transportation system

Functions of the position (profile of the position of field operator or remote operator) of the transportation system

Question database based on the technical and operational specifications of the transportation system

e) **About certification:** The procedure must establish the terms of reference for the award of the certifying institution, specifying the legal, commercial and regulatory requirements applicable to the company and the International Certification requirements set forth in these guidelines.

f) **External documentation:** The procedure must make reference to:

The standard or standards adopted for the process:

- ASME B- 31-Q Pipeline Personnel Qualification
- API 1161 Recommended Practice for Pipeline Operator Qualification
- NCCER training modules applicable to the tasks to certify.
- ARPEL Guidelines
- List of standards, laws and regulations within the legal, commercial and regulatory framework applicable to the process.

CHAPTER 3: Operator qualification program

For the purpose of reducing the risk of major accidents caused by human error, regulatory agencies increasingly require that the personnel who perform certain tasks which may affect the safety or integrity of persons, the environment or the infrastructure ("covered tasks"), be duly qualified to carry out such tasks and be able to recognize and react appropriately to abnormal operating conditions.

To comply with these requirements, the operating company must implement and manage a formal qualification program for the personnel assigned to covered tasks. This program must comprise at least the following:

1. Essential elements required for the qualification:
   a) Identifying covered tasks
   b) Ensuring through evaluation that the personnel performing covered tasks is duly qualified
   c) Allowing unqualified personnel to perform a covered task under the direction and control of a qualified individual
   d) Re-evaluating an individual if the company has reasons to believe that his/her performance of a covered task contributed to an incident
   e) Re-evaluating an individual if the company has reasons to believe that the individual is no longer qualified to perform a covered task
   f) Communicating the changes that affect covered tasks to the individuals performing those tasks.
   g) Defining the re-qualification intervals for the personnel performing covered tasks
2. Identification of abnormal operating conditions
3. Requirements for contractors
4. Targeted training

Listed below are the most important aspects for the development of the qualification program:

3.1. Essential elements required for the qualification

3.1.1 Identification of covered tasks

Based on a compilation and analysis of tasks carried out at the pipeline facilities, the operating company must identify and document those tasks that compromise the safety and integrity of the pipelines and that could be considered covered tasks if they meet other requirements listed in this section.

A covered task is an activity identified by the company, which complies with the following four criteria:

1. **It must be carried out in the pipelines facilities**

   The location where the task is performed defines whether such task is a covered task. For example, a test or calibration of a component removed from the facilities and performed in a workshop is not considered a covered task. On the contrary, if the same task is carried out with the component mounted in the facilities, it is considered a covered task.

2. **It must be an operation or maintenance task**

   While the standards of reference do not formally state what an operation or maintenance task is, the definitions of operation (start up, shutdown, monitoring of control devices or systems) and

maintenance (action to maintain or restore a physical asset so that it may perform its intended function) will be considered for its identification.

3. **It must be performed to comply with the requirements of the regulations in force**

   The operating company must review all local regulations and its own standards to ensure that all requirements are being considered.

4. **It must affect the operation or integrity of the pipeline system**

   If a task is performed incorrectly, it could adversely affect the operations or the integrity of persons, the environment or the infrastructure during or after its performance. The term "operations" refers to all actions taken to facilitate the storage or transportation of hydrocarbons and their derivatives by a regulated pipeline. The term "integrity" refers to the pipelines' ability to operate safely and to withstand stresses imposed during operations.

If one of these criteria is not met, the task analyzed cannot be considered a covered task.

3.1.1.1 Other considerations:

- The qualification program must use a methodical process to determine the covered tasks. The most-used processes are based on the knowledge of a group of experts on the subject and/or on fault trees.
- The written program of the company must identify the method used to determine if a task is covered or not. It must also identify how tasks are incorporated to or eliminate from the program.
- A task related to management, control and inspection of the design and construction of the pipeline entails responsibility and decision-making regarding the design and construction of new facilities.
- A task related to operation or maintenance is a task performed on existing pipeline facilities.
- An operation task is a task performed to operate a system or part of a system.
- A maintenance task is carried out with the purpose of preserving the operability or integrity of an existing system or part of it.
- A task performed on pipeline facilities directly affects the pipeline facilities. A task carried out on a component removed from the system is not considered a task on pipeline facilities. However, the pipeline cutting and joining tasks must be considered tasks carried out on the pipeline facilities, because they entail the modification of an existing part of the pipeline.
- Affecting the operations or integrity of the pipeline means that the improper performance of the task may adversely affect the safe operation or the integrity of the pipeline.
- When assessing the effect on the operation, it is important to consider if the incorrect task performance might exceed the design limits of the line.
- In assessing whether a task can affect the integrity of a line, it is important to consider if the incorrect performance might render the pipeline inappropriate to operate at its MAOP, although this effect is not immediate.
- The performance of the task does not necessarily have to include contact with the pipeline for the task to be considered a covered task.

3.1.1.2 Examples

Whether a task affects the operation or integrity of the pipelines may be confusing. Below are two examples that must be considered covered tasks.

Example 1 - Inspection for leak detection in gas pipelines:

> "If the inspection is not performed correctly, there might be an undetected leak, which would result in a potentially hazardous situation."

It is clear that the inspection by itself does not affect the pipeline. There might be a leak in the pipeline during the inspection or not, and therefore, nothing changed in the pipeline due to the inspection. However, the inspection may have detected the condition of the pipeline integrity.

Example 2 - Measurement of the pipeline-to-soil potential:

> "While this task is not immediately involved in the operation of the pipeline, the pipeline integrity could be compromised in the future if the cathodic protection is inefficient (for example, a corrosion process could begin)".

As in Example 1, the direct inspection task does not affect the pipeline, but may predict a future integrity problem.

For the purpose of a correct identification of the task, it must be considered that the concept of the term "affect" includes "detect" and "predict".

3.1.1.3 Covered Task List

With the covered tasks identified, the company must develop a covered task list with the description of the identification processes. The typical covered tasks are available in the listings of standards API 1161 and ASME 31Q. Annex B hereof contains a format example for the master list of tasks.

Annex C shows an example of covered task list for local and remote operators.

3.1.2 Evaluation process

The evaluation process is the process that allows an evaluator to check whether a person meets the skills required to perform a covered task and if he/she has the skills to recognize and react to abnormal operating conditions that may arise during the performance of the task.

To perform an evaluation, it is necessary to determine the subject of the evaluation, the subject of measurement; to choose "references" on which the evaluation will be based; to identify the tools and methods to be used; to designate the persons who will be responsible for the performance of this evaluation; and to identify the effects of the evaluation.

The operating company is responsible for selecting the most appropriate method to evaluate a person assigned to a covered task. The evaluation method selected must allow the company to determine if the person is qualified to perform the routine aspects of the task described, and to recognize and react to abnormal operating conditions associated with the covered task.

The company must be able to demonstrate that the evaluation for each covered task measures the knowledge, abilities, skills and attitudes required for the safe performance of the task.

The evaluation must also consider other critical skills in addition to the basic skills required to perform the task. For example, some tasks may require physical abilities and skills that go beyond the knowledge and skills related to the proper performance of the task. In this case, the evaluation method must be complemented with assessments that measure these abilities and skills.

3.1.2.1 Evaluator

The person responsible for evaluating and qualifying the individuals who will perform covered tasks must have the knowledge required, acquired by training or by experience, to determine that a person is able to:

a) perform covered tasks and
b) recognize abnormal operating conditions that may appear or be observed during the performance of those tasks, and react to them

The company may use the services of third parties to qualify the personnel performing covered tasks, as long as the evaluator meets the criteria stated in this paragraph.

The evaluation process must be objective and consistent. To ensure this, the evaluator must be knowledgeable about the subject task to be evaluated.

The generation and management of records that support the knowledge of an evaluator is a good practice.

3.1.2.2 Evaluation method

For the purpose of selecting the evaluation method to use for each covered task correctly, the following criteria will be considered regarding each task to evaluate:

- Repetitive feature
- Risk level
- Complexity
- Existence of controls, such as checking spreadsheets, written plans, follow-up actions, audits, etc.
- Legal requirements
- Availability of evaluation methods

The evaluation method chosen for any specific covered task must include one or more of the following elements:

a) Written examination
b) Oral examination
c) Work performance history *
d) Observation ** during:
    - Performance on the job *
    - Training on the job or in classroom
    - Simulations
e) Other forms of assessment established in this standard.

* Some regulatory authorities may set a time limit for using this method.

** The "observation" of the task performance must include methods to assess the knowledge of the person performing the task about the procedure, as well as the skills to carry it out. This means that the assessment must include questions and appropriate answers for the observation to be effective. The

mere act of watching, without any kind of interaction between the observer and the individual being observed, is considered inappropriate.

3.1.2.3 Written or oral examination

An examination used as an evaluation method must be as objective as possible. The questions asked in these examinations must be expressed in a manner that does not lead the individual being examined to a particular response.

Example of how to perform a knowledge evaluation:

Knowledge testing on the following topics will be included in the assessment, either by virtual platforms (e-learning) or in writing:

1. Basic theoretical knowledge testing on fluid mechanics (properties of fluids, viscosity, density, specific gravity, steam pressure, effects on temperature of fluids)
2. Basic technical knowledge testing (shut-off valves, control valves, internal combustion engines, generators and electric motors, pumps, centrifugal and reciprocating compressors, gas turbines, flow measurement systems, auxiliary systems)
3. Basic technical knowledge testing on control systems (SCADA, HMI, PLC, DCS, RTU)
4. Knowledge testing on operation (operation instructions, procedures and manuals, operation philosophy)
5. Basic knowledge testing on basic programming, nominating and quality of products of oil and gas pipelines
6. Basic knowledge testing on integrity of pipelines (MAOP, running of pigs)
7. Basic knowledge testing on drag reduction agents and injection of chemicals
8. Knowledge testing on protection systems

The minimum score to pass knowledge tests is 80% per subject. The knowledge testing may be uploaded into a virtual platform that compiles statistics on the operator's studies.

The company must define and control the duration of the evaluation and the number of attempts allowed to an operator who fails any assessment.

Assessments must be classified according to the operator profile and the operation station.

3.1.2.4 Review of work performance history

The company must analyze whether the documentation related to the work performance history is adequate to enable a proper evaluation. To this end, the following must be considered:

1. The work performance documentation may not be sufficiently detailed to comply with the qualification requirements to recognize abnormal operating conditions and react to them. The company may use documentation of a participation of the individual evaluated in:
    - the detection of leakage, damage to a facility, or abnormal operation
    - a response to an emergency, or training for this purpose and

- training for abnormal operation

2. In this evaluation method, statements or certificates of previous performance must not be used as the only documentation available.
3. If the company expects that the work performance history review will be used as part of future evaluations, it must consider what type of records would be useful for the evaluation.
4. The work performance history review must include at least the verification of the records stating that the individual evaluated has successfully performed the covered task and there are no indications of insufficient work or involvement in an incident caused by an error when performing such task.

3.1.2.5 Observation of the task, during training, or in a simulation

The observation of the individual being evaluated while performing a task, whether on the job or in a simulation, is used to verify that the individual possesses knowledge, skills and abilities to perform the routine aspects of that task.

Abnormal operating conditions can be evaluated through observation in simulations. When the observation on the job is used as a method of evaluation for a task, the ability to recognize abnormal operating conditions and react to them can be evaluated separately or through questions made by the evaluator during the observation on the job.

To ensure that the evaluation is made correctly, checklists or other references may be useful to control the key steps in the task or procedures.

The company may take into account the observation, scheduled or unannounced, the performance of the personnel in covered tasks and documentation that may be useful in a work performance review .

3.1.2.6 Evaluation categories

The two categories are:

1. Initial qualification: the first qualification of an individual for a covered task.
2. Periodic qualification: the qualification of an individual to perform a covered task after the initial qualification, in the interval stated in article 3.1.7 (evaluation intervals). The periodic qualification process may use different evaluation criteria to those used in the initial qualification.

Periodic qualifications must:

- check that the changes since the last qualification have been communicated to corresponding personnel
- identify the scope of the qualification
- evaluate the employee's performance in the previous interval

3.1.2.7 Definition of consequences

Three cases may arise in the operator qualification process:

1. The operator passes the knowledge testing and skill evaluations: in this case, the documents certifying that the operator is qualified to perform his/her job will be issued.
2. The operator fails the knowledge testing and/or skill and profile evaluations:

- In the event that the operator does not pass the knowledge testing, the company must implement a training plan, and the operator will be re-evaluated; during this period, the operator must not perform covered tasks until passing the re-evaluation process.
- In the event that the operator fails the skill and profile evaluations, the company must specify how many opportunities the operator will be given to be re-evaluated, and the operator must not perform covered tasks until passing the re-evaluation process.

3. The operator is involved in an accident during the performance of a task: In this case, where the operator is involved in an undesired event associated with a human error and identified in a causality analysis during the performance of covered tasks, such individual will not be permitted to perform covered tasks and his/her knowledge and skills will be re-evaluated. The mentor will evaluate the individual and prepare the corresponding report to reinstate the operator in his/her job.

When an operator fails psychological or fatigue assessments, it is recommended that the company review these evaluations and implement its general Human Resources Policy to determine the individual's ability to perform a task.

3.1.3 Unqualified Personnel

Current regulations allow, under certain circumstances, that unqualified individuals perform covered tasks, including the participation of unqualified individuals performing covered tasks during their training program or when performing tasks as members of a work team. However, in all circumstances, non-qualified personnel may perform covered tasks if the following conditions are met:

- A qualified individual is assigned to direct and control the non-qualified personnel during the performance of the covered task.
- A qualified individual is able to take immediate remedial action, if necessary. It must be understood that the qualified individual is in the workplace and a few meters from the unqualified individuals.
- Supervision from a remote location is not acceptable. If a qualified individual, who is watching or directing the work of a non-qualified individual, needs to move away from the site, the performance of the covered task must be stopped until the qualified individual returns.

The company must limit the number of individuals who are controlled by every qualified individual, based on the ability of the controlling person to act if errors occur during the performance of the task by the non-qualified individuals. For these purposes, the following factors must be considered:

- Complexity of the task
- Consequence of the incorrect performance of the task
- Skills of the individual performing the control
- Knowledge and skills of the individuals controlled

Not all the covered tasks may be performed by non-qualified individuals, not even if they are controlled by qualified personnel.

If an error in the performance of the task might entail risk because the controller does not have enough time to respond, the operator must not allow non-qualified personnel to perform the covered task.

3.1.4 Performance contributing to an incident

If there is any reason to believe that the performance of a covered task by any person contributed to an incident (incident/accident/quasi-accident, as defined in the company's policy), a review of his/her qualification to perform such covered task must be performed.

Some errors in the performance may not be the result of insufficient training, but attributable to emotional factors. In these cases, the company may decide that the re-evaluation is not necessary.

If the company concludes that the re-evaluation is required, it must also determine whether there is a deficiency in the evaluation performed for the recent qualification. If so, it may also require a re-evaluation of the qualification of other individuals who were qualified for the covered task involved in the incident and make the appropriate adjustments to the evaluation process. The company must also consider whether additional training would be appropriate prior to the re-evaluation.

As recording the performance of each covered task is not required, there might be situations where the company is unable to identify the person who contributed to the incident. In this case, the company must consider the review of the qualification of all the individuals that might have contributed to the incident if they had performed the covered task. This can also include a review of the work schedule, progress reports, and records on the performance of the individuals who performed the covered task in the area for a period of time.

3.1.4.1 Options of the company when the qualification of a person is no longer valid

When the qualification of a person is no longer valid, the company will have the following options:

- Re-evaluating the person (after any remedial training required)
- Having the qualified individual observed by other qualified individual during the execution of a covered task
- Reassigning the person to tasks for which no qualification is required.

3.1.4.2 Qualification program review

After a poor performance has contributed to an incident, the company must additionally review the following:

- Qualification program
- Covered task list
- Evaluation methods
- Evaluator credentials
- Evaluation intervals
- Operation and Maintenance procedures, if required.

3.1.5 Reasonable cause to verify the qualification

If there is a reasonable cause to assume that an individual is no longer qualified to perform a covered task, his/her qualification must be reviewed. The following circumstances can be some of the motivating questions about the qualification of an individual to perform a covered task:

- Injury or physical limitation
- Procedure rarely or hardly ever carried out by such person

- Documented statement of the person or others regarding his/her performance of the covered task
- Documented unsatisfactory performance of the covered task
- Accident/incident/quasi-accident
- Not having performed the covered task for a long time
- Results of evaluations conducted by the company regarding the covered tasks.

3.1.5.1 Process to determine if there is reasonable cause

An investigation will be conducted to determine if there is reasonable cause to evaluate the qualification of an individual to perform the covered task.

If upon the result of the review the company concludes that the individual is no longer qualified, he/she must be re-evaluated in accordance with the qualification program if the company intends to keep him/her performing the covered task. It must also consider whether it is advisable that this person be trained before the re-evaluation.

Once the re-evaluation is completed, if the individual is no longer qualified to perform the covered task, the company must not assign him/her that task again.

3.1.5.2 Qualification program review

When it is determined that an individual ceases to be qualified to perform a covered task, the company must additionally review the following:

- Qualification program
- Covered task list
- Evaluation methods
- Evaluator credentials
- Evaluation intervals
- Operation and Maintenance procedures, if required.

3.1.6 Management and communication of changes

Whenever the company makes a change in procedures or qualification requirements corresponding to the qualification program, it must communicate it to the personnel involved (e.g, contractors, evaluators, supervisors, qualification program managers).

3.1.6.1 Types of changes

Examples of changes that may be made and must be managed:

- Changes in company policies or procedures.
- Changes in applicable regulations.
- Changes in company operations that may affect the covered tasks.
- Use of new technology equipment.
- New information about equipment or product manufacturers.
- Changes required as a result of monitoring of performance or efficiency of programs.
- Mergers, acquisitions, change of shareholders

The change can be sufficiently significant to require modifications to the qualification process, additional evaluation requirements, or the need to re-evaluate the qualifications of any qualified individual for the covered tasks.

Note: According to "PHMSA Advisory ADB-09-03, Dec 7, 2009", as applicable to operator qualification program modifications, the term "significant" includes but is not limited to:

- increasing evaluation intervals,
- increasing span of control ratios,
- eliminating covered tasks,
- mergers and/or acquisition changes, and
- wholesale changes made to operator qualification plan.

3.1.6.2 Re-evaluation criteria

A re-evaluation may be required if the changes affect the knowledge, skills and abilities required for the covered task.

For example, if the company acquires a new leak detection device, it must consider whether the new instrument is basically the same as the old one to be replaced, and in such case, it only has to communicate the change to the person who uses this instrument. However, if the new instrument operates under different principles, it will be necessary to train and re-evaluate the personnel who will use this instrument.

3.1.6.3 Communication level

The need to communicate changes may vary depending on the impact of the change of the covered task. If the change that does not affect the knowledge, skills or abilities required for a covered task, the company may decide that it is not necessary to communicate the change.

3.1.6.4 Communication timing

Significant changes that may affect a covered task must be reported as soon as possible, to the persons performing this task.

Changes in regulations that turn a non-covered task into a covered task must be communicated in such a way that by the effective date of the new regulation the qualification requirements of the company are complied with.

The time of implementing some changes may vary. For example, the use of new equipment can be gradually introduced if it is considered appropriate to continue using the existing equipment; this would provide the operator time to make the necessary communication and perform any required training or additional evaluation without interrupting the activities of the qualification program.

3.1.6.5 Type of communication

The methods of communication can be:

- Oral or written instructions
- Individual or group meetings
- Briefings prior to work
- Training sessions
- Technical information emails

The type of communication may vary according to the impact or the complexity of the change. For example:

- Changes with limited impact or minor changes in procedures may require written or oral communication, or a briefing.
- More substantial changes require training or a guiding session, and in some cases, additional evaluations.

3.1.6.6 Communication records

The company must keep records of the communications made regarding these changes, including the identification of the notified persons.

The communication of the change may be documented using the "Management of Change" procedure of the company.

3.1.7 Evaluation intervals

To continue with their qualification, the individuals who perform covered tasks must be re-evaluated periodically. To be consistent with industry standards, the company may adopt the evaluation cycles stated by standard ASME 31Q in paragraph 9.5.1.

For infrequent tasks, the company may determine that the re-evaluations be performed immediately before performance.

Another source of information to take into account to define these intervals is the operational experience of the company. The company may make a DIF analysis (difficulty, importance, frequency). The factors to consider in the DIF analysis are:

- Difficulty or complexity More complex tasks require shorter re-evaluation periods
- Task importance and risk level. What is the consequence if the task is performed incorrectly? What is the worst scenario if the task is not performed correctly? Shorter re-evaluation periods correspond to more significant consequences
- Task performance frequency Longer re-evaluation periods correspond to higher performance frequency

For most covered tasks, the most commonly adopted period of re-evaluation is of three years. Periods longer than 5 years will require justification.

The re-evaluation must not necessarily be performed following the same initial qualification process, but it must cover all skills required to perform the task and also the skills to recognize and react to abnormal operating conditions related to the task.

3.2. Abnormal operating conditions (AOC)

The individuals qualified to perform covered tasks must be able to recognize and react appropriately to abnormal operating conditions that may occur while performing the task.

An abnormal operating condition, as defined by the international standards, is any condition identified by the company that indicates a malfunction of a component or a form of diversion from the normal operations that may:

- indicate a condition beyond the design limits; or

- represent a hazard to persons, the environment or property.

Reference to abnormal operating conditions is also made in the definition of qualification:

> "A person is qualified if he/she has the skills required to perform the covered task correctly, and has the ability to recognize and react appropriately to any abnormal operating condition during the performance of the covered task. This may include notifying the responsible parties or taking corrective actions to mitigate the condition".

For example, a person who has been qualified to perform the task of detecting a leak must be able to detect and react appropriately to a hazardous gas leak. Likewise, a person qualified to monitor operational parameters, such as pressure, flow or temperature, must be able to recognize and react appropriately under abnormal operating pressure.

The conditions included in the basic requirements of a particular task must not be considered AOC for that task. Examples:

a) If a company determines that leak detection is a covered task, the detection of a leak must not be considered an AOC by the person who performs this task. Leak detection is a goal of this task, and the person who performs the task is expected to know how to identify leaks and react appropriately.

b) If monitoring cathodic protection systems is a covered task, the measurement of insufficient potential must not be considered an AOC. Determining those values is a goal of this task, and the person who performs the task is expected to know how to identify these conditions and react accordingly.

3.2.1 Methods to define an AOC

The company is flexible in the determination of methods to ensure that qualified personnel are able to recognize and react appropriately to an AOC.

These methods may include, without limitation, the following:

- developing an independent evaluation of the AOCs
- incorporating the AOCs within the evaluation of qualified tasks
- reviewing the AOCs in meetings prior to work and recording the reviews
- reviewing the AOCs in periodic meetings and recording the reviews
- a combination of all the above.

The company must identify the conditions that must be recognized by an individual performing a covered task.

3.2.2 Examples

Some examples of AOCs are:

- Gas leak
- Fire or explosion
- Pressure outside the operating range (e.g., increase, decrease, high, low, no pressure)
- Diversion of flow (e.g., high, low, no flow)
- Activation of a safety device
- Inadequate odorization

- Damage to the facilities (e.g., damage by excavation, tornado, flood, earthquake, etc.)
- Component failure
- Interference current
- Unexpected movement or unusual load on the pipeline
- Unplanned change of condition (e.g., start/stop of the unit, opening/closing valve, etc.)
- Interruption or failure of control, communication or power systems

3.3. Contractors/subcontractors

The company can use contractors or subcontractors to perform covered tasks in its facilities. Regulations require that any individual who performs a covered task in the company's facilities must be qualified in accordance with the qualification program for operators of the company. When the company uses a contractor/subcontractor to perform a covered task, the company is responsible for ensuring that each employee of the contractor/subcontractor, who performed one or more covered tasks, is qualified for these tasks or is being directly observed by a qualified individual.

3.3.1 Methods to apply in the qualification of contractors

Regardless of the method selected by the company, it will require a proper identification of the contractor/subcontractor before authorizing the performance of the covered task.

Below are four methods that the company can use to manage the qualification of its contractors/subcontractors:

- The company can evaluate the contractor/subcontractor personnel using the company's evaluation procedures.
- The company can allow the contractor/subcontractor to evaluate its own personnel using the company's or its own evaluation procedures. In the latter case, the company will be given a copy of the procedures used by the contractor/subcontractor making sure that everything is properly documented.
- The contractor/subcontractor may be evaluated by a third party (e.g., NACE, NCCR, etc.).
- The company may decide not to evaluate the contractor/subcontractor personnel, in which case it must assign a company's qualified employee to observe the task performed by non-qualified personnel.

3.3.2 Contractor/subcontractor personnel who do not speak Spanish

The company must make sure that there is a efficient communication on the requirements of covered tasks, when these are performed by qualified individuals who do not speak Spanish.

3.4. Training

The purpose of this section is to describe how training is in line with the qualification program. Although qualification is achieved through the evaluation process, some individuals may need a targeted training to gain the knowledge, skills and abilities required to pass the evaluation for a covered task.

3.4.1 When training may be necessary?

Some examples of when an individual may require targeted training are:

- Admission of new personnel

- Individuals who are assigned for the first time to perform a covered task (either due to transfer or promotion)
- Individuals who have failed the evaluation one or more times
- Correction of problems in the performance of a person (e.g., performance that contributed to an accident/incident, etc.)
- Application of the MOC procedure (changes in processes, procedures, equipment, etc.)

After an incident or due to re-evaluation, a refresher training may also be necessary

Audit programs can generate the need for training

All this does not mean that the individual who performs covered tasks must go through a training process before being re-evaluated. Training by itself is not a determining factor to take into account in the evaluation process. Attendance records, certificates of completion, etc., that come from training classes, are not evaluation records and cannot be used as key documentation to qualify an individual for any covered task.

Only the records with the results of the written/oral examinations and observations on the job will be taken into account for the evaluation process.

CHAPTER 4: Certification of local and remote operators

The purpose of the certification of local and remote operators is to evaluate and recognize through an International Certification under the reference of the DOT, the theoretical knowledge and satisfactory performance of the covered tasks and the adequate reaction to abnormal operating conditions.

The acceptable methods for the development of the certification are written examinations, oral examinations, observation (performance evaluation), practical training, simulation, or a combination of the above methods.

Once the certification is obtained, companies must implement a re-training and annual evaluation program that will help to maintain the existing knowledge, skills and abilities of the certified operators, considering that the International Certification of pipeline operators is valid for three years and upon completion of this period, a re-certification process is to be conducted.

Listed below are the most important aspects for the development of the certification process:

4.1. Development of knowledge testing

The aim of developing the knowledge testing is to have a question database that allows testing knowledge of the operators who will participate in the International Certification process. For this purpose, the development of the following aspects is recommended as a minimum:

a) Acquiring the documentary material associated with the subjects that are evaluated in the International Certification process:
In this regard, the modules currently defined by NCCER for certification of operator are listed below:

Liquid Pipeline Field Operations:

66101-02 Introduction to the Pipeline industry (API Fundamentals)
66102-02 Liquid Pipeline General Abnormal Operating Conditions (API Fundamentals)
60102-02 Basic Pipeline Hydraulics
60103-02 Pipeline Communications
60104-02 Product Batch and Pig Tracking
60105-02 Routine Field and Facility Operations
60106-02 Monitoring Pipeline Operations
60107-02 Field Quality Control
60108-02 Field Measurement

Liquid Pipeline Control Center Operations:

66101-02 Introduction to the Pipeline industry (API Fundamentals)
65102-02 Control Center Abnormal Operating Conditions
65103-02 Basic Pipeline Hydraulics and Equipment
65104-02 Pipeline Communications
65105-02 Monitoring Pipeline Operations - Control Center
65106-02 Routine Control Center Operations
65107-02 Liquid Pipeline Measurement/Quality Control

Gas Pipeline Operations:

66101-02 Introduction to the Pipeline industry (API Fundamentals)
67102-02 Basic Pneumatics and Equipment
67103-02 Pipeline Communications
67108-02 Quality Control and Measurement
67109-02 Abnormal Operating Conditions

It is important to bear in mind that each subject listed above is study and reference material for the operators who participate in the certification process.

b) Translating the documentary material associated with the International Certification process:
All the above-mentioned documents are in English. Therefore, depending on the command of the English language within the population of operators that will be subject to certification, the translation to the language in each area or country is recommended.

c) Defining the experts who will conduct the technical validation of translations:
Due to the importance of the technical language used in the above-mentioned materials, and with the purpose of ensuring that the translations really convey the intended message, it is considered desirable to appoint a panel of experts of the company to ensure that the translations comply with the intended purpose and use the appropriate terms and those commonly used in the industry in the region or country.

d) Developing the question database:
It is recommended that the same individuals who were designated as experts for the review of translations develop the question databases associated with each module.

The question databases must be developed by subject, taking into account the modules defined by the NCCER as listed under a), 4.1 of this document.

The questions must be associated with the most important aspects of each subject and may be constructed as follows:

- Multiple choice with a single valid answer
- Multiple choice with multiple valid answers
- True/False Test

4.2. Knowledge evaluation and identification of gaps

This activity aims to identify the level of knowledge that participants have in the subjects that will be evaluated in the International Certification process, with the purpose of ensuring that individuals will have the requisite knowledge to obtain this certification.

This activity also establishes the aspects to be taken into account to close properly the knowledge gaps that may identified in the definition of gaps.

4.2.1 Definition of knowledge gaps:

The following steps must be taken to define knowledge gap:

a) Making use of the knowledge testing developed, each participant must take an examination which can be made in printed documents or using a virtual platform where evaluations are uploaded.

b) Once the examinations have been made, they must be qualified by module:

Liquid Pipeline Center Operations (REMOTE OPERATOR)	Liquid Pipeline Field Operations (REMOTE OPERATOR)	Gas Pipeline Operations (LOCAL GAS OPERATOR)
- Introduction to the Pipeline industry (API Fundamentals) - Control Center Abnormal Operating Conditions - Basic Pipeline Hydraulics and Equipment - Pipeline Communications - Monitoring Pipeline Operations - Control Center - Routine Control Center Operations - Liquid Pipeline Measurement/Quality Control	- Introduction to the Pipeline industry (API Fundamentals) - Liquid Pipeline General Abnormal Operating Conditions (API Fundamentals) - Basic Pipeline Hydraulics and Equipment - Pipeline Communications - Product Batch and Pig Tracking - Routine Field and Facility Operations - Monitoring Pipeline Operations - Field Quality Control - Field Measurement	- Introduction to the Pipeline industry (API Fundamentals) - Basic Pipeline Pneumatics and Equipment - Pipeline Communications - Quality Control and Measurement - Abnormal operating conditions

The above takes into account that the qualification that finally results in the International Certification is specific by module and not an overall score of the entire examination.

The minimum score that each participant must obtain by subject in order to determine that he/she does not require closing gaps is 80 points (on a score from 0 to 100 points).

A list identifying the score obtained in each module must be prepared for each participant, based on which the population requiring closing gaps will be established.

4.2.2 Process of closing gaps:

The following steps must be taken to close gaps:

a) All participants who require closing gaps must study again the reference material delivered to them in the preparation for the International Certification process.

b) With the support of the expert defined by the company for each subject, the course or courses must be scheduled and implemented on the subjects that require remedial training to ensure gaps are closed in the aspects identified.

c) Once the course or courses to close gaps has/have been completed, the participants in such course(s) must retake the knowledge test.

d) If the individual or individuals continue to have some knowledge gaps in these subjects (score of less than 80 points), the Qualification/Certification Team defined by the company must make a decision on whether this(these) individual(s) must continue in the International Certification process.

4.3. Performance evaluation

Performance evaluation is an aspect required in the development of the certification of the local and remote operators, and consists in the practical verification of how operators act or behave while performing covered tasks in normal and abnormal operating conditions.

This performance evaluation can be performed as follows:

a) Through the use of software or simulation tools that allow recreating the pipeline operating conditions and where different scenarios of normal and abnormal operations can be set up. In this case, it is particularly important to create scenarios that have much similarity with events occurred or that might occur in the actual operation of the pipeline.
b) Through reviews of work cycles, where using the operating guidelines and/or procedures, the operator is requested to simulate the performance of a covered task, and on the basis of the guidelines and/or procedure, the various steps stated in these documents for the safe performance of the task are evaluated.

Based on the performance of the activity, the evaluator must define whether the operator performed the covered task or tasks correctly. If any deficiency in the aspects related to the performance is detected, the company must define training sessions with counseling and supervision, so that the operator may improve his/her individual performance.

CHAPTER 5: Measurement of process effectiveness

As the standard ASME B31 Q recommends that programs be measured at least every three years, at the beginning of the program, companies can incorporate indicators according to the program stage:

At the beginning: aspects associated with the coverage based on the total qualified population, management (man-hours of training) or implementation of the program based on what was documented.

During the development of the program: the training methods, evaluation and response to abnormal operating conditions of operators who have been qualified may be assessed as to whether they are contributing to reduce the probability of occurrence of undesired events attributed to human error. quantifying for this purpose the number of events that have negatively affected the integrity of the system (oil/gas pipeline), if covered tasks were performed during the occurrence of these events and if human error was a contributing factor to the occurrence of the event.

When certification processes have been conducted, the company may resort to external validations taking DOT references such as fatigue, comfort on the job, procedures , among other aspects that are directly related to the knowledge, skills and abilities of operators already certified, while the cycle for the following certification is complied with. Identifying if an individual is no longer qualified or forgot his/her knowledge is not a tangible factor; therefore, it is recommended to keep training programs to enhance knowledge and improve the impact of the program while avoiding undesired events attributed to human error in covered tasks identified in local or remote operation.

CHAPTER 6: Process documentation

This chapter recommends some minimum documentation records that must be created, managed and maintained to ensure the traceability of the qualification and certification processes implemented by companies. These requirements are an extract of the standard ASME B31Q. Listed below are some records

a) Written Qualification/Certification Program

The qualification/certification program must be documented (written, published and signed) and contain each element of the program approach, scope and exclusions. Documentation can include aspects such as the description of the process developed and criteria used for the identification of the covered tasks for local and remote operation, qualification/certification intervals, criticality, structure of the management team of the program, roles and responsibilities of the team members, abnormal operating conditions, applicable qualification plans (internal or external), description of the certification process objective, among others.

Records management

The company will ensure that the records that support the qualification and certification of the staff are protected by electronic copies, file of physical copies or any other suitable method that ensures the preservation of this information.

The records must contain information related to the identification of the qualified/certified individual, the identification of the task in which the person is qualified, the effective date of the qualification/certification and qualification method used.

The records that support the qualification and/or certification of an individual will be kept while that individual is qualified to perform the covered task. Records of prior qualifications and records of individuals no longer performing covered tasks (including employees no longer with the company, contractor, subcontractors) will be maintained for a minimum period of five years.

All records and documents necessary to verify compliance with the qualification and/or certification program must be made available to the regulatory authority. All the processes used to manage the qualification/certification program and/or certification must be included (e.g.: contractor qualification process, communication of changes, identification of covered tasks, etc.). The written program and the list of changes must also be documented and maintained for a minimum period of five years.

b) Communications issued

The program must establish the mechanism and means through which it will keep the company informed about the results of the qualification/certification processes once the operators have been trained and evaluated to perform one or several covered tasks. The changes, modifications or adjustments to the program must also be informed in a timely manner.

c) Changes to the program

Modifications as may be necessary, as for example the addition or elimination of covered tasks or changes in the method to certify operators, must be documented in accordance with the reasons for the adjustments and approvals.

d) Evaluation criteria and methods

The acceptance criteria, minimum results that operators must obtain to complete their training, the type of knowledge testing and performance evaluations must be defined.

All the records generated in the qualification and certification processes can be stored, in some cases on a confidential basis, in both magnetic and digital means, for a recommended period of at least 3 years.

ANNEX A: Desired profile for remote operator

The candidate for remote operator must be evaluated to determine if he/she has the desired behavioral profile for the function of operator.

The general characteristics expected for a remote operator are:

- Focus on precision and details
- Caution, aversion to risk
- Evaluation of all alternatives before making a decision
- Willingness to cooperate with others
- Willingness to establish and maintain routines

The behavioral requirements for an operator may be classified in further detail in three categories of requirements: Moderate to High, Moderate, and Moderate to Low. The behavioral profile of an operator is expected to meet most of these requirements within this classification.

Moderate to High:

- Demonstrating discipline while working alone
- Following procedures and key and/or critical processes thoroughly
- Checking the accuracy of work, especially the operator's own work
- Examining several variables at the time of making decisions
- Evaluating alternative methods and actions carefully
- Remaining neutral in case of conflict
- Keeping control when becoming impatient or anxious
- Listening to others with caution
- Cooperating with others to perform tasks
- Following a methodical way of doing things
- Taking into account the views of those who do not agree
- Changing through orderly, planned processes
- Taking responsibility for detail tracking
- Maintaining methods that have proved effective in the past
- Developing functional, repetitive routines
- Responding to problems by means of study and cooperation

Moderate:

- Taking greater risks based on potential results
- Acting energetically even bothering others
- Guiding the efforts of others
- Demanding immediate results
- Responding to problems quickly
- Taking risks with unproven ideas
- Delegating to others the responsibility for consistent actions

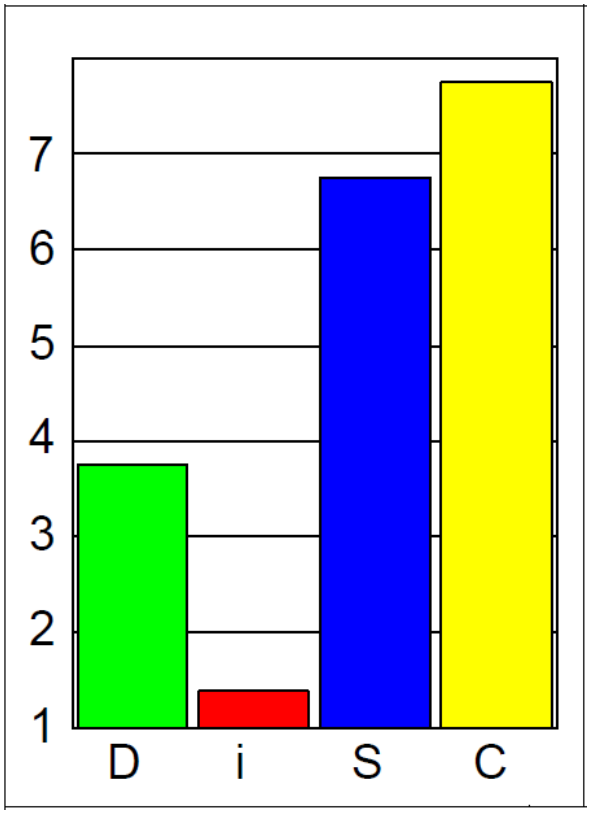
- Using the power and authority to achieve results

Moderate to Low:

- Reducing the tension in the group by means of verbal interaction
- Using personal charm and enthusiasm
- Resolving conflicts by initiating and promoting their analysis and discussion
- Verbalizing others' thoughts and actions
- Encouraging other in their efforts with words
- Facilitating interaction among people
- Influencing people by transmitting optimism
- Influencing or inspiring others orally

D I S C Evaluation

The DISC evaluation (dominance, influence, steadiness and conscientiousness) of a candidate is essential in the selection of candidates for operator. In the case of remote operators, the behavior of a candidate must be based in steadiness and conscientiousness. As an example, Figure 01 and Figure 02 show the results of the evaluation of the DISC behavioral profile for a candidate who would be selected and for another who would not be selected.



The DISC Behavioral Model describes four behavioral dimensions. These are briefly defined below:

D dominance: Individuals with a high "D" behavioral trend seek to control their environment to obtain results.

I influence: Individuals with a high "I" behavioral trend seek to change their environment and persuade others.

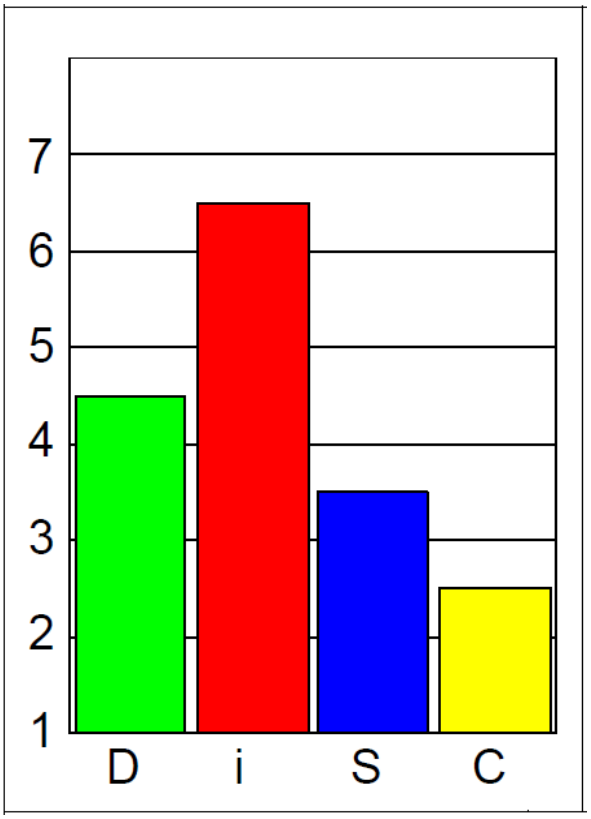
S Steadiness: Individuals with a high "S behavioral trend seek to cooperate with others in the performance of their duties.

C Conscientiousness: Individuals with a high "C" behavioral trend seek to act in accordance with the established precepts to ensure quality and accuracy.

All individuals have the four dimensions within themselves, although in different degrees.

The relationships between these dimensions create a profile that provides information on the potential behavior of the individual.

Figure 01 - *Adequate behavioral profile of an operator*



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All individuals have the four dimensions within themselves, although in different degrees.

The relationships between these dimensions create a profile that provides information on the potential behavior of the individual.

Figure 02 - *Behavioral profile not suitable for operator*

ANNEX B: Covered Tasks

COVERED TASKS									
API TASK #	ASME B31Q TASK #	NCCER MODULE #	NACE TASK #	TASK DESCRIPTION	OIL GAS BOTH	WRITTEN EVALUATION	PERFORMANCE EVALUATION	EVALUATION METHOD	CRITICAL TASK YES/NO

ANNEX C: Covered Task List

Task #	Covered Task Description	NCCER Reference Module	Operator Central Control	Operator Field	Operator Gas Pipeline
50	Purging gas from gas pipelines (gas)	67104 67105			×
51	Purging air from gas pipelines (gas)	67104 67105			×
54	Testing remotely controlled shutdown devices (gas)	67104 67105			×
56	Upgrading pressure to MAOP (gas)	67104 67105			×
57	Operating odorant equipment (gas)	67104 67105			×
58	Monitoring odorant level (gas)	67104 67105			×
63	Pipeline Operations (liquid)			×	
	63.1 Performing pipeline startup procedures	60105		×	
	63.2 Performing pipeline shutdown procedures	60105		×	
	63.3 Monitoring parameters	60106		×	
	63.4 Performing valve and equipment startup/shutdown procedures, manually or by remote control	60105		×	
64	Pipeline Operations (liquid)		×		
	64.1 Performing pipeline startup procedures	65106	×		
	64.2 Performing pipeline shutdown procedures	65106	×		
	64.3 Monitoring parameters	65105	×		
	64.4 Performing valve and equipment startup/shutdown procedures, manually or by remote control	65106	×		
65	Pipeline Operations (gas)				×
	65.1 Performing pipeline startup procedures				×
	65.2 Performing pipeline shutdown procedures	67104			×
	65.3 Monitoring parameters	67104			×
	65.4 Performing valve and equipment startup/shutdown procedures, manually or by remote control				×

Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean

ARPEL is a non-profit association gathering oil, gas and biofuels sector companies and institutions in Latin America and the Caribbean. It was founded in 1965 as a vehicle of cooperation and mutual assistance between companies in the sector, with the primary purpose of actively promoting industry integration and competitive growth and the sustainable energy development in the region. Its membership represent over 90% of upstream and downstream activities in the region and includes national, international and independent operating companies, providers of technology, goods and services to the value chain, and national and international sector institutions.

Mission

To promote the integration, growth, operational excellence and effective socio-environmental performance of the industry in the region, facilitating the dialogue, cooperation, development of synergies among players as well as the shared creation of value among members through the exchange and expansion of collective knowledge.

Vision

To be an institution of reference in the consolidation of the oil and gas industry, furthering the provision of reliable and safe energy that meets the growing regional energy demand in a sustainable manner.

MEMBER COMPANIES

MEMBER INSTITUTIONS

ALLIANCES

REGIONAL ASSOCIATION OF OIL,
GAS AND BIOFUELS SECTOR COMPANIES
AND THE CARIBBEAN

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