Vale Learning - 21137 - CAR 10 - Critical activities requirements: Working with Electricity

Hello, welcome to the **CAR 10 course – Critical Activity Requirements: Working with Electricity**

In this knowledge journey we will explain the requirements for this critical activity, through videos, texts, graphics and interactions.

Expand your knowledge, review your activities and behaviors. The obsession with security is one of the key behaviors of those who are part of Vale!

Good course!

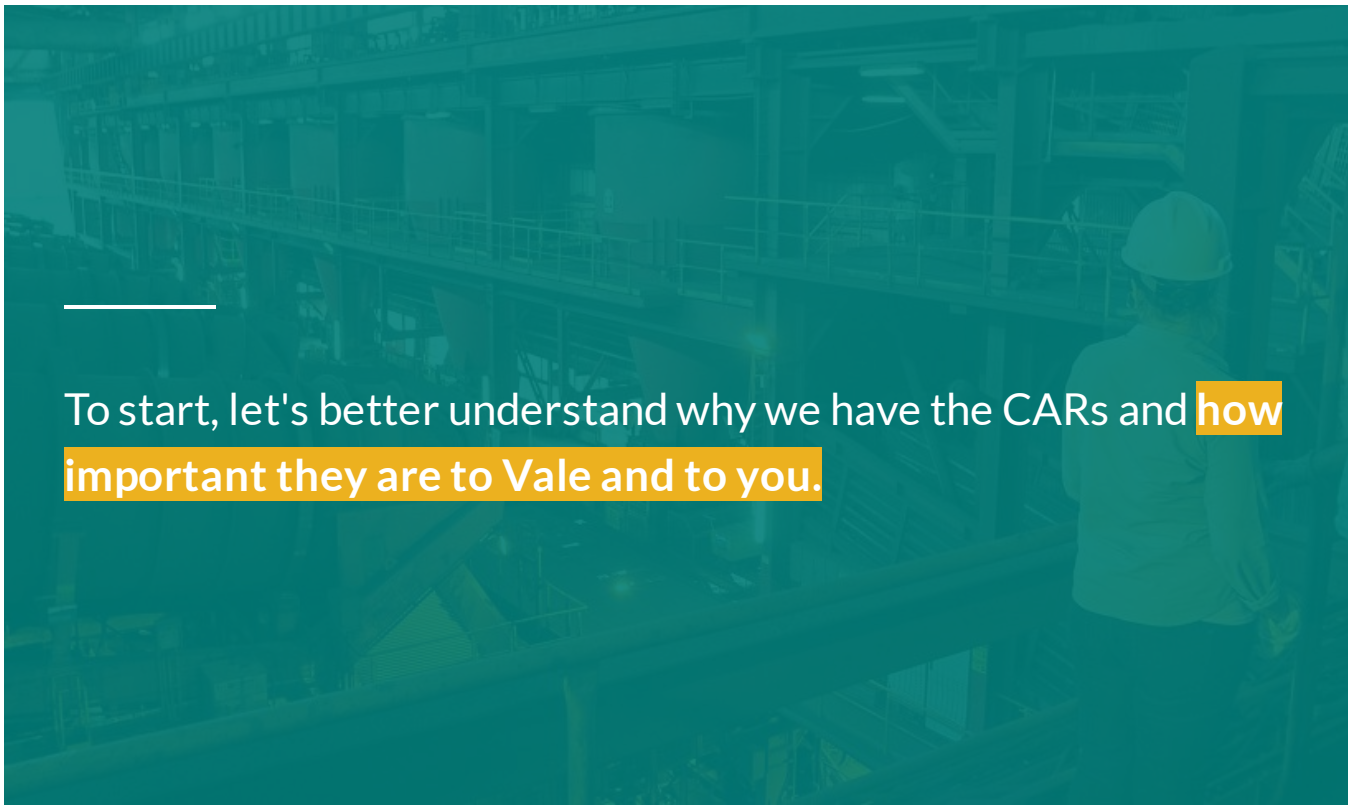
- **Welcome**
- **Context**
- **Working with Electricity**
- **In Practice**
- **Incidents Cases and Lessons Learned**
- **Conclusion**

Lesson 1 of 6

Welcome

Watch the full video to continue.

Context



Click play on the following video and start your journey of knowledge!

Watch the full video to continue.

Working with Electricity

Check out the following video!

Watch the full video to continue.

This CAR aims to **ensure safety devices in electrical installations and procedures suitable for working with electricity** with the protection of people!

CONTINUE

Next we will introduce the **Applicability** of CAR 10.

Check out the following video!

Watch the full video to continue.

Keep an eye on the CAR!

CAR 10: Applicability

CAR 10 applies to **activities and interventions** in electrical installations.

Such as:

1. Preventive or Corrective maintenance or electrical switching in electrical switchgear, connection and lighting panels, automation panels, switchgear and distribution panels, junction boxes, Cubicles and Cabinets, frequency Inverters and generators;
2. Tests in industrial outlets;
3. Sensitive and predictive inspections in panels or equipment in the field;
4. Preventative maintenance in rectifiers, chargers and battery banks;

5. Preventative or corrective maintenance in Plug and Switch System (PASS) control circuits;
6. Preventative or corrective maintenance in control circuits of oil or dry transformers;
7. Opening and Closing disconnecting switches.

CONTINUE

Here at Vale, unfortunately, there have been critical and unwanted incidents, and that's what you will see in the following video!

Watch the full video to continue.

In Practice

You know what CARs are, what CAR 10 covers, and what is expected about this requirement.

Now it's time to see in practice how it applies!

Watch the full video to continue.

In Practice

CAR 10

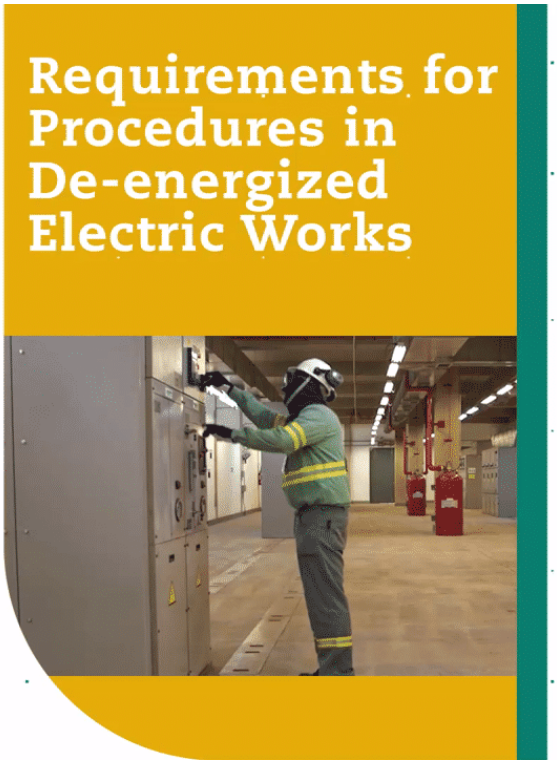
General Requirements for Procedures

Watch the full video to continue.

We will check below the requirements for procedures for work with eletricity. **Check out!**

Procedures for **de-energized** electrical work:

In Practice
CAR 10

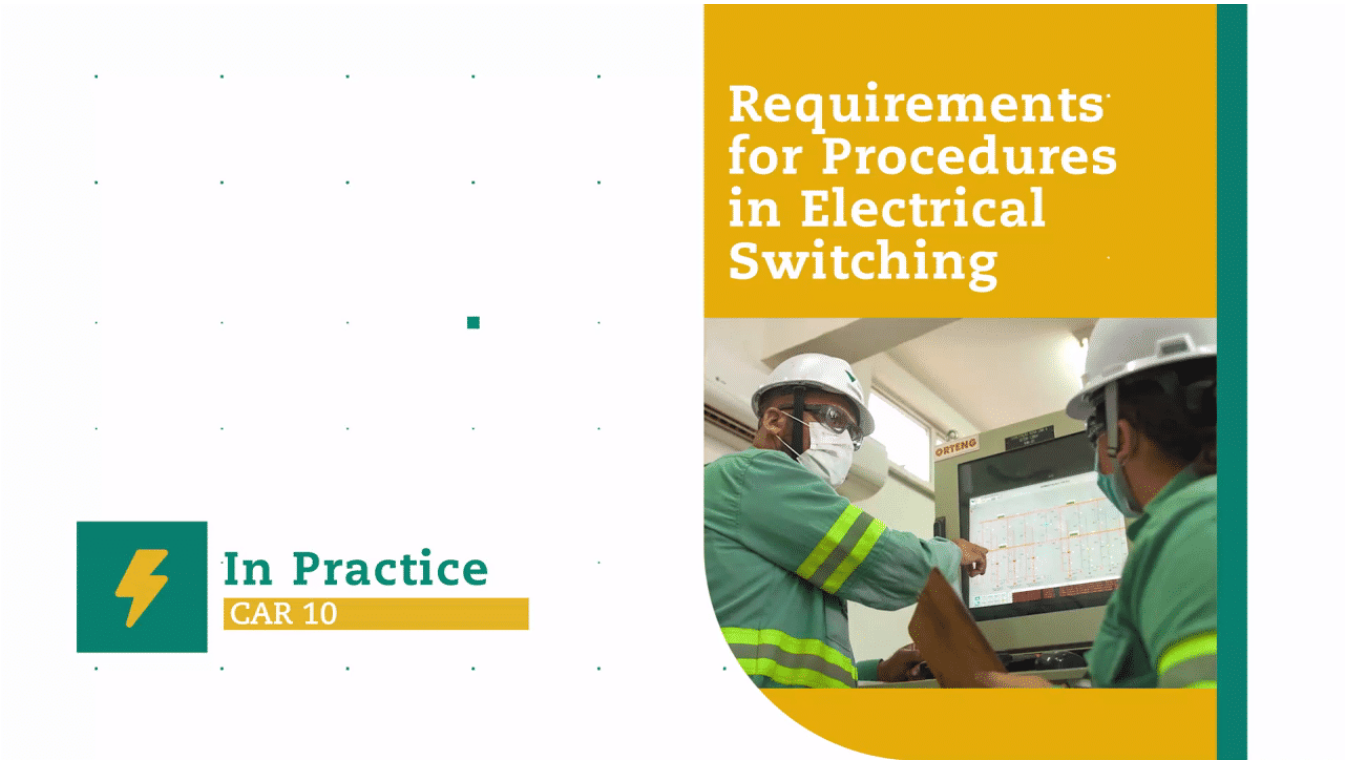


Watch the full video to continue.

Requirements for procedures in **energized** electrical work:

Watch the full video to continue.

Electrical Switching Procedures:



Watch the full video to continue.

Lesson 5 of 6

Incidents Cases and Lessons Learned

What are Incidents?

Incidents are unwanted events, but if they do happen, it is essential that we identify the main contributing factors and share any lessons learned in order to implement the necessary control measures to prevent other similar incidents from happening. This way, we generate organized learning and continuous improvement.

We will now know about some **incidents that occurred** at Vale related to work with electricity and **understand what were the main contributing factors** associated with **each event and what CAR 10 requirements could have been applied** to prevent these occurrences.

CONTINUE

1

Incident Report #1

Date: 16/03/2021.
Location: Itabira - MG - Brazil.
Type of occurrence: N2.

Event description:

During a maintenance activity at electrical panel QD-ABB Model UniGear at substation SE 1415EE01, while cleaning the cubicle which feeds the lighting transformer TL1415EE01, the worker received an electric discharge, and fell to the ground.

REQUIREMENTS ASSOCIATED TO CAR 10

10.7.1 (A) - De-energizing measures

In electrical work where the worker enters the Electrical Arc Flash Hazard Distance or where there is interaction of the worker with equipment, conductors and/or parts of circuits, with the probability of injuries to the worker due to electrical arc flash or electrical shock must adopt the electric de-energization by means of the following steps, except in the situations covered in item 10.7.3:

- Isolating;
- Lockout (impediment to re-energize);
- Test of absence of voltage at the intervention point;
- Temporary grounding installation with equipotencialization of the circuit conductors at the intervention point;
- Protection of the energized parts present at the Electrical Arc Flash Hazard Distance Zone, when applicable;
- Installation of signs of impediment to re-energize.

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (C) - Prohibition

It is prohibited to perform any electrical work on high voltage power circuits, including cleaning, which requires entry into cubicles compartments without the complete de-energization of all inlet and outlet points of the panel that could result in electrocution and/or exposure to incident energy levels capable of causing burns and/or more serious consequences.

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (D) - Authorization

The workers must be authorized to perform electrical work as per local legislation. The authorization must be documented in the work contract records of the company.

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (E) - Prohibition

It is prohibited to perform any electrical work without specific formal authorization for the activity.

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (F) - SWP

Work with eletricity must have a Safe Work Permit as per PNR-000031

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (I) - Personal Voltage Detector

For works inside the Electrical Arc Flash Hazard Distance a personal voltage detector type “helmet” or “wrist” (or similar device) compatible with the involved voltages must be used as an individual protective measure to alert against a non intentional proximity of parts of the body to energized surfaces

(X) Missing requirement.
( ) Present and flawed requirement.

Complete the content above before moving on.

Main Lessons Learned

1.

In work with electricity where the worker enters **the Electrical Arc Flash Hazard Distance or where there is interaction of the worker**

with equipment, conductors and/or parts of circuits, with the probability of injuries to the worker due to electrical arc flash or electrical shock **must adopt the electric de-energization.**

The electrical works in high voltage power circuits, including cleaning, which require the entry into cubicles compartments must be performed with the complete de-energization of all inlet and outlet points of the panel to prevent electrocution and/or exposure to incident energy levels. In this event, the cleaning activity was being carried out with the circuit energized and there were divergent understandings on how the activity should be performed. The complete de-energization of the electrical circuits could have prevented this occurrence

2.

The workers must be authorized to perform electrical work as per local legislation. The authorization must be documented in the work contract records of the company. **It is prohibited to perform any electrical work without specific formal authorization for the activity.**

Workers must be authorized to perform electrical work and it is prohibited to perform any electrical work without a specific formal authorization for the activity. In this event, the worker was not mapped for maintenance at QD 1415EE01, and this failure contributed to the occurrence of the incident.

3.

The electrical works must have a Safe Work Permit as per PNR-000031.

The issuing of a Safe Work Perit as per PNR-000031 must be done before the beginning of the electrical works and in this event compliance to this requirement could have contributed to prevent this event, impeding the beginning of the activity before the implementation of all control measures.

4.

For **works inside the Electrical Arc Flash Hazard Distance** a personal voltage detector type “helmet” or “wrist” (or similar device) compatible with the involved voltages must be used as an **individual protective measure** to alert against a non intentional proximity of parts of the body to energized surfaces.

Workers performing electrical work inside the Electrical Arc Flash Hazard Distance must use a personal voltage detector as na individual protective measure to alert against a non intentional proximity of parts of the body to energized surfaces. In this event, the workers performing the activity were not using the personal voltage detector and this failure contributed to the occurrence of the event.

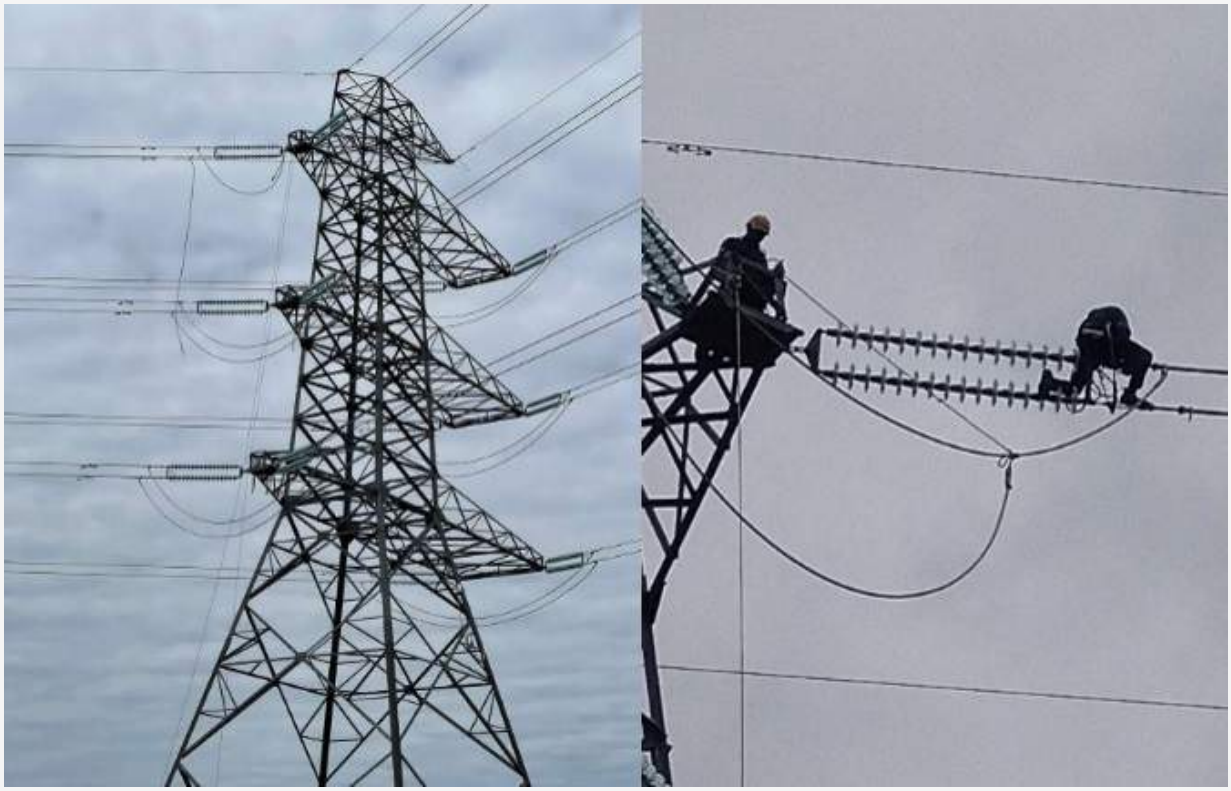
CONTINUE

Incident Report #2

Date: 17/06/2021.
Location: Tete - Moatize - Mozambique.
Occurrence Type: N1.

Event description:

Two employees were carrying out an operation on the 220 kV power transmission line from Matambo to Vale, in the village of Benga, located 17 km from the Moatize Coal Mine, when one of the employees felt ill and needed to be rescued. The employee was assisted and sent to an external medical clinic, but he did not resist and died.



Associated CAR 10 requirements

10.7.1 (A) - De-energizing measures

The electrical work where the worker enters the Electrical Arc Flash Hazard Distance or where there is interaction of the worker with equipment, conductors and/or parts of circuits, with the probability of injuries to the worker due to electrical arc flash or electrical shock must adopt the electric de-energization by means of the following steps, except in the situations covered in item 10.7.3:

- Isolating;
- Lockout (impediment to re-energize);
- Test of absence of voltage at the intervention point;
- Temporary grounding installation with equipotencialization of the circuit conductors at the intervention point;
- Protection of the energized parts present at the Electrical Arc Flash Hazard Distance Zone, when applicable;
- Installation of signs of impediment to re-energize.

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (B) - Prohibition

It is prohibited to perform live line work or hotline maintenance in high voltage (above 1kV), including works in power transmission lines with energized circuits.

(X) Missing requirement.

( ) Present and flawed requirement.

10.7.1 (D) - Authorization

Workers must be allowed to perform work on electricity in accordance with local legislation. Authorization must be documented in the company's employment contract records.

(X) Missing requirement.
( ) Present and flawed requirement.

10.7.1 (E) - Prohibition

It is forbidden to perform any work on electricity without specific formal authorization for the activity.

(X) Missing requirement.
( ) Present and flawed requirement.

Complete the content above before moving on.

Main Lessons Learned

1.

Electrical Arc Flash Hazard Distance or where there is interaction of the worker with equipment, conductors and/or parts of circuits, with the probability of **injuries to the worker due to electrical arc flash or electrical shoc**k must adopt the electric de-energization.It is prohibited to perform live line work or hotline maintenance in **high voltage (above 1kV)**, including works in power transmission lines with energized circuits.

In electrical works where the worker enters the Electrical Arc Flash Hazard Distance or where there is the interaction of the worker with equipment, conductosr and/or parts of the circuits, de-energization measures shall be adopted and it is prohibited to perform live line work or hotline maintenance in high voltage, including intervention in power tranmission lines. In this event, the activity at the transmision line was performed in a situation which is characterized as live line work with the energized circuit and this failure definitely contributed to the occurrence of the incident.

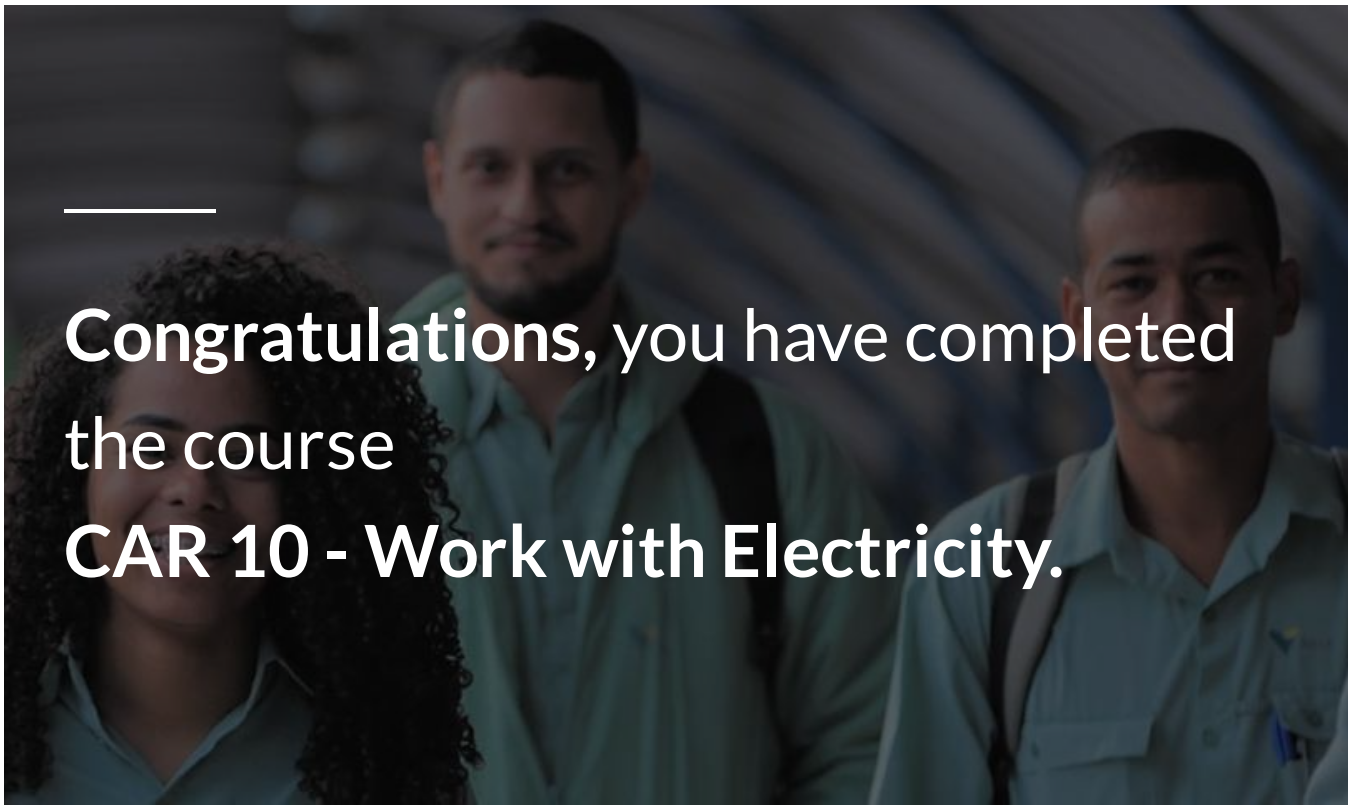
2.

Workers must be allowed to perform work on electricity in accordance with local legislation. **Authorization must be documented in the company's employment contract records.**

Workers must be authorized to perform electrical work and it is prohibited to perform any electrical work without a specific formal authorization for the activity. In this event, the workers were not qualified to perform work in power transmission lines according to the local legislation. The existence of an adequate evaluation process and formal authorization to carry out critical activities could have contributed to prevent this incident.

CONTINUE

Conclusion


Congratulations, you have completed the course
CAR 10 - Work with Electricity.

Also check out the courses of the other CARs. Apply the knowledge acquired here in your day to day, and good work.

Thank you for completing the

Vale Online Module Training.

Complete Your Module Validation

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