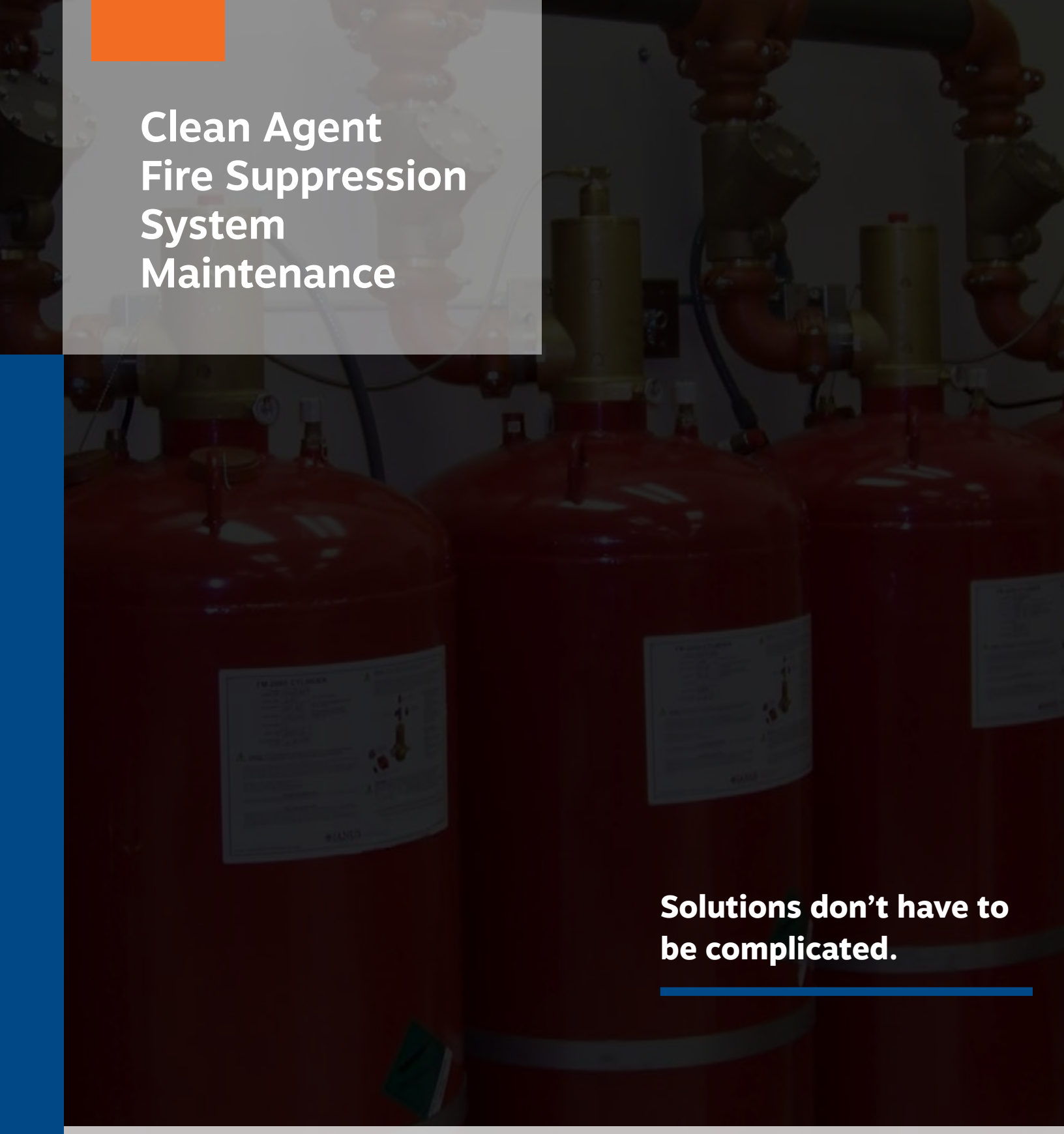
Clean Agent Fire Suppression System Maintenance



Solutions don’t have to be complicated.

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Who is Rotaflow?

Rotaflow is a mid-size, premier full-service Engineering, Procurement, and Construction Management (EPCM) company. Located in Edmonton, Alberta, we specialize in industrial fire and water projects. For over 25 years, we've worked with the world's leading energy companies, including Suncor Energy, Gibsons, Husky, Cenovus, and Albian Sands.

Customers and market influencers see us as subject matter experts in executing Industrial Fire and Utility projects from concept through CSU to operation. Our team of over 100 engineers, designers, and trades work collaboratively to design, build, retrofit, repair, operate, and maintain systems, protecting life and assets and enabling companies to focus on their core business.

Fire suppression systems require constant care and maintenance if you wish for them to effectively prevent fires when disaster strikes. This care routine involves frequent checkups, which are almost like doctor appointments for your suppression system. This also includes any special fire suppression systems like the one we will be discussing today, which are clean agent fire suppression systems. The Alberta Edition of The National Fire Code of Canada states that NFPA 2001, the standard on clean agent fire suppression systems, is to be followed for any building utilizing one of these systems. This standard specifies the maintenance routines to be carried out on a monthly, semi-annual, and annual

basis. It should be noted that a person who is knowledgeable in NFPA 2001, the given system being inspected, and requirements provided by the manufacturer should be performing these inspections.

For monthly inspections and maintenance, the routine is mainly visual. At a minimum, the following should be complete. A visual inspection must be done in accordance with the manufacturer's manual for the given system. The inspection should also at minimum verify that:

- Releasing panel is powered and free of supervisory, trouble, or alarm conditions
- Manual controls are unobstructed
- System shows no physical damage or condition that could prevent operation
- Pressure gauges are in the operable range
- Protected equipment and/or hazard has not been changed or modified
- Any previously noted deficiencies have been corrected

If deficiencies are found at any point during the inspection, the appropriate steps to correct the problem must be taken immediately. It should be noted that any correction steps taken must be carried out by someone with the same knowledge required to inspect the system. A record of the inspection must also be kept by the owner. This record must at minimum contain the date of the inspection, the initials of the person inspecting the system, and any deficiencies that were found. These records must be kept until the next semi-annual service and inspection. Do not worry though, we at Rotaflow have created checklists that can be used for this exact purpose. These checklists will be provided at the end of this content.

For semi-annual inspections, the main focus will be the pressure and quantity of the clean agent in the containers. Each container gets checked separately, and there are different rules depending on the type of the container and its contents. The one thing that's common across all canisters is that we are looking for a pressure or quantity drop that passes a certain threshold. Halocarbon clean agents that have a container with a built-in pressure indicator have a threshold of a 5% quantity loss or 10% pressure loss. If the halocarbon

clean agent is in a container without a means of reading the pressure, only the 5% quantity loss will be looked at. Any halocarbon agents that were removed from the container during this or any other maintenance procedure must be recovered and either recycled or disposed of in accordance with applicable laws and regulations.

For inert gas clean agents, we are

only looking for a pressure loss that exceeds a 5% threshold. If container pressure gauges are used for inert clean gas agents, they must be tested against a calibrated measuring device at least annually. Additionally, if any special measuring devices were used to measure the quantity of any clean agent in a container, these devices are to be listed in the report. The last step is to attach a tag to each container that contains the following information:

- Date of inspection
- Person performing the inspection
- Type of agent
- Container pressure and temperature
- Gross weight of the container and net weight of agent (halocarbon clean agents only)

Annual inspections are by far the most in depth. Firstly, a service report with all recommendations must be filed with the owner of the system. All system hoses must be inspected annually for damage. If any deficiency is detected, the hose must be either replaced or tested immediately. Even if a hose shows no deficiencies, it must still be tested every five years. When testing hoses, a test pressure of one and a half times the maximum container pressure at 130°F (54.4°C) must be applied within one minute of the test beginning and must be maintained for one minute. The test procedure is as follows:

- The hose is removed from any attachments
- The hose assembly is then placed in a protective enclosure that allows for observation of the test
- The hose must be completely filled with water before the test
- Pressure is then applied to reach the desired threshold within one minute and then maintained for one minute
- After observing for leakage, movement of couplings, and distortion, the pressure is released

The hose will only pass the test if all of the following are observed:

- There is no loss of pressure during the test
- There is no movement of the couplings while under pressure
- There is no permanent distortion of the hose

After passing the test, each hose is to be marked with the test date and internally dried before being reinstalled. If a hose fails the test, it must be marked and destroyed. The last part

of the minimum requirements for annual inspection involve inspecting the protected enclosure. The enclosure must be inspected annually or monitored by a documented administrative program for changes in barrier integrity or enclosure dimensions.

It should be noted that these inspection routines do not encompass the entirety of what is required out of clean agent suppression system maintenance. NFPA 2001 states that the clean agent storage vessels are to be inspected every 5 years. The requirements of the inspection vary between container types and are outside the scope of NFPA 2001. NFPA 2001 lists the standards that should be referenced for varying containers depending on their contents.

While we all hope that our fire suppression system never has to be used, it is important to keep it in optimal working order so that it can fulfill its purpose in the event of a fire. These inspection routines should help ensure that your clean agent suppression system is in working order and capable of protecting your assets in an emergency.

The document on the next page can be used to complete your monthly, semi-annual, and annual inspections.

CLEAN AGENT SUPPRESSION SYSTEM INSPECTION REPORT

GENERAL INFORMATION

Tag #: _____ Manufacturer: _____

Plant #: _____ Date (dd-mm-yyyy): _____

Location: _____ System: _____

Area #: Work Order #:

SUPPRESSION SYSTEM CHECK SHEET

MONTHLY

Description	*Inspected (✓)*				*N/A*	*Notes*
Visually inspect the system in accordance with the manufacturers listed maintenance manual	YES		NO			
Releasing panel is powered and is free of supervisory, trouble, or alarm conditions	YES		NO			
Manual controls are unobstructed	YES		NO			
System shows no physical damage or condition that could prevent operation	YES		NO			
Pressure gauges are in the operable range	YES		NO			
Protected equipment and/or hazard has not been changed or modified	YES		NO			
Any previously noted deficiencies have been corrected	YES		NO			

SEMI-ANNUALLY

Check agent quantity and pressure for refilleable containers using the correct proceedure for the agent and container	YES		NO			
Hydrocarbon agents removed from the containers must be recovered and recycled or disposed of in accordance with applicable laws and regulations	YES		NO			
Container pressure gauges used for inert gas clean agents must be compared to a separate calibrated device at least annually	YES		NO			
Special devices used to measure the quantity of agent in a container must be listed	YES		NO			
Attach a tag to the container with the following information: - Date of inspection - Person performing the inspection - Type of agent - Gross weight of the container and net weight of the agent - Container pressure and temperature	YES		NO			

ANNUALLY

All system hoses must be examined for damage	YES		NO			
If examination shows any deficiency, the hose must be replaced or tested as specified in NFPA 2001	YES		NO			
The protected enclosure must be inspected annually or monitered by a documented administrtive program for changes to barrier integrity or enclosure dimensions	YES		NO			
The results of the inspection must be attached to each container and filed in a suitable inspection report	YES		NO			
A complete copy of this report must be furnished to the owner of the system or an authorized representative	YES		NO			

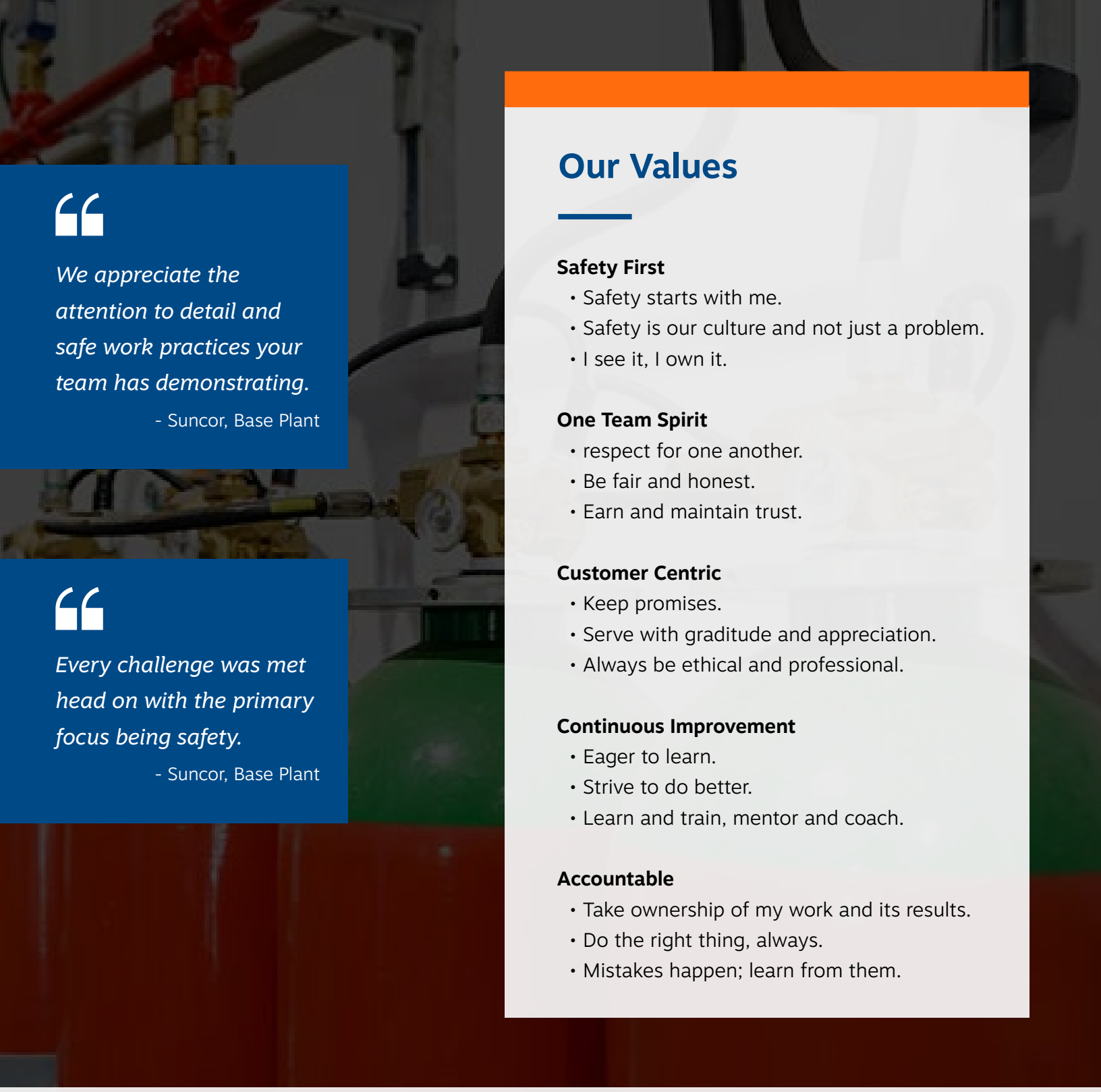
SUPPRESSION SYSTEM TEST REPORT

Test Container Location	Previous Pressure	Current Pressure	% Change in Pressure	Previous Agent Quantity	Current Agent Quantity	% Change in Agent Quantity

NOTES

FORM INFORMATION

Performed By:		Company:		Signature/Date:	
Performed By:		Company:		Signature/Date:	
Approved By:		Company:		Signature/Date:	



> *We appreciate the attention to detail and safe work practices your team has demonstrating.*
>
> - Suncor, Base Plant

> *Every challenge was met head on with the primary focus being safety.*
>
> - Suncor, Base Plant

Our Values

Safety First

- Safety starts with me.
- Safety is our culture and not just a problem.
- I see it, I own it.

One Team Spirit

- respect for one another.
- Be fair and honest.
- Earn and maintain trust.

Customer Centric

- Keep promises.
- Serve with graditude and appreciation.
- Always be ethical and professional.

Continuous Improvement

- Eager to learn.
- Strive to do better.
- Learn and train, mentor and coach.

Accountable

- Take ownership of my work and its results.
- Do the right thing, always.
- Mistakes happen; learn from them.

APEGA NFPA MEMBER CFAA MEMBER COR ICAB CASA CWB Avetta ABSA COMPLYWORKS ISN ULC LISTED CQN

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