#2 Miles Canyon Road
Box 5920, Whitehorse
Yukon Y1A 6S7
yukonenergy.ca

December 12, 2023 File: 2515.03.01

Elizabeth Barker, Environmental Protection Analyst
Yukon Government, Department of Environment, Standards & Approvals Section
Box 2703
Whitehorse, Yukon Y1A 2C6

(via email to: elizabeth.barker@yukon.ca)

Dear Ms. Barker,

RE: AIR EMISSIONS PERMIT NO. 60-010-01 FARO GENERATING STATION – PART 2, CLAUSE 5 – REQUEST FOR APPROVAL OF CAPACITY REPLACEMENT

Pursuant to Part 2, Clause 5 of the above referenced permit Yukon Energy is requesting approval to complete a capacity replacement at the Faro Generating Station. As part of Yukon Energy's Thermal Replacement Project, the Corporation is replacing end of life diesel generators with new diesel capacity. In this case, Faro Diesel No. 1 or FD1 (nameplate capacity 5.15MW) reached end of life after nearly 50 years of service and was retired. Yukon Energy is working to complete a replacement of the generating capacity represented by this unit with two new 2.5 MW generators.

The new generators will meet the EPA's Tier 4 emission standards for non-road diesel engines, replacing the FD1's Pre-Tier emissions. As part of its Thermal Replacement Project, Yukon Energy is making this investment in all *new permanent* diesel generation it installs across the grid, which will result in a decrease in emissions of particulate matter (PM) and oxides of nitrogen (NOx) of approximately 90% from EPA Tier 2 levels. The emissions controls on the units will also reduce noise emissions as compared to the unit being replaced. The new generators will be enclosed in modular containers and, as such, will not require a building to house them. Specifications for the replacement generators and the selective catalytic reduction (SCR) exhaust aftertreatment system are attached to this request for approval.

Yukon Energy expects to complete the installation in Q3 2024, after which it will begin commissioning and load testing units, thereby initiating emissions from the units.

Please contact me by telephone at 867.393.5350 or by email: travis.ritchie@yec.yk.ca if you have any questions, comments, or concerns with this request.

Thank you for your time and consideration in this matter.

Yours Sincerely,

Travis Ritchie
Manager – Environment, Assessment, & Licensing

Attachment: Specifications Caterpillar C175-16 Engine/Generator and ECOCUBE SCR Exhaust Aftertreatment

c. Larry Baran, Chief Administrative Officer – Town of Faro, Yukon Territory (via email)
Lorraine Sterriah, Manager – Heritage, Lands, and Resources – Ross River Dena Council (via email)

PRODUCT SPECIFICATIONS FOR C175-16 (60 HZ)

GENERATOR SET SPECIFICATIONS

Standby Rating	3365(no fan)/3250/3100(no fan)/3000 ekW
Prime Power Rating	3115(no fan)/3000/2825(no fan)/2725 ekW
Emissions/Fuel Strategy	Low Fuel, Tier 2
Voltage	480 to 13800 Volts
Frequency	60 Hz
Speed	1800 RPM
Duty Cycle	Standby, Mission Critical, Prime, Continuous
Maximum Rating	3365 ekW
Minimum Rating	2500 ekW

ENGINE SPECIFICATIONS

Engine Model	C175-16 SCAC, V-16, 4-Stroke Water-Cooled Diesel
Bore	6.89 in
Stroke	8.66 in
Displacement	6456.31 in³
Compression Ratio	16.7:1
Aspiration	Turbo Aftercooled
Fuel System	Common Rail
Governor Type	ADEM A4

GENERATOR SET DIMENSIONS

Length - Minimum	241.6 in
Length - Maximum	312.9 in
Width - Minimum	83.1 in
Width - Maximum	113.7 in
Height - Minimum	87 in
Height - Maximum	134.3 in
Dry Weight - Genset (minimum)	42750 lb
Dry Weight - Genset (maximum)	50500 lb

C175-16 (60 HZ) STANDARD EQUIPMENT

AIR INLET SYSTEM

4 x Single element canister with service indicator(s).

CONTROL PANEL

2 Programmable relay outputs (Form C)
Low coolant level
Over/under voltage
Coolant temperature
Serial annunciator module data link
Alarm acknowledge
Text alarm/event descriptions
Volts (L-L & L-N)
Reverse power
Over/under frequency
Environmental sealed front face
Programmable protective relaying functions
Speed adjust
Generator phase sequence
Low coolant temperature
Generator mounted - rear facing
Overspeed
Controls

Frequency (Hz)
Engine cycle crank
Engine cool-down timer
Warning/shutdown Indicators:
Lamp test
2 Programmable digital outputs
6 Programmable digital inputs
High coolant temperature
Customer data link (Modbus RTU)
Auto/start/stop control
Emergency stop pushbutton
RPM
Digital Indicators
Communications
Accessory module data link
Oil pressure (psi, kPa or bar)
Low oil pressure
Overcurrent
Emergency stop
24 Volt DC operation
4 Programmable relay outputs (Form A)
Failure to start (overcrank)
True RMS AC metering, 3-phase, +/-2% accuracy
Power factor (per phase & average)
Operating hours
DC volts
Amps (per phase & average)
Cat ECS 100
Reverse reactive power

EXHAUST SYSTEM

Bolted flange, with bellow for each turbo
Exhaust flange outlet

FUEL SYSTEM

Engine mounted filters #REF!
Filters x 3
10 Micron spin on yype
Secondary/tertiary fuel filters
4 Micron spin on type
Primary fuel filter water/fuel water separator

GENERATORS AND ATTACHMENTS

Right side extension box, bottom cable entry
IEC platinum stator RTDs
Reactive droop capability
3 Phase voltage sensing

(MV) Busbar connections, right side extension box, bottom cable entry
Class F temperature rise at 40C ambient
Anti-condensation space heater
NEMA Class H insulation
6 Leads
Class H temperature rise at 40C ambient
Voltage regulator
Exciter diode monitor
Form wound
RFI suppression
(LV) Busbar connections, top/center mounted, top cable entry
3 Phase brushless
60 Hz models: NEMA standard hole pattern
Permanent magnet excitation (PMG)
Min / max exciter limiter
Salient pole

GOVERNING SYSTEM

Redundant shutdown (Overspeed protection through a duplicate speed sensing system)
ADEM A4

LUBE SYSTEM

Oil filter, filler and dipstick
Integral lube Oil cooler
Oil drain lines and valve
Fumes disposal
Lubricating oil
Prelube - required with prime, continuous, and standby
Gear type lube oil pump

MOUNTING SYSTEMS

Rails - Engine/generator
Rubber anti-vibration mounts - shipped loose
Dual 24 volt electric starting motors
Battery disconnect switch
Batteries and battery rack w/cables

POWER TERMINATION

Busbar

SERVICE INSTRUCTIONS

Two PM inspections

GENERAL

Paint - Caterpillar yellow with high gloss black rails & radiator

SAE standard rotation
LH Service
Flywheel and flywheel housing-SAE No. 00

C175-16 (60 HZ) OPTIONAL EQUIPMENT

AIR INLET SYSTEM

Air inlet adapters
Dual element air cleaner
Single element air cleaner
Air inlet protection

CONTROL PANEL

Package mounted radiator
Automatically selected ground
Customer AC-DC connection mounting location - LV/MV
Load share governor
EMCP 4.4
E-Stop
Frame boxes
Annunciator modules
Load share module / auxiliary plate and auxiliary box (LV)
Fuel cooler
Controller mounting location - LV/MV
Modbus monitoring of packages
Customer interface options
EMCP 4.4 optional harness
Controller voltage and current sensing groups
Remote radiators
Generator harness
Interconnect harness
Speed adjust
Controller and MV and HV power connection locations
Raise lower switch

CRANKCASE SYSTEMS

Explosive relief valves
Crankcase ventilation system

EXHAUST SYSTEM

Mufflers
Exhaust support group
Weld flanges
Exhaust collectors/manifold
Front housing - Prime or continuous
Front housing - Standby or mission critical

Aftercooler drain

FUEL SYSTEM

Primary fuel filter

GENERATORS AND ATTACHMENTS

Low voltage - 1800 and 3000 Frames - 60 Hz, 3 phase, 1800 rpm, FW, PM, No of leads=6, Pitch 0.6667
Medium voltage - 1800 and 3000 Frames - 60 Hz, 3 phase, 1800 rpm, FW, PM, No of leads=6, Pitch 0.6667
Conversion GP - Top cable entry
Low voltage - 1800 and 3000 Frames - 50 Hz, 3 phase, 1500 rpm, FW, PM, No of leads=6, Pitch 0.6667
Differential current transformers
Space heater kit
Medium voltage - 1800 and 3000 Frames - 50 Hz, 3 phase, 1500 rpm, FW, PM, No of leads=6, Pitch 0.6667
Thermostat for space heater
Generator air intake

INSTRUMENTATION

Pyrometer and thermocouples

LUBE SYSTEM

Drain group oil pans
Oil filters
Lube oil heater
Electric prelube pumps
Lubricating oil

MOUNTING SYSTEMS

IBC vibration isolators - Shipped loose
Spring type linear vibration isolators
Rubber anti-vibration mounts

POWER CONNECTIONS

Low voltage connection cable
Center post busbarss (LV)
1800 Frame generator side / rear mounted busbars (MV)
Enclosures - Control packaging (LV)
Paralleling circuit breakers
1800 Frame generators Circuit breaker
Neutral ground (LV)
Neutral ground (MV)
Cable entry options (LV)
Cable entry options (MV)
Masterpack breakers
Power connection covers (LV)
Harnesses (Breaker)

Masterpack breaker connections
Side/rear mounted busbars (LV)

SPECIAL TESTS / REPORTS

IBC seismic Certification
Special test charge - Engine only
PGS Test report @ 0.8 power factor
Genset fuel consumption test
Standard genset TVA (Torsional Vibration Analysis) report
PGS Test report @ 1.0 power factor
OSCOSH1 seismic Certification
Custom generator TVA report
Generator test report
Standard engine test charge

STARTING / CHARGING SYSTEM

Heavy duty battery sets with rack
Charging alternators - Dry
Air pressure regulator
Starter location covers
24 Volt power distribution box
24 Volt electric starting motor
35 Amp Battery chargers
24 Volt battery set - Dry
20 Amp Battery chargers
Jacket water heaters
50 Amp Battery chargers
Air starting motor
Jacket water heater wiring groups

GENERAL

Special paint colors
Control GP - air powered bar group
Barring group manual
Service tools - Engine barring group
Engine barring air powered

TABLE 'A'

ecoCUBE ® CONFIGURATION	ENGINE MODEL	EST. WEIGHT (lbs)	EST. PRESSURE DROP (inH2O +/- 10%)	EST. 32.5% UREA CONSUMPTION (L/h +/- 10%)	EXHAUST TEMPERATURE (deg C)
Series 5	CAT C175-16	12500	17.0	39.3	444

TABLE 'B' - FULL LOAD EMISSION PERFORMANCE

ecoCUBE ® CONFIGURATION	INLET NOX (g/HP-h)	OUTLET NOX (g/HP-h)	INLET CO (g/HP-h)	OUTLET CO (g/HP-h)	INLET VOC (g/HP-h)	OUTLET VOC (g/HP-h)	INLET PM (g/HP-h)	OUTLET PM (g/HP-h)
Series 5	6.07	0.50	0.50	< 0.50	0.04	< 0.04	0.04	0.02

The DPF will provide an 85% PM reduction. Please note that if the level of PM that will result post-DPF for a given load point is less than 0.018 g/bhp-hr, the measurement will likely be within the error bars of EPA Method 5/202 (i.e. Method 5/202 will have difficulty accurately measuring this amount of PM as it is so low). As a result, measurements should be taken as per ISO method 8178-4 or 40 CFR 1065.

TABLE 'C' - EXHAUST SOUND ATTENUATION

ecoCUBE ® CONFIGURATION	FREQUENCY (Hz)	62.5	125	250	500	1000	2000	4000	8000
Series 5	MAXIMUM ATTENUATION (dB)		26	29	38	37	41	39	44

TABLE 'D' - BREAKOUT SOUND ATTENUATION

ecoCUBE ® CONFIGURATION	FREQUENCY (Hz)	62.5	125	250	500	1000	2000	4000	8000
Series 5	MAXIMUM ATTENUATION (dB)		26	26	35	35	39	41	40

All stated sound reductions assume 1/1 octave band resolution, from 63 Hz to 8000 Hz.
If engine datasheet does not include complete sound data from the 63 Hz to 8000 Hz frequency range, then the above analysis and guarantee is limited to the frequency range that was provided.
Insertion loss (IL) measured based on ISO 6798-1995 in a survey grade 3 environment.
SPL predictions assume hemispherical sound propagation; it does not account for site-specific conditions.
For outdoor or enclosure mounted ecoCUBE®s, acoustic measurement point is assumed to be at least 7 meters laterally from the enclosure wall (or SCR wall if no enclosure), at a height of 1.5 meters above ground.
For indoor ecoCUBE®s, acoustic measurement point is assumed to be to be at least 7 meters from the edge of the stack opening, perpendicular to the axis of the stack.

NOTE 'A': SYSTEM SPECIFICATIONS

1. REFER TO TABLE 'A' FOR SYSTEM SPECIFIC SPECIFICATIONS & TABLE 'B' FOR EMISSIONS PERFORMANCE.
2. INLET/OUTLET LOCATIONS ARE FIXED. SEE APPROVED SHOP DRAWING FOR FINAL.
3. ecoCUBE® IS INSULATED PER PROJECT PROPOSAL TYPICALLY WITH MINERAL WOOL INSULATION AND METAL CLADDING. MINIMUM AIR FLOW OF 4.0 M/S AROUND ecoCUBE® REQUIRED TO MAINTAIN TOUCH SAFE TEMPERATURE.
4. ecoCUBE® with SILENCING INCLUDED. REFER TO TABLE 'C' AND 'D'.
5. ecoCUBE® UREA CONSUMPTION AND EMISSIONS REDUCTION ARE CALCULATED FROM SPECIFICATIONS ON ENGINE DATASHEET.
6. ecoCUBE® IS FACTORY PRESSURE TESTED TO MEET THE PRESSURE WITHSTAND LEVELS IN CSA B139.1.0:19 S 13.7.
7. ecoCUBE® MEETS THE TEMPERATURE WITHSTAND LEVELS IN CSA B139.1.0:19 S 12.3.
8. SYSTEMS WITH DIESEL PARTICULATE FILTERS (DPFS) MUST BE OPERATED WITH ULSD ONLY. IN ORDER TO PROPERLY REGENERATE DPFS, OPERATING TEMPERATURE MUST BE ABOVE 280ºC FOR 30% OF ENGINE OPERATING TIME AND GREATER THAN 40% ENGINE LOAD.
9. ACCESS CONSIDERATIONS SHOULD BE MADE FOR SERVICING OF THE ecoCUBE® COMPONENTS. IF THE ecoCUBE® REACTOR IS PLACED ON A ROOF OR PLATFORM, EITHER A WALK WAY OR FALL ARREST TIE OFF POINTS SHOULD BE PROVIDED BY OTHERS.
10. UREA QUALITY AND STORAGE IN ACCORDANCE TO ISO22241.
11. OPERATING REACTOR ABOVE 950 DEG F WILL VOID ALL WARRANTIES.
12. INSTALLATION CONTRACTOR TO ENSURE GENERAL PUBLIC SHALL NOT HAVE ACCESS TO REACTORS OR CONTROL PANELS.

NOTE 'B': ecoCUBE® SEISMIC RESTRAINT/MOUNTING (BY OTHERS)

1. MATERIAL: 304 SS
2. USE A HEAVY 6mm WASHER PLATE OVER THE SLOT OR HOLE IN THE SLIDING SUPPORTS AND ADJUST BOLTS TO THE LISTED TORQUE SPECS ON DRAWINGS DM-01.
3. FOR ecoCUBEs INSTALLED IN SEISMICALLY ACTIVE AREAS, ecoCUBE® MOUNTING INFRASTRUCTURE (BY OTHERS) MUST BE SUITABLE.

NOTE 'D' - ADDITIONAL NOTES FOR ENCLOSURE MOUNTED SYSTEMS

1. CLIENTS' INLET DUCT MUST HAVE MINIMUM 7 GA WALL THICKNESS.
2. NO SUDDEN EXPANSION UPSTREAM OF ecoCUBE® INLET. EXPANSION CONE CONE ANGLE NEEDS TO BE LESS OR EQUAL TO 20 DEGREES.
3. FOR SITES REQUIRING ACOUSTIC REDUCTION IN EXCESS OF 35 DBA, ENSURE ALL EXPANSION JOINTS MEET THE REQUIREMENTS AS FOLLOW:
   a) CORRUGATED MULTI-PLY BELLOWS ELEMENT, TYPE T304/T321 SS.
   b) T304/T321 STAINLESS STEEL FLOW LINER.
   c) SHIPPED WITH RETENTION BARS HOLDING JOINT AT NON-COMPRESSED LENGTH.
   d) CONFORM TO EJMA STANDARD OR MIN. 3000 CYCLES FOR ANY ONE MOVEMENT.
   e) MIN. AXIAL COMPRESSION OF 3 IN.
   f) MIN. AXIAL EXPANSION OF 0.5 IN.
   g) MIN LATERAL OFFSET OF 0.5 IN.
   h) MAX. AXIAL SPRING RATE OF 125 LB/IN.
4. ENSURE THIMBLES USED ARE UL/ULC LISTED.
5. ENSURE INLET VELOCITY LESS THAN 7,250 FT/MIN.
6. IF UPSTREAM PIPING IS SMALLER THAN SCR INLET DIAMETER, THE TRANSITION MUST BE 3 X SCR INLET DIAMETER OR MORE.

NOTE 'E' - ENGINE START UP

1. FOR ecoCUBE® SYSTEM EQUIPED WITH DPF AND SCR CATALYST, YELLOW SMOKE MAY APPEAR FOR A BRIEF TIME PERIOD DURING ENGINE START UP. PLEASE SEE SAFETY POWER WHITEPAPER FOR MITIGATION MEASURES TO BE IMPLEMENTED BY INSTALLER: https://safetypower.ca/news/#Yellow

NOTE 'F' - LINEAR OR SPLITTED REACTORS

1. EXHAUST COMPONENTS BETWEEN DPF AND SCR REACTORS NEED TO BE STAINLESS 304/316.

NOTE 'G' - WIND LOADING

1. OUTDOOR REACTOR WITH HEIGHT MORE THAN 72 INCHES MUST HAVE WIND LOADING STUDY DONE BY OTHERS.

NOTE 'C' - INSTALLATION DETAIL FOR CLIENTS AND INSTALLATION CONTRACTORS

1. CLIENTS' INLET DUCT MUST BE SUPPORTED INDEPENDENTLY OF SPI.
2. CLIENT MUST MAKE SURE THERE IS NO ABSORPTIVE SILENCER UPSTREAM OF ecoCUBE®.
3. MAXIMUM AXIAL LOADING ON INLET/S AND OUTLET/S OF REACTOR IS 500 LBS. CONSULT SAFETY POWER IF OTHER LOADS ARE EXERTED ON THE INLET/S AND OUTLET/S.
4. UREA LINES TO BE INSULATED AND HEAT TRACED (SEE PI-02). UREA LINES TO BE 1/4" SS UNLESS GREATER THAN 75 FEET OF HEAD. IF GREATER THAN 75 FEET THEN CONSULT SAFETY POWER.
5. CONTRACTOR TO ENSURE FIXED POINTS OF REACTOR ARE RIGIDLY CONNECTED TO BUILDING STRUCTURE. DO NOT WELD REACTOR TO BUILDING STRUCTURE.
6. CONTRACTOR TO ENSURE ecoCUBE® FLANGES ARE NOT SUBJECTED TO LOAD DURING TRANSPORTATION, STORAGE & INSTALLATION.
7. ENSURE FLOOR MOUNTED ecoCUBE® IS MOUNTED AT LEAST 18" OFF OF FLOOR TO ALLOW FOR INSTALLATION OF FLOATING COLLAR AT INLET.
8. ALL CONDUIT AND WIRING MUST NOT COME IN CONTACT WITH THE REACTOR AND ITS SUPPORTING ELEMENTS.
9. CLIENTS TO SUPPLY DRAINAGE VALVES FOR DRAINAGE BUNGS LOCATED AT THE BOTTOM OF ecoCUBE® AND PIPED TO A LOCATION THAT ALLOWS OPERATOR EASY ACCESS FROM FLOOR LEVEL.
10. ALL OPENINGS ON THE REACTOR MUST BE SECURELY COVERED BEFORE TRANSPORTATION.
11. CLIENT MUST USE ENGINE LUBE OIL APPROVED BY MANUFACTURER FOR USE WITH DOWNSTREAM CATALYSTS.
12. CLIENT ENGINE MUST BE EQUIPPED WITH EXHAUST TEMPERATURE SENSOR AND ALARM.
13. ON ecoCUBE® EQUIPPED WITH OXIDATION CATALYSTS IT IS IMPORTANT THAT THE ENGINE CONTROL UNIT HAVE AN OVERRIDE TO PREVENT OVER FUELLING AN ENGINE WHICH IS UNABLE TO DELIVER ITS REQUESTED LOAD. FAILURE TO HAVE THIS OVERRIDE CAN RESULT IN EXCESS POST COMBUSTION IN THE OXIDATION CATALYSTS. SUCH EXCESS POST COMBUSTION WILL DAMAGE THE OXIDATION CATALYSTS AND VOID ANY ASSOCIATED WARRANTY.
14. PRIOR TO INSTALLATION CONTACT DESIGNATED SAFETY POWER PROJECT MANAGER FOR INSTALLATION OVERVIEW.
15. RECOMMENDED MINIMUM STACK HEIGHT IS 3 DIAMETER OF ecoCUBE® OUTLET.
16. REFER TO DIMENSIONAL DRAWING DM-01 FOR DETAILED VIEWS, ANCHOR POINTS AND SENSOR LOCATIONS.
17. STRUCTURAL CROSS BRACE MUST BE INSTALLED AT FIXED POINTS FOR CEILING MOUNT REACTOR.
18. CONTRACTOR TO ENSURE NO CONDUITS ENTER ANY OF THE SAFETY POWER CONTROL AND JUNCTION BOXES FROM THE TOP.
19. IF EXHAUST TEMPERATURE EXCEEDS THE DESIGN TEMPERATURE AS STATED IN THE SPI PROPOSAL THEN THE CATALYST WARRANTY IS REDUCED. EXCESSIVE ENGINE EXHAUST TEMPERATURE WITHOUT SAFETY POWER'S CONSENT WOULD VOID WARRANTY OF THE SCR CATALYST.
20. MAXIMUM THERMAL EXPANSION OF UP TO 1.5" ON ALL DIRECTIONS AWAY FROM FIXED ANCHOR POINT. DO NOT USE REACTOR FLANGES AS ANCHOR POINTS.
21. REFERENCE KINETIC NOISE DOCUMENT WITH LATERAL SUPPORTS AND SPRING HANGERS FOR CEILING HUNG ecoCUBE® REACTOR.
22. ENSURE UPSTREAM PIPING GASKETS ARE RATED FOR APPROPRIATE TEMPERATURE. DECOMPOSITION OF GASKET MATERIAL MAY POISON CATALYST AND VOID WARRANTY.
23. INSTALLATION CONTRACTOR MUST NOT INSULATE OVER SENSOR AND INSTRUMENT PORTS
24. FOR OUTDOOR APPLICATIONS, CONTRACTOR TO INSULATE ecoCUBE® INLET COLLAR AND UPSTREAM EXHAUST COMPONENTS. ROOF PENETRATION MUST BE ACOUSTICALLY INSULATED TO PREVENT BREAKOUT NOISE.
25. ENSURE THAT ECOCUBE NOT INSTALLED DOWNWIND OF COOLING TOWERS AS PHOSPHATES WILL DE-ACTIVATE SCR CATALYST.
26. THE FOLLOWING CONDITIONS CAN VOID CATALYST WARRANTY: (1) ENGINES THAT USE LUBE OIL WHICH IS NOT RATED FOR USE WITH DOWNSTREAM CATALYSTS (2) ENGINES WITH DATA SHEET EXHAUST TEMPERATURES IN EXCESS OF 480 DEG C CANNOT USE WIPA ECOSYN OILS EVEN THOUGH THEY ARE RATED FOR DOWNSTREAM CATALYST USE
27. SAFETY POWER HAVE NO DIRECT OR CONTINGENT LIABILITY FOR DAMAGE CAUSED BY A THERMAL EXCURSION CREATED BY THE ENGINE'S CONTROL UNIT INJECTING EXCESS FUEL THAT COMBUSTS DOWNSTREAM OF THE ENGINE'S COMBUSTION CHAMBER.
28. UREA TANK MUST NOT BE INSTALLED HIGHER THAN ecoCUBE® REACTOR. CONSULT SAFETY POWER FOR UREA TANK PLACEMENT.
29. DO NOT INSTALL ANY ELECTRONICS BELOW CP100 PANEL.
30. PROPER WEATHER PROTECTION NECESSARY DOWNSTREAM OF ecoCUBE®.
31. ecoCUBE® CANNOT BE INSTALLED IN AN ENCLOSED UN-VENTILATED ENVIRONMENT UNLESS REVIEWED BY SPI.
32. FOR INDOOR INSTALLATIONS, ENSURE THAT ADEQUATE LIGHTING IS AVAILABLE WHERE ecoCUBE® IS INSTALLED.
33. MODBUS POLLING RATE MUST NOT BE MORE THAN ONCE EVERY 10 SECONDS.
34. UPSTREAM PIPING NEEDS TO BE THERMALLY INSULATED.
35. INJECTION LANCE FLEX HOSE MUST NOT SUPPORT WEIGHT OF UREA/AIR LINES OR BUNDLE.
36. IF SYSTEM HAS A BLOWER ENSURE SUCTION SIDE CONNECTED TO OUTSIDE AIR.
37. INSTALLER SHALL PROVIDE CLEARANCE AND ACCESS TO ecoCUBE® WITH NECESSARY MAN LIFTS, SCAFFOLDING AND/OR LADDER.
38. FOR ENCLOSURE APPLICATION, PACKAGER TO STRAP AIR COMPRESSORS WITH VERTICAL RECEIVERS PRIOR TO SHIPMENT TO SITE
39. ENSURE EXHAUST PRESSURE RELIEF VALVE/S ARE INSTALLED VERTICALLY.
40. MOUNTING FEET ON ecoCUBE® REACTOR, UREA TANK, COMPRESSOR W/ RECEIVER TANK ARE DESIGNED FOR STATIONARY APPLICATION. CONTACT SPI FOR PROPER PACKAGING INSTRUCTIONS PRIOR TO SHIPPING.
41. PHOTO VERIFICATION OF COMPLETE INSTALLATION MUST BE SUBMITTED TO SAFETY POWER BEFORE COMMISSIONING CAN BE SCHEDULED.

FOR CUSTOMER APPROVAL

FINNING VENDOR DRAWING REVIEW

Permission to proceed does not constitute acceptance or approval of design details, calculations, test methods or materials developed or selected by Seller and does not relieve Seller from full compliance with contractual or other obligations.

- [x] 1. Reviewed and accepted with no comment.
- [ ] 2. Revise and resubmit. Work may proceed subject to incorporation of comments.
- [ ] 3. Revise and resubmit. Work shall **not** proceed.
- [ ] 4. For information only.

Sign: SW Date: 2022-12-13

FINNING DWG#: 700828E01B1405R0
DATE: 2022-12-13 SW SHT 4 OF 14

FILE NAME: 99004026 22091 DC-01 Rev1.0

REV	DESCRIPTION	DATE
1.0	Issued for Approval	Dec-02-2022
SHOP DRAWING REVISION NUMBER		1.0

CUSTOMER: Finning Canada
Yukon Energy Corporation

PROJECT NO.: 22091

TITLE: ecoCUBE DESIGN CRITERIA

DRAWING: DC-01

ENGINEER: JH

safety POWER