ATTACHMENT F

[redacted]

Kinder Morgan

Proposal Title: Caprock

Proposal Number: [redacted]

Proposal Description: [redacted] Emission Control System to Reduce Emissions from (2) GE Frame 3 Turbines

Submitted by: [redacted]

[redacted] Contact: [redacted]

Date Submitted: July 8, 2021

[redacted]

July 8, 2021

Kinder Morgan
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[redacted] Proposal #:	[redacted]
Project Name:	**Caprock**

James,

We are pleased to submit this proposal for an [redacted] **Emissions Control System** designed to reduce emissions for (2) Frame 3 Turbines.

The [redacted] **Emissions Control System** offered for this project is based on engine and emissions data provided by Kinder Morgan. The enclosed proposal details the price, scope of supply, warranty, commissioning and terms and conditions necessary to achieve the required emissions limits and long-term compliance.

Should you have any questions or comments, please do not hesitate to contact me.

THE [redacted] ADVANTAGE: COMPLIANCE AT A COMPETITIVE COST

[redacted] is an environmental engineering company supplying reliable exhaust after-treatment based emissions control systems to the North American market. Our strength is helping customers comply with federal and local emission regulations targeting process machines, marine vessels, offshore rigs, stationary diesel and natural gas engines and turbines. We specialize in reducing NOx using a comprehensive systems approach based on Selective Catalytic Reduction (SCR). Our SCR systems are then combined with oxidation catalysts or particulate filter technologies to reduce other regulated pollutant emissions, such as carbon monoxide (CO), hydrocarbons (HC), volatile organic compounds (VOC) and particulate matter (PM). We also offer an array of supporting component options, from urea storage tanks to air compressors to silencers, with the goal of providing everything necessary for a successful and near-turnkey installation.

Based in [redacted] [redacted] is [redacted]. [redacted] leverages more than five decades of experience in environmental compliance, and draws upon the knowledge of over 1000 successful SCR systems in a wide variety of markets such as marine, power generation, oil and gas development, industrial and chemical processes.

Our structured engineering approach begins by comparing your project's emissions profile to the regulations, or to the project's unique requirements. We then design an emission control system tailored to your application. Our product manufacturing process is governed by exacting quality standards, and our systems are commissioned with the [redacted] Emissions Guarantee. To ensure compliance over the long-term, we provide support after the sale through extensive operator training, spare parts, and on-site maintenance.

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I. QUOTATION

PROPOSAL #: [redacted]

PROJECT: Caprock

DESCRIPTION: [redacted] Emission Control Systems to reduce emissions from GE Frame 3 Natural-Gas Fired Turbines

1. SCOPE OF SUPPLY

ITEM	DESCRIPTION	EXT. PRICE ($)

001	**EMISSIONS CONTROL SYSTEM (2 x Frame3)**
	• 2 x Ducting / SCR Housing / Silencer
	  ○ Oxidation Catalyst
	  ○ Ammonia Injection Grid
	  ○ SCR Catalyst
	  ○ Ducting from Regen Outlet to SCR
	  ○ Expansion joint at Regen Outlet
	  ○ Ducting from SCR to Tailpipe
	  ○ Silencer / Tailpipe with CEMS Ports
	• 2 x Recycle Gas Skid, each including:
	  ○ 1 x Two-Phase Injection Lance for ammonia/air
	  ○ 1 x Static mixer
	  ○ 1 x Ventilator fan
	• 1 x SCR Control System with Touch-screen and PLC
	  ○ With NO/O2 analyzer (dual channel, single O2 measurement)
	  ○ 2 x Sample Probes and Heated Sample Lines (Per Unit)
	• 2 x Ammonia/Air Dosing Panel
	• 1 x Reagent Pump Station
	• 1 x Reagent Storage Tank
	• Engineering, Operation & Maintenance Documentation (Thumb Drive Only)
		$6,200,000

Not included in the scope of supply:

- Load signal from the engine (4-20 mA)
- Fuel flow signal from the engine (4-20mA)
- Fuel composition (TCP/IP)
- Engine running signal (digital dry contact, closed when engine is running)
- Internet connection for remote PLC access and service support
- Structural and civil work necessary to complete the installation
- Catalyst element lift / crane (available as an option)
- Aqueous Ammonia Solution
- Unloading valve/pump skid and controller (available as an option)
- Platforms and other support structures not listed herein
- Compressed Air, per ISO 1.3.4 requirements
- Heat tracing of Ammonia tank or Ammonia lines (available as an option)
- Provision for electricity and connection of the power supply to the enclosure
- System integration (design and engineering) with the building structure
- Unloading of material at customer location
- Any 3rd party emission certification of stack test

2. PRICE

The given prices for the SCR Emissions Control System are net prices, DDP to customer location in NM, according to Incoterms 2010. All prices are in US dollars. Not included are taxes. Shipping based on standard ground, sea vessel and non-expedited shipping.

3. PAYMENT

All payments are to be paid within 30 days after each date of invoice, net.

4. SCHEDULING & DELIVERY

Delivery of the drawings and technical documents is approximately 16 weeks after receipt of a purchase order. Delivery of the hardware is approximately 32 weeks after approval of all technical details. Total estimated schedule is 36 weeks (8 weeks for customer review) for receipt of material at each station.

- Preliminary Engineering Drawings – Approximately 16 weeks after receipt of a purchase order
- Customer Review/Approval – 6 Weeks from Receipt of Preliminary
- Release IFC's – 4 Weeks From Receipt of Customer Comments
- Manufacturing – Approximately 6 months From Customer Approval
- Shipping – 4 Weeks
- Follow on unit hardware 'ready to ship' at 2–3-month intervals

5. QUALITY STANDARD

All drawings will be in both metric and English units. We reserve the right to adapt the technical design of the emission control system based on the results of the final engineering work, provided this does not impact the affect the guaranteed performance characteristics and is approved by the customer before production begins.

6. OFFER VALIDITY

This offer is valid 90 days from date on proposal.

II. TECHNICAL DESCRIPTION

1. EXHAUST GAS DATA & EMISSION REQUIREMENTS

Unit Data:

Parameter = 100% Load	Unit	GE Frame 3*
Fuel	-	CQNG
Power	bhp	7,040
Exhaust Gas Flow Rate (wet)	lb/hr	~335,000
Exhaust Gas Moisture Content (actual, wet)	Vol. %	3.5
Oxygen Content (actual, wet)	Vol. %	18.1
Exhaust Temperature	°F	450**

** From KM provided data*
***Regen Outlet*

Emission Control System Design Parameters:

Parameter	Unit	Frame 3
Aqueous Ammonia Solution	%	19
Aqueous Urea Solution Consumption Rate (at 100% engine load) approximately, per engine	gph	~10.0
Total Estimated Backpressure Contribution	inH_2O	9.0
Air Consumption, per engine (Based on 87 psi nominal, max 160 psi	scfm	25**

***Type Z purge for control panel and dosing panel are not included in this air consumption*

2. EMISSIONS GUARANTEE & WARRANTY

Constituent	Current Engine Out	Required Stack Out**
NOx as NO_2*	150 ppmvd @15% O_2	50 ppmvd @15% O_2
CO*	35 ppmvd @15% O_2	15 ppmvd @15% O_2
VOC*	20 ppmvd @15% O_2	9 ppmvd @15% O_2

** Based on 1 hour averaging with the engine operating at 100% load. Minimum temperature for SCR performance is 570F.*

***Based on a minimum 440F SCR outlet temperature with 19% NH3 and Maximum SCR inlet temperature of 750F*

Provided the engine is operating under stable operating conditions, [redacted] guarantees the stack emissions (Based on % reduction) for a period of 24,000 hours of operation or 36 months after the initial SCR commissioning, or 42 months after delivery, whichever comes first. All values are per EPA-approved measurement methods, with one-hour averaging while the engine is operating at 100% load. The mechanical warranty is 12 months after commissioning or 18 months after delivery, whichever comes first.

This guarantee is subject certain maintenance practices and engine operating conditions, [redacted]. The guarantee is also based on the emissions data provided to [redacted] at the time of this quotation and defined in Section 1 of the Technical Description. [redacted] reserves the right to modify Items 001 in the Scope of Supply and associated price once more accurate and complete emissions data are obtained in order to ensure the emission limits can be maintained as required.

3. SCOPE OF SUPPLY

A. Engineering (Per Site)

- Drawings
- System flow diagram
- Control of the SCR system
- Documentation
- Supporting Analyses

B. Ammonia Injection Grid (Per Unit)

Includes one ammonia injection grid (AIG). The ammonia gas will be re-injected in the main exhaust gas duct with an ammonia injection grid.

C. OXI / SCR Reactor Housing / Ducting / Silencer (Per Unit)

The reactor housing duct and stack is designed as a cool wall lined system. This design incorporates a high strength carbon steel casing complete with external structural stiffening and support steel with an internal floating liner decoupled from the casing using a proprietary liner isolation support system. Compressed thermal / acoustical insulation between the 409SS liner and casing reduce thermal and acoustic coupling between the two surfaces minimizing the transfer of heat and noise to outer surfaces of the duct system. Ducting/structure consists of the following major components:

- Inlet expansion joint
- Acoustically and thermally lined inlet transition duct
- SCR reactor housing designed for AIG, SCR and Oxicat elements. Includes personnel access doors for catalyst maintenance and replacement
- Exhaust stack to include silencer section and (4) EPA approved flanged test ports. Acoustic design is based on 85 dBA @ 3ft perpendicular to stack exit, 100 mph wind load.
- Stack height from grade is 85ft
- Maintenance platform for installation and removal of the oxidation and SCR modules.

D. OXI/SCR Catalyst (Per Unit)

The elements will be designed for installation within the framework of the ducting. Oxicat to be installed before the AIG and SCR elements installed after the AIG.

Note the SCR catalyst impurity tolerance specification in Section IV and SCR manufacturer data sheet.

E. Recycle Gas Skid (Per Unit)

A small part of the exhaust gas will be taken out from the main exhaust gas duct downstream of the SCR reactor housing and sent to the recycle gas skid, where aqueous ammonia solution will be injected, evaporated and re-injected in the main exhaust gas duct via the ammonia injection grid.

F. SCR Control (Per 2 Units)

The SCR unit is controlled by a single control system housed in a control cabinet. Includes an Allen-Bradley ControlLogix Programmable Logic Controller and an A-B 15in touch screen with menu-guided parameter inputs (without any program change); password protection; error message and clear readable display. Includes an Ethernet communication between the PLC and the customer's control system.

G. Reagent Dosing Panel (Per Unit)

All components for aqueous ammonia dosing are mounted on a steel back panel; includes steel dosing valve, magnetic valves and shut-off valves. (Pressure indicators related to reagent solution supply to the dosing panel are the customer's scope.)

H. Ammonia Pump Station (Per Site)

Pump station complete with auxiliary valves, filters; ships fully assembled and pretested from our factory. The pump station has been designed for 19% aqueous NH3 for simultaneous operation of all units at the facility. The pump station also comes with one 100% backup pump.

I. Ammonia Tank and End Devices (Per Site)

Includes (1) horizontal, 25,000 USG, single-wall stainless-steel tank. 120in D x 42ft tangent to tangent length, made of 304 stainless steel, built to ASME Section VIII Division 1 Code, Design Parameters: 30 psig, 125˚F with 1/16 in corrosion allowance. With the following end devices:

- (1) Ultrasonic level transmitter
- (1) Temperature transmitter
- (1) Pressure transmitter
- (1) Relief and Vacuum Valve
- (1) NH_3 leak detection sensor
- (1) Control panel for indication of level, pressure and temperature

III. OPERATING PRINCIPLE

Selective Catalytic Reduction Principle
NOx is a general term referring to Nitrogen Oxide (NO) and Nitrogen Dioxide (NO_2) gases. NOx forms at the high temperatures of a combustion process, typical of internal combustion engines. NOx is a precursor to smog and adversely effects health and the environment. As such, NOx is increasingly regulated by both the US Environmental Protection Agency and by local authorities.

NOx emissions are most efficiently removed from the exhaust by Selective Catalytic Reduction, often referred to as SCR. SCR works by promoting a chemical reaction between the NOx and ammonia gas (NH_3), which is introduced upstream of the SCR catalysts. The ammonia can come from a variety of sources, including directly as a gas (known as anhydrous ammonia), or as an aqueous ammonia solution. It is more common to use aqueous urea solution. Urea is a widespread component of fertilizer, and water-based solutions made from urea are easier to handle than ammonia compounds. Moreover, aqueous urea solutions are readily available in different storage capacities and concentrations.

Commercially, aqueous urea solutions come in two concentrations, either 32.5% or 40%. The lower concentration, 32.5%, has the lowest freezing point of 12ºF (-11ºC), and is therefore used in colder climates where ambient temperatures can reach this point. The 40% concentration has a higher freezing temperature of 35ºF (2ºC), but requires less volume of solution to achieve the same degree of NOx reduction. In either case, freezing is to be avoided since injection becomes problematic. When low temperatures are encountered in the application, it is customary to install an immersion heater in the urea storage tank, as well as heat-tracing the urea supply lines to the SCR System. This is true for both concentrations of urea solution.

When the engine is running and the catalyst has warmed up to its normal operating temperature, urea solution is injected into exhaust stream ahead of the SCR catalyst, in combination with high-pressure air, to assist in atomizing the spray. (The air also cools the urea injection nozzle and purges the injector when the engine is no longer running.) Chemically, the heat of the exhaust first vaporizes the water in the urea solution, resulting in the formation of small urea crystals. These crystals further breakdown in the exhaust stream into ammonia and carbon dioxide. Once ammonia is present, the chemical reactions shown below take place over the SCR catalyst, reducing NOx to harmless nitrogen gas and water vapor.

Once ammonia gas is present, the chemical reactions shown below take place over the SCR catalyst, reducing NOx to harmless nitrogen gas and water vapor:

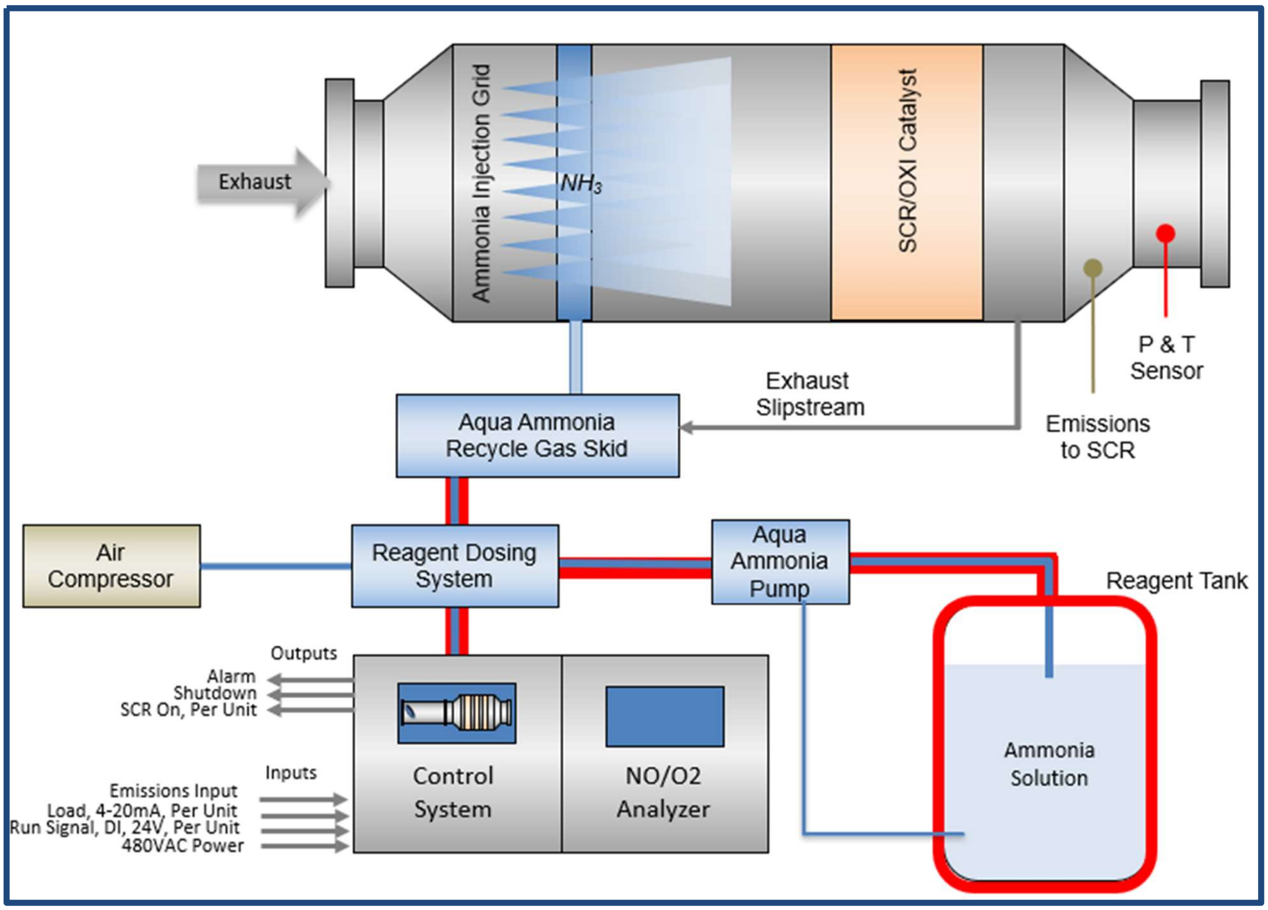
$$4\,NO + 4\,NH_3 + O_2 \rightarrow 4\,N_2 + 6\,H_2O$$
$$6\,NO_2 + 8\,NH_3 \rightarrow 7\,N_2 + 12\,H_2O$$
$$2\,NO + 2NO_2 + 4\,NH_3 \rightarrow 4\,N_2 + 6\,H_2O$$

The SCR Catalyst Technology:
SCR catalysts generally fall into two categories, a vanadia-based catalyst embedded in an extruded ceramic substrate, or a zeolite-based technology coated onto the surface of a ceramic substrate. In the former, the catalyst is actually incorporated into the ceramic structure, and as a result the catalyst is generally more robust to thermal variation. In addition, vanadia-based technologies operate over a wide temperature range, and when combined with its strength advantages and lower cost, are used in many

industrial applications such as large-scale power plants and boiler systems. Vanadia-based catalysts have demonstrated NOx reduction capability of up to 98%, and can operate continuously to temperatures of 510°C (950°F).

Zeolite systems are ideal for higher temperature applications, for example above 510°C, and as such have found wide use in mobile diesel applications such as on-highway trucks. These systems have also demonstrated a capability for high NOx reduction.

The size of the SCR catalyst elements and how they are configured in a catalyst housing (e.g., number of catalyst layers) is determined by factors such as the required NOx reduction, allowable back pressure of the engine, and ammonia slip limits. High levels of NOx reduction (>80%) generally require 2-4 layers of catalyst.



Schematic of a representative [redacted] Emission Control System.

Urea Injection Strategy:

Reducing NOx to N_2 with high levels of chemical conversion efficiency without introducing excess ammonia into the exhaust (known as "ammonia slip") requires precise control of the urea or ammonia injection process. The strategy for urea or ammonia injection depends on the degree of NOx reduction, and the required ammonia slip limits.

The simplest injection strategy links the engine to the SCR system through the engine load. NOx emissions are measured as a function of engine load, creating a "NOx vs. Engine Load" map. From this map, an injection algorithm determines the amount of urea or aqua ammonia necessary to reach the required NOx level, and sends this signal to the dosing control system. Because the amount of urea or ammonia injected is based on the engine load and not on a direct measurement of NOx, such an engine mapping strategy is often referred to as an "open-loop" control strategy. Such an injection strategy has been used successfully when NOx reduction requirements are generally less than 90%. Moreover, the strategy has demonstrated that ammonia slip is minimal, generally far less than typical 10ppm regulatory requirements.

When higher levels of NOx reduction are necessary, it is customary to add a NOx analyzer to the SCR System to directly measure NOx after the SCR catalyst. The signal from the analyzer is then sent to the SCR dosing control system, which then "trims" the injection volume up or down to ensure the required NOx reduction level is reached, without overdosing that could lead to an increase in ammonia slip. As the NOx is measured directly with the NOx analyzer, and the signal is used to control the reagent dosing volume, this strategy is referred to as "closed-loop" control. This strategy has demonstrated up to 98% NOx reduction, with very low levels of ammonia slip (as low as 5ppm in some applications).

Role of the Oxidation Catalyst:

By incorporating an oxidation catalyst into the system, it is possible to reduce carbon monoxide (CO), many hydrocarbon species (HC), volatile organic compounds (VOC) such as formaldehyde, and particulate matter. Placement of the oxidation catalyst depends on the application requirements, such as degree of CO reduction, but also on parameters such as the degree of NOx reduction and maximum levels of ammonia slip. In many cases, the oxidation catalyst can be incorporated directly into the SCR catalyst housing, saving both space and the cost of a separate housing.

Oxidation catalysts are generally precious metals-based systems composed of platinum, or mixtures of platinum, palladium and other precious group metals (PGM). PGM catalysts are highly effective at utilizing the excess oxygen in the exhaust stream of lean-burning engines to convert CO, HC and formaldehyde to water vapor and carbon dioxide, as shown below:

$$2CO + O_2 \rightarrow 2\,CO_2$$

$$HC^{*} + O_2 \rightarrow H_2O + CO_2$$

$$HCOH + O_2 \rightarrow H_2O + CO_2$$

Oxidation catalysts can be engineered to operate at temperatures similar to SCR catalysts, allowing for reduction of several pollutant emissions within the same system. Moreover, oxidation catalysts are highly effective, reducing emissions as much as 95%.

* *The specific reaction depends on HC species, such as CH_4, C_2H_6 etc.*

IV. SCR CATALYST IMPURITY TOLERANCE SPECIFICATION

SCR catalysts, like all catalyst materials, are susceptible to severe performance degradation if certain impurities in the exhaust stream exceed specific levels. These impurities derive from the use of improper or off-spec fuels, certain impurities in landfill or digester gases, lubrication oils, or other additives that could become part of the exhaust gas composition.

In order to maintain the warranty for the SCR quoted in this engineering document, the following impurities and impurity concentrations must be strictly adhered to. Any unexpected performance degradation of the SCR and/or Oxidation catalyst system will result in a chemical analysis of the catalyst system to determine if these impurity tolerances were exceeded.

Impurity	**Max. Concentration Limit**
Alkaline Metals	5 mg/Nm^3 (wet)
Alkaline Earth Metals	1 mg/Nm^3 (wet)
Hydrochloric Acid; Chloride Compounds	100 mg/Nm^3 (wet)
Hydrofluoric Acid; Fluoride Compounds*	1 mg/Nm^3 (wet)
P_2O_5; Organic Phosphorous Compounds	0.05 mg/Nm^3 (wet)
Mercury & Zinc	0.1 mg/Nm^3 (wet)
Lead & Cadmium	0.1 mg/Nm^3 (wet)
Arsenic; Arsenic Compounds	0.005 mg/Nm^3 (wet)
Organic Silicon Compounds (e.g., Siloxanes); Silicon Halides	0.005 mg/Nm^3 (wet)

**Depending on exhaust gas composition and engine operating condition, a concentration of up to 20 mg/Nm3 may be acceptable. Please contact us for more information.*