Attachment: Seneca Resource Corporation's Application for the Low Carbon Fuel Standard Credits Program (Innovative Method: North Midway Sunset Oil Field Solar Project)

1. The Seneca Solar Project is a 3.13 megawatt ("MW") direct current ("DC")/ 2.5 MW Alternative Current ("AC") fixed tilt solar photovoltaic ("PV") project located near the city of Taft, Kern County, California at Seneca's North Midway Sunset Oil Field (the "Oil Field"). Seneca is the owner of the onsite Solar Project.

   The Solar Project consists of 10,120 Canadian Solar 310 watt solar photovoltaic modules and two (2) central inverters which convert the DC solar power from the solar modules into AC power which is used directly by the Oil Field to power Seneca's oil production equipment at the Oil Field. The solar panels sit on fixed racking and mounting system tilted at 25 degrees to take advantage of optimal solar production.

   The construction of the Solar Project was completed in May 2016 (see photo of the completed project attached at **Exhibit A**) and this project is fully operational as of the end of June 2016. The Solar Project is estimated to generate approximately 5,400,000 kilowatt hours ("kWh") of electricity in year 1, *all of which* will be consumed onsite by Seneca's crude oil production equipment at the Oil Field. Please see the attached PV Syst generation report at **Exhibit B**, which provides a weather-based estimate of the annual kWh generation for the Solar Project. **Exhibit B-1** sets forth a table that shows that the monthly kWh solar generation (based on the PV Syst forecast) comprises of only an average of approximately 20% of Seneca's kWh usage at the Oil Field. Hence, site electricity consumption for crude oil production is greater than solar generation at all times.

   The amount of electricity generated from the onsite Solar Project for Seneca's Oil Field operations means that the same amount of power from the utility's transmission/ distribution grid is not being used to operate Seneca's Oil Field. Since the source of utility power is predominately carbon-based fuels, by using more solar power from the Solar Project, the amount of carbon emissions stemming from Seneca's oil production operations is reduced.

   In addition, the Solar Project qualifies as a "non-export" project under PG&E utility interconnection rules, which means that the PG&E will not allow any of the solar power generated by the Solar Project to be exported onto PG&E's distribution or transmission network. Prior to receiving permission to operate, Seneca was required to demonstrate to PG&E that the Solar Project would never export to PG&E's grid and, if it ever did back-feed, it would be shut down automatically in less than two seconds. As a result, the system

is designed to curtail automatically and dynamically based on the Oil Field's electricity consumption by means of a system of automated relays that communicate with the Solar Project's two inverters. The relay system is backed up with a PG&E approved battery-backup system, and there is a further fail-safe in a direct line that will trip off the Solar Project should it ever lose communications between the relays and inverters. PG&E required each of these redundancies to ensure that the Solar Project will not export power under even the most unusual circumstances. (See E.1.3 and E.1.4 Single Line Diagram attached as **Exhibit C)**

Pursuant to Section 95489(d)(1)(E) of the LCFS Regulation, Seneca meets the eligibility threshold of 0.10gCO2/ MJ carbon intensity ("CI") reduction based on the following assumptions and calculation:

511 [grams CO2/kwh LCFS emission reduction value] x 5,400,000 [estimated kwh annual solar electricity produced for onsite crude production load] x 1 / 1,442,809 [barrels of oil produced at the Oil Field[1] (and offset by the Solar Project)] x 1/6,000 [barrel of crude to mega joule conversion] = 0.31gCO2/MJ. At 0.31gCO2/ MJ CI reduction, the CI reduction for Seneca's Oil Field is more than *triple* the CI reduction requirement of 0.10gCO2/ MJ CI to qualify for LCFS crude producer credit.

2. Please see the attached engineering drawing attached as **Exhibit C** that illustrates the onsite location of the Solar Project within the Oil Field property lines, relevant process equipment and energy flows necessary to calculate the innovative method credits. Pursuant to Section 95489(d)(2)(B)(2) of the LCFS regulations, attached as **Exhibit D** is also a detailed process flow diagram that identifies the system boundaries, relevant crude production/ processing equipment and energy flows for the Oil Field.

3. Please see the map attached as **Exhibit E** which provides global positioning system ("GPS") coordinates for the Solar Project at the Oil Field.

4. The Solar Project is estimated to generate approximately 2,760 metric ton ("MT") credits. Seneca arrives at this number by multiplying the LCFS mandated emission reduction value of 511 gCO2/kw-hr by the estimated annual solar production from the Solar Project of 5,400,000 kWH over 1 x 10^6 as required by 95489(d)(1)(F) of the LCFS Regulations.

   The estimated 5,400,000 kWH of Year 1 solar production is derived from the PVSyst report attached as **Exhibit B**. This report provides the estimated annual electricity generation of

[1] Seneca produced 1,442,809 barrels of crude oil at its Oil Field in 2015. See attached comparison prepared by Seneca with California Department of Conservation Division of Oil, Gas & Geothermal Resources ("DOGGR") report attached as **Exhibit D**. The Solar Project is only offsetting electricity consumed at the MWSS North Oil Field.

the Solar Project based on the system equipment specifications of the Solar Project, historical weather data in the region and estimated system losses based on system design. The PVSyst software (and PVSyst report) is widely recognized in the solar industry as one of the most reliable forms solar production modeling in the world. (Lalwanim, Mahendra, Kothari, D.P., Mool Singh, Mool, "Investigation of Solar Photovoltaic Simulation Softwares," International Journal of Applied Engineering Research, Dindigul, p. 594 (2010)). Actual solar production data will be metered and recorded accurately and independently by a leading third-party monitoring provider, Locus Energy. (See Locus specification sheet at **Exhibit C**).

The SCADA system implemented at Seneca by Locus Energy utilizes an SEL735 panel type meter for load measurements. The meter, with five (5) A rated CTs, has an accuracy rating of ±0.02%. On the single line diagram at **Exhibit C**, the Locus meter #2 is located at the 21kV equipment Pad, in Cabinet #3. The flow of solar kWh generation is measured before it reaches the main service panel of the Oil Field. The meter communicates both relevant power and energy measurements to the SCADA system via Modbus TCP and is logged every five (5) minutes. Measurements taken from these logs are available for historical recording purposes on the Locus Energy SolarNOC cloud based platform which has charting and reporting features to be used by asset management and operations stakeholders. Measured data is also available through the Locus Energy external API.

List of References

1. PV Syst: http://www.pvsyst.com/
2. Lalwanim, Mahendra, Kothari, D.P., Mool Singh, Mool, "Investigation of Solar Photovoltaic Simulation Softwares," International Journal of Applied Engineering Research, Dindigul, p. 594 (2010).

EXHIBIT A – SENECA SOLAR PROJECT

EXHIBIT B – PV SYST REPORT AND SENECA USAGE

EXHIBIT B-1 – SOLAR GENERATION VS. OIL FIELD ELECTRICITY LOAD

EXHIBIT C – ENGINEERING DOCUMENTS

EXHBIT D – SENECA PROCESS FLOW DOCUMENTS & DATA

EXHIBIT E – GPS MAP