Validation of Anti-Idling Methodology and Verification Report for Implementing Anti-Idling Technologies on Schneider's Trucking Fleet

May 7, 2009

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Abbreviations

ACR	American Carbon Registry
ANSI	American National Standards Institute
CCU	Auxiliary Cab Cooling Unit
CO2e	Carbon Dioxide Equivalent
DFH	Direct Fire Heater
ECM	Electronic Control Module
GHG	Greenhouse Gas
GPS	Global Positioning Satellite
GWP	Global Warming Potential
ISO	International Standards Organization
RCE	Ruby Canyon Engineering

1.0 Introduction

This GHG emission reduction project verification is being performed by Ruby Canyon Engineering, Inc. (RCE). The project involved emission reductions (ERs) generated by the use of anti-idling technologies in the transportation sector. RCE's background and qualifications can be found in Appendix A.

1.1 Responsible Party

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1.2 Project Background[-1]

Headquartered in Green Bay, Wis., Schneider National has a 70-year track record of providing expert transportation and logistics solutions. Schneider transportation solutions include: One-Way, Intermodal, Dedicated, Bulk, Transportation Management, Transloading Services, International Services and Schneider Payment Services. Schneider Logistics, a wholly owned subsidiary of Schneider National, provides supply chain management technology, managed services, engineering services and freight payment.

Schneider's core business of transporting goods creates significant mobile source emissions. These emissions are directly proportional to the amount of goods transported and miles travelled. The only way to reduce emissions without sacrificing growth opportunities is to decrease the energy intensity required to transport these goods. Consequently, Schneider has been constantly striving to reduce their energy intensity by improving fuel efficiency, reducing unnecessary miles, reducing engine idle time, and shifting to intermodal modes of transport.

In 2003, Schneider began the implementation of idle reduction technologies including direct fired heaters (DFHs) and auxiliary cab cooling units (CCUs). DFHs reduce idling by providing in-cabin heat for drivers in cold temperatures. CCU units consist of a bank of batteries that charge while driving. The power from the batteries are then be used to power a small air-conditioner so the truck does not have to idle.

This project document evaluates the ERs associated with the reduced engine idle time of Schneider's fleet when compared Schneider's own average idling time where the technology is not installed. To be conservative and to only include reductions which are surplus to regulations, ERs generated in states with any kind of state or local anti-idling regulations that do not have applicable exemptions have been excluded from the GHG assertion. As a result, approximately 50% of the total idling reduction achieved by the Schneider's fleet throughout North America is not claimed.

The project implemented in 2003, and has a crediting period from January 1, 2006 through December 31, 2008.

DFHs are devices that reduce idling by providing in-cabin heat for drivers in cold temperatures. These are usually used in the months of October through end of March. Thus, for this project the emission reductions for trucks with DFHs will be claimed for first and last quarters of each year.

The CCUs consist of a bank of batteries and a small air conditioner. The CCU utilize the charging system from the truck to charge the battery bank while driving and then consume the stored power to run the small air conditioner so the truck does not have to idle for cooling needs. The CCUs have zero project emissions since battery power is used to run the air conditioner.

A small part of Schneider's fleet includes installation of both CCU and DFHs on the same truck. Thus, to avoid double counting, the emission reductions for trucks with CCUs will be claimed for only 2nd and 3rd quarters of each year and the DFHs for the 1st and 4th quarters for each year.

2.0 Validation and Verification Plan

The validation and verification plan included discussing and meeting with Schneider National to gain an understanding of the anti-idling technologies, project scope, project monitoring, and maintenance systems. To do this RCE did the following:

- Obtained the project calculations spreadsheets and the project design document, PDD.
- Performed a site visit to Schneider National Inc. headquarters in Green Bay, WI
- Met with engineers from Schneider to understand the Data Management System and how the data is collected from the ECM and GPS devices. Verified the process of how the data is collected and where the roll-up data from the baseline calculation comes from.
- Performed a risk-based sample plan and reviewed the data received and followed up with an additional questionnaire requesting further clarifications
- Continued with sampling and analysis to assess the materiality of the methods and data used to generate the GHG assertion
- Reviewed the anti-idle laws and regulations applicable to the project
- Verified the project's eligibility against the American Carbon Registry guidelines

2.1 Objectives

The goal of the validation and verification activities was to ensure that the project was eligible under the ACR, guidelines, the GHG assertion made by Schneider National Inc. was materially correct, that the calculation methods and data gathering and monitoring systems used were compliant with ACR guidelines. (**See Appendix C**) Furthermore, the validation and verification activities ensure that the data provided to RCE is well documented and free of any material errors.

2.2 Eligibility Criteria – What is eligible?

All emission reduction credits for this project are available for the American Carbon Registry. See **Appendix C** for ACR eligibility criteria for offset projects. RCE verified the assertion by following its verification policies and procedures established by ISO 14064-3.

2.3 Implementation Barriers

Schneider overcame significant institutional barriers and made a large monetary and time investment in implementing the anti-idling technologies. Schneider spent approximately $17 million dollars to implement, install, maintain, and create driver training programs to change the culture of the company to embrace and utilize the anti-idling technologies. The carbon market helped to finance the anti-idling program otherwise the extra expenditures could have been easily diverted into the company's core business of transporting goods.

Initially there was opposition from the drivers to use either of the DFHs or CCUs especially in extreme weather conditions since the drivers did not purchase their own fuel and the use of the anti-idling devices did not directly affect their own performance matrixes.

Schneider had to create new user manuals, training and incentive for the drivers to adopt the technologies while still keeping steady driver retention rates since there is stiff competition between trucking companies to retain drivers.

2.4 Scope

The scope of the validation and verification activities includes the following:

- Validate the validity of the new methodology
- Establish the eligibility of the Project as a ACR GHG reduction project under the new anti-idling methodology
- Verify the existence and ongoing operation and maintenance of the Project
- Verify the source of the raw data
- Ensure the completeness and accuracy of the GHG reduction calculations.
- Verify that the monitoring, metering, and recordkeeping procedures conducted by the Project operator meet the ACR guidelines

2.5 Materiality

The accuracy of the GHG assertion is dependent upon the accuracy and completeness of the relevant data needed to calculate the GHG assertion. The relevant data in this case includes:

- Calculating the baseline idle hours
- Calculating the idle hours for both the DFH and CCU
- Verifying the Data Management system for the Truck's ECM (computer) and GPS tracking, and maintenance records
- Verifying the total fleet mileage and average speed calculations
- Number of DFHs and CCUs installed on the Schneider truck fleet
- Idle percentages and miles travelled by each truck.
- Miles travelled in each state based on GPS data

3.0 Assessment of GHG Data and Information

3.1 Scope

The following sections define the scope to which the GHG verification was limited.

3.1.1 Project boundary

Heavy duty diesel engine truck idling laws and regulations were reviewed at the local, state (or provincial), and federal level. To ensure compliance with ACR's GHG offset protocol guidelines, only ERs which were considered surplus to anti-idle laws and regulations were included in the GHG assertion. To ensure a conservative approach, emissions reductions

generated in states with anti-idling regulations which were assigned to a specific county, city, or other location were excluded from the GHG assertion.

Two states, (Texas and South Carolina) have anti-idling restrictions, but were included in the assertion because of applicable exceptions in the regulations that allowed for heavy duty diesel truck idle for sleeper trucks.

> **Texas:**
> (12) a motor vehicle when idling is necessary to power a heater or air conditioner while a driver is using the vehicle's sleeper berth for a government-mandated rest period and is not within two miles of a facility offering external heating and air conditioning connections at a time when those connections are available.
>
> **South Carolina:**
> The anti-idle restrictions defined for South Carolina is to regulate Passenger Busses and not long haul trucks.
>
> **City of Beaufort Code of Ordinances**
> Chapter 11. Tourism Management
> Sec. 7-11027. Idling.
> Idling of engines is allowed only while passengers are embarking onto or debarking from vehicles, not to exceed fifteen (15) minutes, with exceptions as noted below. (Ord. No. O-13-04, 6-8-04)
>
> **Code of City of Charleston**
> ARTICLE VI. TOURING REGULATIONS GENERALLY
> Sec. 29-239. Limitations on engine idling.
> No buses may park with engines idling for more than five (5) minutes in residential areas. (Ord. No. 1983-22, § 72, 5-10-83)

3.1.2 Baseline scenario

Currently there are no federal, state or local laws requiring the installing of any anti-idling technologies on over-the-road trucks in the United States. It is not considered an industry best practice to install anti-idling technologies because there are no regulations requiring it (except in certain states) and the devices are expensive to install and require continued maintenance. Without the project, the less efficient heavy duty diesel engines would be used for idling instead of the smaller, more energy efficient anti-idling devices. See **Table – 2** for the sources of GHG emissions for the baseline and project.

3.1.3 Activities, technologies and processes of the GHG project

The main activity of this project is to reduce the idle time of the heavy duty diesel engines using the anti-idling devices. **Table – 1** shows the numbers of anti-idling technologies installed by year. This project uses sophisticated technology which includes GPS tracking devices and integrated EMC modules that communicate the trucks statistics using satellite communication.

Table – 1 [-1]: Number of Installed Anti-Idling Technologies by Year

Technology	2006	2007	2008
Direct Fired Heaters	6,758	8,450	8,688
Auxiliary Cab Coolers	195	267	277

3.1.4 GHG sources, sinks and/or reservoirs

See **Table – 2** for sources of GHG emissions.

Table – 2 [-1]: Sources of GHG Emissions for the Baseline and Project

	Sources	Gas	Included	Justification
Baseline Emissions	Fleet fossil fuel consumption due to idling	CO_2	Included	Main Emission Source
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
Project Emissions	Fossil fuel consumption due to idling	CO_2	Included	Main Emission Source
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
	Fossil fuel consumption for DFHs	CO_2	Included	Main Emission Source
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
	Fossil fuel consumption for CCUs	The Auxiliary Coolers are battery powered so the project emissions are zero.		

3.1.5 Types of greenhouse gases

This verification is concerned only with the release of carbon dioxide as a byproduct of the combustion.

3.1.6 Time period

The crediting period for the project is from January, 2006 through December, 2008.

3.1.7 Materiality

The process that Schneider National Inc. used to determine the GHG emission reduction assertion was found to be materially correct. The project was conservative by not taking credits for an entire state even if anti-idling regulations were in affect just for small areas. A conservative approach was also taken by assuming the anti-idling technology was used at all times the truck was not moving since the DFHs do not track runtime.

3.2 Sampling Plan

RCE's created a risk-based sample plan.

The sample plan was based on the following:

- on-site assessment of the Data Management System for the ECM, GPS, and maintenance records[6]
- completeness of supporting documentation,
- calculation methodologies were correctly applied,
- calculations of the baseline and project emissions were materially correct,
- fuel usage verified from\ from manufacturer specifications[4,5]

3.3 Emission Reductions - Baseline and Project Calculations

The emission reductions were calculated for this project using the standard formula:
ERs = Baseline Emissions – Project Emissions.

3.3.1 Baseline Calculations

The baseline percent idle is calculated using Schneider's remaining fleet that does not have the anti-idling technologies installed. The idle time is calculated by truck's ECM so the exact idle percentage can be determined for each individual truck. Approximately 1000 trucks were used as the basis for the baseline determination.

The baseline percent idle time is determined for each crediting year which provides a dynamic baseline. It may be considered conservative because it takes in-account any new anti-idling incentives added by Schneider throughout the project's life. See **Table – 3** for the baseline Idle Percentages

Table – 3: Baseline Idle Percentages

Baseline Idle Percentage				
Year	Q1	Q2	Q3	Q4
2006	24.204%	14.093%	20.259%	21.355%
2007	30.054%	14.876%	22.257%	25.132%
2008	32.633%	14.075%	20.730%	28.458%

3.3.2 Project Calculations

The ERs were calculated using the idle hours for trucks equipped with DFH and CCU. To only include trucks that have the anti-idling technology installed, the Schneider's fleet moving hours were multiplied by the ratio of miles travelled by units with DFHs and CCUs based on the ECM data. See **Table – 4** and **Table – 5** for the idle percentages and % idle reduction.

Table – 4: DFH Idle Percentages and Idle Reductions

Idle Percentage DFHs		
Year	Q1	Q4
2006	9.582%	10.620%
2007	16.692%	14.729%
2008	18.016%	16.485%

% Idle Reduction for DFH		
Year	Q1	Q4
2006	60.412%	50.269%
2007	44.460%	41.393%
2008	44.792%	42.073%

Table – 5: CCU Idle Percentages and Idle Reductions

Idle Percentage CCUs		
Year	Q2	Q3
2006	12.586%	20.342%
2007	9.072%	14.343%
2008	8.110%	14.265%

% Idle Reduction for CCU		
Year	Q2	Q3
2006	10.693%	0.000%
2007	39.016%	35.557%
2008	42.380%	31.187%

3.4 Assessment of GHG Information and Information System Controls

3.4.1 Data Management System

The data from this project is considered to be of high quality and materially correct since all data acquisition is generated electronically and automated. The data is pulled from the ECM and GPS units and stored in a large database system at Schneider's headquarters in Green Bay WI.

Schneider's IT department has data scrubbing routines that verify the data falls within a predetermined acceptable range. If the data falls outside the range, Schneider has policies and procedures to troubleshoot the cause of the anomaly and to take corrective actions.

3.4.2 Subsequent Data Received and Additional Interviews

RCE received addition anti-idling ordinances and regulations for the states of Texas and South Carolina to verify that the states could be included even though ordinances and regulations exist. (See section 3.1.1)

3.5 Evaluation of the GHG Assertion

3.5.1 Emission reduction calculation

The final GHG assertion presented by Blue Source and verified by RCE is shown in **Table - 6**. **Table – 6** states the quantity of metric tonnes of CO_2e emission reductions by year for the anti-idling project from January 1, 2006 – December 31, 2008.

Table 6: Total GHG reductions CO_2e (tonnes)

Year	Q1	Q2	Q3	Q4	Total
2006	6,550	22	(1)	5,268	11,839
2007	7,854	117	181	5,685	13,836
2008	9,871	114	142	7,115	17,241
				*Total	**42,916**
*****Totals do not add due to rounding, see assertion data					

3.5.2 Verification Records

All records pertaining to and supporting the verification statement reside at RCE's Grand Junction, Colorado office.

4.0 Conclusions

RCE verifies that the GHG assertion emission reductions, **Table – 6,** are materially correct at a reasonable level of assurance of 95%, and free from material misstatements. The total reductions for the crediting period January 1, 2006 – December 31, 2008 equal 42,916 metric tons CO_2e.

5.0 Recommendations

Schneider National is in the process of evaluating new tracking system for the trucks that will allow Schneider to get a more detailed account of the GPS location of the fleet. RCE recommends using this detailed data to filter areas that have idling regulations instead of excluding the miles from the entire state.

Date:

Michael M. Coté
Vice President

April 27, 2009

Appendix A: RCE's Background and Qualifications

Verification Experience

RCE has completed complex GHG inventories for several U.S. and international companies that included stationary combustion, mobile combustion, process emissions, fugitive emissions, and indirect electric emissions. As a result, the RCE staff is quite familiar with emissions estimation, calculation methods, emission factors, and the concepts of materiality. Moreover, RCE has completed numerous project design documents and monitoring plans for CDM and VER projects, as well as attended validation meetings for project proponents. This experience has given RCE first hand knowledge of project eligibility issues, monitoring and metering systems, and additionality testing.

Since its formation, RCE has been a subcontractor to the U.S. EPA's Climate Change Division. As part of this project, RCE manages the coal emissions inventory each year for the annual "U.S. Greenhouse Gas Emissions and Sinks" document. Over the years, RCE has made significant improvements to the methodology used to calculate emissions avoided at coal mines that recover and use methane. RCE authored a new abandoned mine methane emissions estimation methodology on behalf of U.S. EPA's Coalbed Methane Outreach Program that was accepted into the *2006 IPCC Greenhouse Gas Inventory Guidelines*. In 2007, RCE developed new emission factors for the U.S. EPA's GasStar program to be used for the natural gas production and processing sectors.

RCE is an experienced greenhouse gas (GHG) project verifier. The senior staff at RCE has been verifying GHG offset projects since 2003 in the U.S. RCE is currently completing the ANSI accreditation program to become an ISO 14065 approved GHG validator and verifier (V&V). The accreditation process is expected to be completed by March 30, 2009. RCE is currently an approved verifier for the Chicago Climate Exchange, California Climate Action Registry, The Climate Registry, and the American Carbon Registry. RCE has completed GHG verifications in the coal mine methane, abandoned mine methane, agricultural wastewater, oil & gas, renewable energy, and transportation sectors.

Accreditation Status

RCE is currently in the ANSI pilot accreditation program for the ISO standard 14065 "Requirements for Greenhouse Gas Validation and Verification Bodies for Use in Accreditation or Other Forms of Recognition". The ISO standards require rigorous and consistent GHG management and verification policies of validation/verification bodies and many registries will only be accepting ISO accredited verifiers in the upcoming years. RCE is expected to complete the ANSI accreditation process by July 30, 2009.

- RCE is accredited to perform verifications for the Chicago Climate Exchange (CCX) for coal mine methane, abandoned mine methane, and renewable energy sector projects.
- RCE is accredited to perform verifications for the American Carbon Registry (ACR) for all sectors.
- RCE has conducted verifications for the Climate Neutral Network for projects in the transportation sector.

- RCE is as a listed verification body under The Climate Registry (TCR) and the California Climate Action Registry (CCAR) for entity-based verification. In addition, RCE is as a listed verification body under CCAR for landfill gas and agricultural methane projects. Upon RCE's completion and accreditation of the ISO 14065 standard from ANSI, RCE shall be an accredited verification body for TCR and CCAR.

RCE has on staff verification team members and lead verifiers qualified to validate and verify projects in the oil and gas, coal mine methane, renewable energy, landfill and agricultural sectors. RCE also has on staff verifiers accredited to CCAR's General Reporting Protocol and the Landfill and Agriculture Project Reporting Protocols. RCE has scheduled additional staff to obtain upcoming lead verifier trainings offered by CCAR.

Appendix B: Document References

1- Project background was provided by "*Blue Source's Greenhouse Gas Emissions Reduction Protocol for Schneider National's Implentation of Anti-Idling Technologies on its Trucking Fleet*".

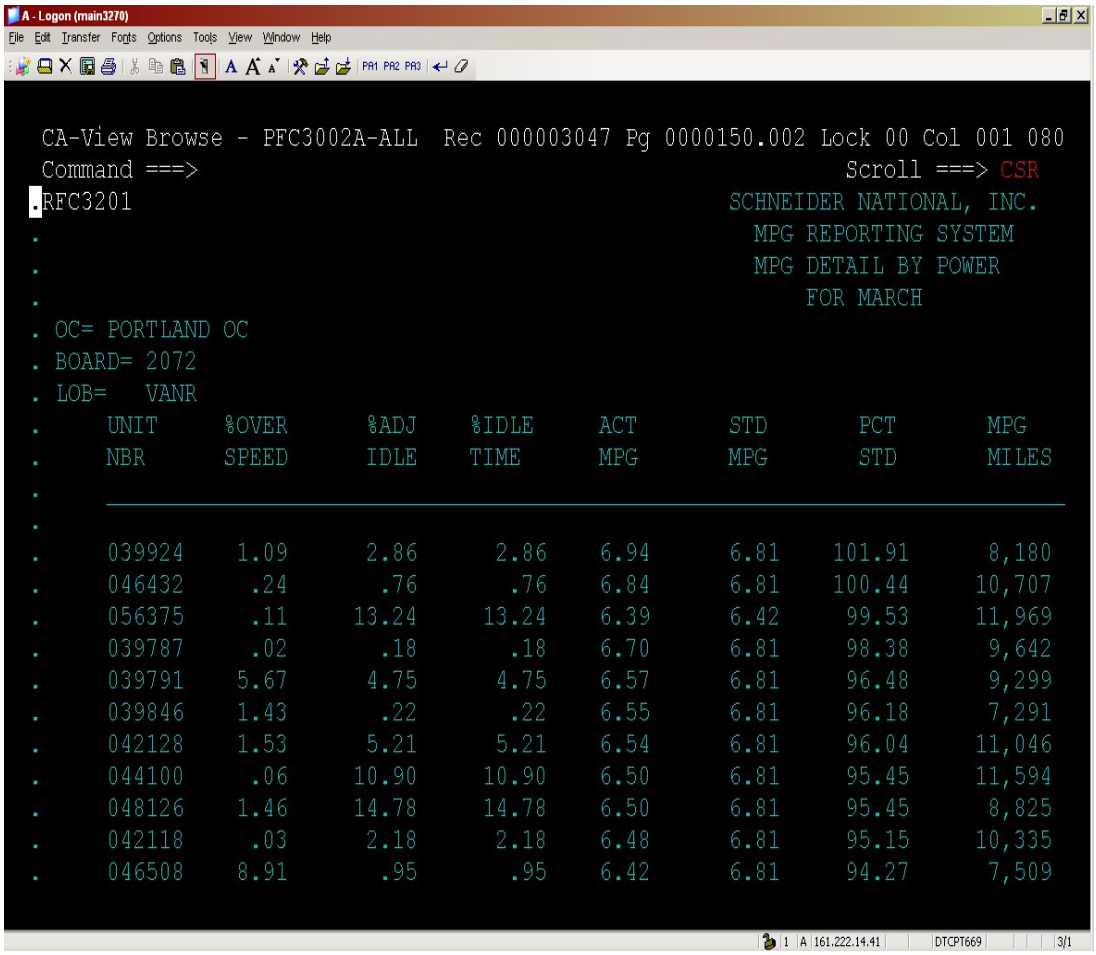
2- United States Environmental Prortection Agency – "Compilation of State, Country, and Local Anti-Idling Regulaitons" EPA420-B-06-004

3- Texas Commission on environmental quality control of air pollution from motor vehicles. Locally enforced motor vechile idling. http://www.nctcog.org/trans/air/programs/idling/LEIRrule.pdf

4- Manufacturer specifications for Webasto DFH http://www.webastoshowroom.com/images/truck_trifold.pdf

5- Manufacturer specifications for Airtronic D2/D4 DFH http://www.espar.com/html/products/technology_air.html

6- Screen Shots from Schneiders reporting databases displaying the source of the rollup data used in the assertion.



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056375	.11	13.24	13.24	6.39	6.42	99.53	11,969
039787	.02	.18	.18	6.70	6.81	98.38	9,642
039791	5.67	4.75	4.75	6.57	6.81	96.48	9,299
039846	1.43	.22	.22	6.55	6.81	96.18	7,291
042128	1.53	5.21	5.21	6.54	6.81	96.04	11,046
044100	.06	10.90	10.90	6.50	6.81	95.45	11,594
048126	1.46	14.78	14.78	6.50	6.81	95.45	8,825
042118	.03	2.18	2.18	6.48	6.81	95.15	10,335
046508	8.91	.95	.95	6.42	6.81	94.27	7,509

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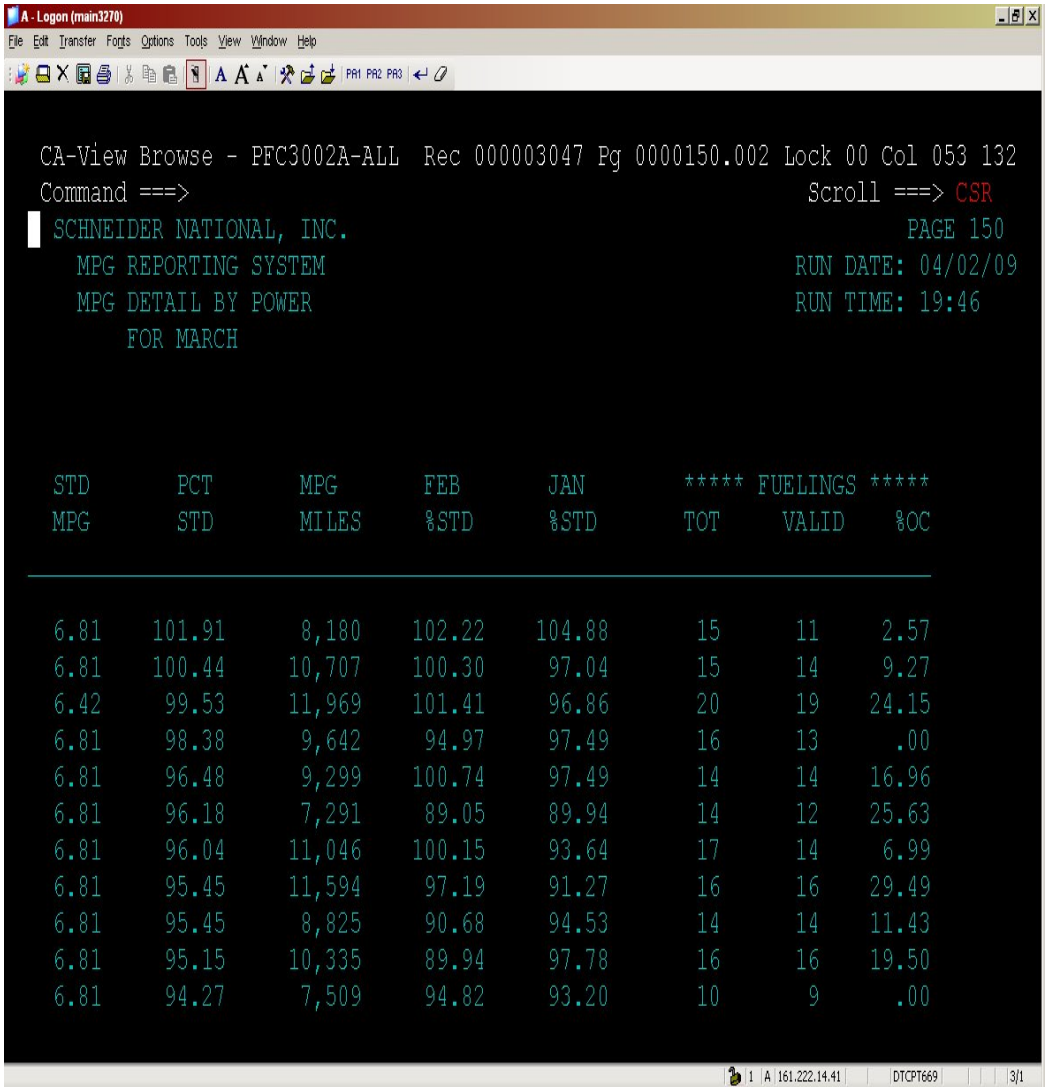
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Appendix C: Eligibility Criteria for Offset Projects

Criteria	Definition	Requirement	Project
Start Date	ACR defines project start date for non-forest projects as the date by which the project began to reduce GHG emissions against the project's baseline. ACR defines the start date for forest projects as the date by which the project developer began the project activity on project lands.	Projects with a start date of 01 January, 2002 or later are eligible for ACR registration. This start date does not apply to forest projects. ACR accepts forest projects with earlier start dates that comply with all other eligibility criteria.	Schneider National starting implementing the anti-idling technology in 2003
Real	A real project-based offset is the result of a project action that yields after-the-fact, quantifiable and verifiable GHG emissions reductions and/or sequestration. Real offsets yield atmospheric benefit.	ACR requires that an offset exist prior to issuance. ACR will not forward issue nor forward register a projected stream of future offsets.	The credits started immediately in 2006 at the project implementation
Direct Emissions	An emission or removal is a "direct emission" if the project developer owns or has control over the source of the emissions (e.g., equipment) or the emissions sink (e.g., project lands).	ACR requires a project developer to own or have control over the GHG sources or sinks from which the emissions or removal originates.	Schneider National Inc owns it's trucking fleet where the anti-idling technology is installed
Additional	Additionality is a test intended to ensure that project offsets are "in addition to" reductions and/or sequestration that would have occurred without carbon market incentives.	ACR requires every project to pass through a test of the project's additionality on three components: 1) projects must exceed regulatory requirements; 2) go beyond common practice; and 3) overcome implementation barriers (institutional, financial or technical).	The continuation of carbon funding is a key part to Schneider's long term sustainability efforts.
Title	Title is a legal term representing rights and interests in an offset, a future stream of offsets, or a project delivering offsets.	ACR requires documentation and attestation of undisputed title to all offsets prior to registration. Title must be clear, unique, and uncontested.	

Project Baseline	The project baseline is a counterfactual scenario that forecasts the likely stream of emissions or removals to occur if the project developer does not implement the project, i.e., the "business as usual" case.	ACR requires use of best practices from the CDM, the GHG Protocol, ISO 14064-2 standard, U.S. EPA Climate Leaders, and the VCS for calculating and updating baselines. ACR requires that all forest and land use projects calculate the baseline at the project start. ARR baselines are valid for the life of the project; IFM and REDD baselines are valid for up to ten (10) years.	The baseline for this project is valid and uses data from the remaining trucks in Schneider's fleet that does not have anti-idling technology installed. See section 3.1.2
Permanent	Permanence is a reference to the longevity of terrestrial carbon stocks, i.e., carbon that is stored (sequestered) in biomass. Fire, disease, pests, and illegal logging can reduce carbon stocks and result in the reversal of carbon sequestration, i.e., the atmospheric benefit is not permanent.	ACR requires projects to address the risk of reversal by use of one of the following: An insurance product to guarantee offsets; Creation and maintenance of a carbon buffer pool; Access to a secure source of replacement offsets; Other ACR approved risk management technique.	ERCs are permanent because the offset is the reduction of running a large diesel engine.
Leakage	Leakage is the increase in GHG emissions outside the project emissions boundaries that occurs because of the project action.	ACR requires project developers to deduct all leakage that reduces the GHG emissions reduction / sequestration benefit of the project. ACR assesses leakage on a case-by-case basis.	This project does not contain leakage. The emissions from the DFHs are included in the project calculations
Crediting Period	Crediting period is the finite length of time for which the project's GHG Project Plan or monitoring, reporting, verification (MRV) Project Protocol is valid, and during which a project can generate offsets based on the GHG Project Plan or MRV Protocol for registration in the ACR.	ACR requires a crediting period of five (5) years or less for non-forest projects with opportunities for renewal. ACR requires ARR projects to have a crediting period of thirty-five (35) years or less, with opportunities for renewal, and IFM and REDD projects to have a crediting period of ten (10) years or less, with opportunities for renewal. When the crediting period is over, project developers must renew the GHG Project Plan or MRV Project Protocol by re-verifying the project, or cease to generate offsets from that project for ACR registration.	2006-2008

Independent Verification	Verification is the independent assessment of GHG emissions reduction / sequestration by a qualified third party. The outcome is a verification statement that provides an opinion on the relevance, completeness, accuracy, reliability, and transparency of the quantification data and methods.	ACR requires third party verification, as scheduled in the project's GHG Project Plan or MRV Project Protocol contained in the broader project design document, by a Registry-approved verifier. Verifiers must use transparent and replicable verification methods against the relevant ACR project eligibility criteria and standard. The Registry reserves the right to reject verification from an approved verifier.	This project and report was verified by Ruby Canyon Engineering.
Community & Environmental	Projects have the potential to generate both positive and negative community and environmental impacts.	ACR requires written disclosure in the Annual Quality Assurance Review of any claims that arise during the project. ACR reserves the right to remove offsets from the Registry on a case-by-case basis.	