



Summary of Changes for the Mexico Landfill Project Protocols

The Landfill Project Reporting and Verification Protocols (version 2.0) provide accurate, conservative, and consistent methodologies for determining the eligibility requirements, monitoring and reporting guidelines, and emission reduction calculations for landfill gas destruction projects. In August 2008, Mexico's six Border States, California, the Pacific Gas & Electric Company, and the Climate Action Reserve signed a "Memorandum of Understanding" (MOU) agreeing to work cooperatively to develop quantification and verification protocols for greenhouse gas (GHG) emission reduction projects in Mexico. The MOU calls on the Reserve to develop protocols that would ensure the integrity of emission reductions from projects in Mexico designed to reduce greenhouse gas pollutants. Pursuant to this MOU, the Climate Action Reserve initiated the adaptation of its Landfill Project Protocol for eligible GHG reduction projects in Mexico. The protocol adaptation process has involved relevant sector-specific stakeholders in Mexico who have addressed issues such as:

1. Regulatory requirements for landfill operations in Mexico
2. Identifying common practices that affect methane emissions
3. Adapting equations and emission factors for GHG emissions in Mexico
4. Adjusting project monitoring and verification activities

The substantive changes are summarized below.

- **Added definition of landfill gas (LFG) destruction and qualifying and non-qualifying destruction devices.** LFG destruction can take place through a combustion reaction, such as in active burners, boilers, turbines, reciprocating engines, kilns, heaters, etc. or through reduction and oxidation reactions, such as in fuel cells (explained in footnote 1). These are considered as qualifying destruction devices under this protocol, while passive flares are non-qualifying devices. Figure 2.1 was added for illustrating the qualifying and non-qualifying destruction devices.
- **Eligibility rules (Location).** Projects located at landfill operations in Mexico are eligible.
- **Eligibility rules (Project start date).** The project start date criterion was based on the establishment of the agreement between the Mexico's six Border States, California, the Pacific Gas & Electric Company, and the Climate Action Reserve: August 15, 2008.
- **Performance Standard Threshold.** The analysis of solid waste disposal practices in Mexico is explained in Annex A. Firstly, it examines the use of landfills as a final solid waste disposal practice instead of other practices, such as open dumps or controlled sites; and secondly, it explores the use of LFG collection and destruction

systems instead of the passive venting in landfills. Based on this analysis, it was concluded that landfills have progressively become the common practice for final disposal of solid waste, while passive venting is the common practice for LFG management in Mexico (see also Regulatory Test). Although the installation of LFG destruction devices is gradually increasing in recent years, they are mostly being implemented through CDM projects (with the exception of only one demonstrative project financially supported by the World Bank). Hence, a project that implements a LFG collection and destruction system will pass the Performance Threshold.

- **Regulatory Test.** Mexican environmental regulations related to municipal solid waste and landfills that influence LFG collection and destruction practices at the federal, state and municipal levels are briefly described. Within this regulation, it is important to mention the Mexican Official Standard NOM-083-SEMARNAT-2003 (NOM-083), which provides specifications for environmental protection related to the site selection, design, construction, monitoring, closure and complementary works of a final disposal site for urban solid waste and of special management. Its Article 7.2 includes general specifications for LFG control in waste disposal sites through its flaring in punctual wells or through centralized burners. However, this standard does not establish the minimum quantity of LFG that should be collected and burnt, neither the specific technologies to be used. In practice, municipalities and landfill operators have not adopted or exceeded the NOM-083 due to multiple reasons described in section 3.3.2 (Regulatory Test), and the LFG is only vented in landfills or controlled sites. For this reason and in order to substantiate the compliance with the NOM-083, the Reserve introduced a new requirement for Mexican landfill projects to pass the Regulatory Test, which involves the application of an adjustment factor for the compliance with the NOM-083 added in Equation 5.1 as $NOM_{discount}$.
- **Added adjustment factor for the compliance with NOM-083 ($NOM_{discount}$).** The $NOM_{discount}$ factor was established on 7% and it accounts for the methane that would be destroyed in a system of wells and burners sufficient to achieve compliance with NOM-083, under the assumption that landfills have rudimentary flares on passive ventilation systems which have poor collection and combustion efficiencies. The estimation of this factor is explained on Section 5 (GHG Reductions Calculation Method) and was based on an analysis conducted by the Reserve in consultation with Mexican landfill managers, engineers, and industry experts. As mentioned, it is required to apply this adjustment in the calculation of the project GHG emission reductions in Equation 5.1.
- **Eliminating plausible scenario of landfills with pre-existing, non-qualifying destruction devices.** As mentioned, the $NOM_{discount}$ factor accounts for methane emissions that would have been combusted in a non-qualifying combustion device (passive flares, and previously considered in section 3.3.1). Thus, this scenario is already taken into account under the $NOM_{discount}$. For conservativeness and for eliminating the high costs of pre-project monitoring this type of systems, the $NOM_{discount}$ factor was selected as the adjustment factor for landfills with pre-existing, non-qualifying destruction devices. Correspondingly, the $NQ_{discount}$ was deleted on Equation 5.3.
- **Added default lookup table for fuel emission factors and net calorific values.** Specific values for fuel emission factors for mobile combustion and net calorific values were added in Appendix B (Tables B.1 and B.2) according to data of Mexico's National GHG emissions inventory and the Mexico's Energy Balance respectively. Specific values for fuel emission factors for stationary combustion are

based on default IPCC values (2006 guidelines). Values for net calorific values are to be used when data from fuel suppliers or laboratory analyses are unavailable.

- **Added reference for Mexico's electricity emission factors.** Emissions factors from power generation in Mexico are calculated by the Mexico GHG Program (a public-private GHG accounting and reporting initiative from SEMARNAT-CESPEDES-WRI-WBCSD) on an annual basis based on data provided by the Ministry of Energy and Mexico's National Energy Balance. This electricity emission factor is applicable for the Electricity Interconnected System, which includes most part of the country excepting Baja California and Baja California Sur. Reference for obtaining these factors was added on footnote 19.
- **Project monitoring section updated.** Additional guidance was added for monitoring, calibration and data substitution (added Appendix C). The update provides better guidance for project developers. It is important to note that monthly methane concentration analyzers are allowed to be used until January 1, 2010 for Mexican projects (conversely to U.S. projects, which is until January 1, 2009).
- **Added Appendix C on methods for data substitution and failed calibration.** The Reserve developed an appendix to provide guidance on calculating emission reductions when data integrity has been compromised either due to missing data points or a failed calibration. Project developers can use this appendix instead of the data substitution methods provided for under the US EPA Acid Rain Program in 40 CFR Part 75 Subpart D 75.33 previously mentioned on section 6 (Project Monitoring).
- **Eliminating non-methane organic compounds (NMOC) emissions threshold and references.** There are no regulations in Mexico requiring control of non-methane organic compounds (NMOC) from landfills. Hence, the NMOC emissions threshold and the reference to their corresponding U.S. regulations were deleted throughout the document (i.e. regulatory compliance, project reporting parameters, project submittal forms).

Issues to be further analyzed and developed.

- **Supplement to the protocol for project activities related to renewable electricity generation using biogas.** In response to feedback from workgroup members, footnote 5 was added mentioning that the Reserve anticipates the development of this supplement. Considering this type of projects in Mexico will aim to enhance renewable energy generation and GHG emissions reductions in the landfill sector. In the absence of carbon markets, these projects are unlikely to be conducted due to financial, legal, institutional and technological barriers.

The above changes have gone through a month of public comment period. Public comments have been incorporated into the updated Landfill Project Reporting and Verification Protocols where appropriate.