Border Environment Cooperation Commission
Construction of a Sanitary Landfill in the Municipality of Dr. Gonzalez, Nuevo León

1. General Criteria

1.a Project Type

Project Name: Construction of a Sanitary Landfill in the Municipality of Dr. Gonzalez, Nuevo Leon.

Project Sector: Municipal Solid Waste.

1.b Project Category

Category: Municipal Environmental Infrastructure Project – Community-wide Impact.

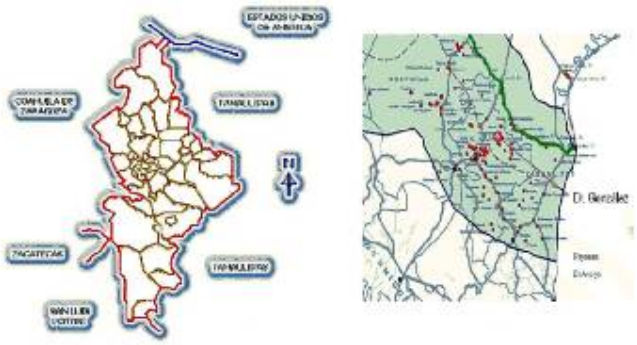
1.c Project Location and Community Profile

Community: Municipality of Dr. Gonzalez, Nuevo Leon.

Location: The Municipality of Dr. Gonzalez, Nuevo Leon is located in the north central region of the state, on the Monterrey - Miguel Aleman highway. Bordered on the north by the Municipalities of Higueras and Cerralvo, on the south by the Municipalities of Pesqueria and The Ramones, east with Cerralvo and west with Marin.

Location within the border: This project is one element of a larger comprehensive regional solid waste project that the sponsor will implement to solve the environmental problem about solid waste disposal in the region. The project is located within the limits of the 100 km border zone. The nearest tributary to the Río San Juan is at 670 m.

Image:



Location of the Municipality of Dr. Gonzalez

Demographics	
Current Population:	3,218 inhabitants in the municipality.
Growth Rate::	1.80 %
Reference:	INEGI, 2000 and CONAPO, 2008
Economically active population:	1,415 inhabitants
Reference:	- INEGI, 2000
Median per capita income:	$ 5,772 US Dollar
References:	*National Institute of Statistics, Geography, and Informatics (INEGI)*
Primary economic activities:	Agriculture, Commerce, and Services
Marginalization rate:	Low.
Services	
Municipality:	**Dr. González**
Drinking Water System	
Coverage of drinking water:	74%
Wastewater Collection System	
Coverage of wastewater collection system:	83 %
Wastewater Treatment	
Coverage of Wastewater Treatment:	52 %
Capacity (lps)	25
Solid Waste	
Coverage of Solid Waste:	100%
Additional Comments:	

1.d Legal Authority

Sponsor:	Comprehensive System for the Environmental Management and Processing of Solid Waste (SIMEPRODE, for its initials in Spanish).
Legal representative:	Mr. Jorge H. Padilla Olvera, Director of SIMEPRODE
Legal instrument to demonstrate legal authority:	Law for the Decentralized Public Agency named Comprehensive System for the Environmental Management and Processing of Solid Waste (SIMEPRODE)
Date of instrument:	June 1, 1987

Compliance with agreements:	- La Paz Agreement of 1983 or Border Environmental Agreement - North American Free Trade Agreement of 1994 (NAFTA) - Border 2012 Program

1.e. Project Summary

Project description and scope:	The project consists of the construction of a new solid waste landfill for the Municipality of Dr. Gonzalez, Nuevo Leon. This project is one element of a larger comprehensive regional solid waste project that the sponsor will implement to solve the environmental problem about solid waste disposal in the region. The proposed project will be implemented according to the specifications and technical requirements for environmental protection, in order to provide adequate solid waste disposal. The design and implementation of the project will be according to Mexican Official Regulation NOM-083-SEMARNAT-2003, which establishes specifications for the environmental protection for site selection, design, construction, operation, monitoring, closure and ancillary works for the proper disposal of municipal solid waste and hazardous materials.
Components:	Construction of the Solid Waste Landfill
Additional comments:	The solid waste generated in the municipality is disposed in an open dumpsite that does not comply with the requirements established in NOM-083-SEMARNAT-2003.
Benefited population:	3,218 inhabitants in the municipality.
Project cost:	MX $ 3,138,039 pesos

Project map:

The location of the Municipal Landfill in Dr. Gonzalez

Project justification

Project justification:

The deficient management of solid waste in the municipality of Dr. Gonzalez causes environmental problems such as air quality problems, contamination of the underground water and soil, and potential explosion and fire risk in the current dumpsite, as well as the development of vectors.

The project will improve solid waste management. The landfill will provide an adequate site for the disposal of solid waste as required by law and the potential for human health infections will be reduced as well as the potential for leachate infiltration which can contaminate groundwater sources.

Additionally, the project will allow the closure of the open dumpsite since it does not comply with the guidelines of NOM-083.

Project need or consequences of the no action alternative:

The deficient management of solid waste in the municipality of Dr. Gonzalez causes environmental problems such as air quality problems, contamination of underground water and soil, and potential explosion and fire risk in the current dumpsite, as well as the development of vectors.

Pending issues:

None

Criterion summary:

The project falls within BECC's core sectors and complies with the general criteria.

2. Human Health and Environment

2.a Compliance with Applicable Environmental and Cultural Resources Laws and Regulations.

Environmental and public health needs addressed by the proposed project:

The Municipality of Dr. Gonzalez does not have a solid waste landfill for the management of municipal and hazardous solid waste.

- The lack of a suitable solid waste landfill to dispose the solid waste generated by the Municipality of Dr. Gonzalez creates the inadequate disposal of this. The inadequate disposal of solid waste may cause its own dispersion while generating contamination of soil and wastewater, risks of fires, and risks to public health due to the proliferation of vectors and disease transmission to the community.

- The problem in the municipality is the lack of a solid waste landfill that complies with the requirements established in NOM-083-SEMARNAT-2003. Currently all types of waste, including waste considered as hazardous, such as used oil, paint residue, and batteries, among others, are deposited in ways which do not meet environmental regulations, furthermore, due to a lack of an appropriate operation workers health is at risk.

The project meets the following applicable laws and regulations:

The project complies with Mexican Official Law NOM-083-SEMARNAT-2003, Environmental Protection Specifications for Site Selection, Design, Construction, Operation, Monitoring, Closure, and Ancillary Works for Municipal Solid and Hazardous Waste Disposal.

2.b Human Health and Environmental Impacts

Human Health Impacts

Direct and indirect benefits to human health:

- Reduce inadequate solid waste disposal
- Reduce the contamination of groundwater sources
- Reduce soil contamination

Health statistics:

The following table presents the most frequent types of diseases in the Municipality of Dr. Gonzalez.

20 Causes of Most Frequent Diseases in the Municipality of Dr. Gonzalez, N.L.

Disease	2007		July 2008	
	No.	Cases	No.	Cases
Acute Respiratory Infections JOO-J06	1	1455	1	615
Intestinal Infections by other organisms	2	176	2	100
Urinary Track Infections N30, N34, N39	3	145	3	52
Chichenpox B01	7	36	4	27
Conjuntivitis B30, H10.0	9	31	5	23
Ulcers Gastritits and Duodenitistis K25-K29	4	94	6	18
Escabiosis B86	12	13	7	17
Acute Otitis H65.0-H65.1	6	56	8	15
Intestinal Amebiasis A06.0-A06.3,A06.9	5	73	9	13
Arterial Hipertension I10-I15	10	29	10	8
Asthma and asthmatic State J45, J46	11	21	11	8
Urogenital Candidiasis B37.3-B37.4	8	32	12	6
Diabetes Mielitus No Insulin-dependent	13	13	13	4

Environmental Impacts	
Direct and indirect benefits:	
Environmental impacts:	Environmental impacts are expected to be minimal during the phases of the project, as long as the project is implemented according to the guidelines and proposed mitigation specified in the Environmental Document clearance. Some of the potential impacts include; Construction Phase: - Dust emissions - Air pollutants emissions from heavy equipment - Presence of workers in the construction site Operational Phase: - Failure during operation
Mitigation measures:	**Mitigation measures include:** - Application of water to reduce dust - Vehicle tune-up to reduce air pollutants emissions - Placement of preventive signs to avoid risky situations
Impacts	
	Overall, the implementation of the project will have a positive environmental impact since: The inadequate disposal of solid waste, gas emissions due to solid waste burning, the generation of methane gas due to decomposition of organic matter will be reduced. The aesthetic value of the area will be improved. In general, solid waste collection service will be greatly improved, thus reducing pollution to the environment and improving the quality of life for the inhabitants of the region while reducing potential human health risks. The balance of the environmental impacts will be positive since the overall benefits outweigh the potential negative impacts during the construction and operational phases of the project. In addition, the overall efficiency of solid waste management in the Municipality of Dr. Gonzalez will be increased.
TransboundaryImpacts	
	Transboundary environmental impacts are not anticipated since the location of the landfill is not adjacent to the United States. However, indirect benefits are expected in the region due to the reduction of contagious diseases related to the inadequate disposal of solid waste in the area.
Formal Environmental Clearance	
Environmental Clearance:	In accordance with the Regulations of the General Law of Environmental Equilibrium and Protection in terms of environmental impact assessment, the Secretary of Environment and Natural Resources (SEMARNAT) through letter

	139.003.03.770/07 issued on October 25, 2007 determined that the project does not require a MIA (Environmental Impact Document) because the planned activities will be developed in an area already impacted by human activities. According to the General Law for Environmental Equilibrium and Protection and the Public Administration Law for the State of Nuevo Leon, the State Environmental Protection Agency evaluated and developed the Environmental Preventive Impact Report resolution for the project. This document was prepared and submitted to the State Environmental Agency which issued its ruling of finding of impact on December 19, 2007 in the official letter numbered APMARN/VII/432/2007, control number 5037 and 5499/2007. The National Anthropology and History Institute determined through Official Letter D-094/08 dated September 2, 2008 determined that the construction of the landfill does not impact cultural and historical resources of the State of Nuevo Leon if the project is implemented in the same area where solid waste is currently disposed.

Pending issues:

None

Criterion summary:

The project provides solution for a human health and environmental problem. The project has all required environmental authorizations and reviews.

3. Technical Feasibility

3.a Technical Aspects

Project Development Requirements:

Design criteria: **The project was developed according to regulations set forth in the Mexican Law NOM-083-SEMARNAT-2003.**

The preliminary engineering studies and final design for the construction of the sanitary landfill were prepared according to NOM-083-SEMARNAT-2003 (Environmental Protection Specifications for Site Selection, Design, Construction, Operation, Monitoring, Closure, and Ancillary Works for Municipal Solid and Hazardous Waste Disposal.

The project has the following components:
The project consists of construction of the solid waste landfill for the Municipality of Dr. Gonzalez. The project objective is to comply with the specifications and technical guidelines and required environmental control systems to provide adequate solid waste disposal services generated in the municipality.

Solid Waste Generation
The estimated per capita waste generation is in the Municipality of Dr. Gonzalez is 1.22 lb/person/day.

To determine the rate of per capita generation of municipal solid waste, in addition to the solid waste generated at home, solid waste from other sources such as government offices, hospitals, shops, markets, industries, to name the most important, were considered amounting to 30% of the generation per capita, based on indicators of the Pan American Health Organization (PAHO) and experience in our country.

The following table shows the total generation of municipal solid waste considered in the project:

SOLID WASTE		
Homes	**Other sources**	**Total Municipal**
1.22 lb/person/day.	0.37 lb/person/day.	1.59 lb/person/day.

The collection of municipal solid waste in the Municipality of Dr. Gonzalez is estimated at 1.59 lb/day, resulting in a total solid waste generation of 2.24 ton/day.

Solid Waste Collection System
Solid waste collection service is provided by the Municipality with one (1) collection truck that makes, on average, 2 trips per day, Monday through Friday. Additionally it makes a trip every third day in which incorporates mainly garden waste. It delivers to the

landfill approximately 197 tons per month on average, of which 15 tons are of garden waste.

Additionally it is estimated that the landfill receives from individuals approximately 30 ton/month on average, mainly garden waste.

Appropriate Technology

Assessment of alternatives:

The alternatives considered for the construction of the landfill are:

- **Alternative 1**. Construct a new solid waste landfill over the existing site. The proposed facility will comply with the specifications laid out on NOM-083 and will reduce the environmental risk associated with solid waste disposal. This was considered the preferred alternative.

- **Alternative 2.** Construct the sanitary landfill in a new site. This alternative consists of constructing a new landfill in a different site than the existing landfill. This alternative was evaluated and rejected due to the potential impacts to the new site and the increment of construction cost.

- **Alternative 3.** No action. The no action alternative implies continuing with the existing conditions; which create a risk to public health and the environment, due to the fact that there is no adequate site to dispose solid waste, or having a site that does not comply with current laws and regulations.

Final Disposal Site

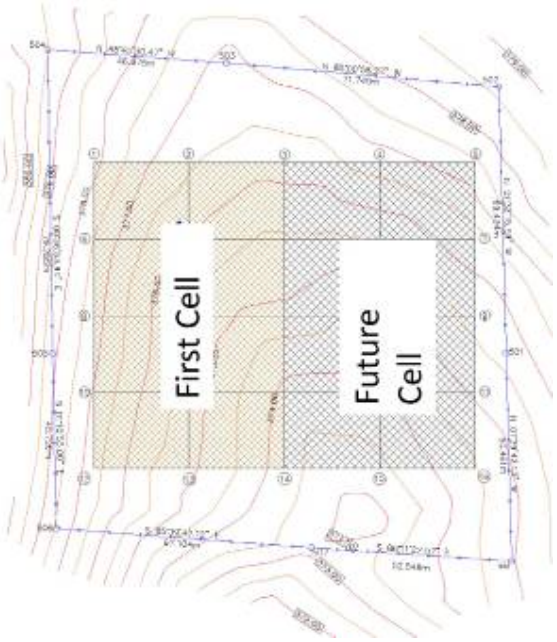
The total generation of municipal solid waste received by the municipal landfill is estimated at 4,938 lb/day (2.24 tons per day), which classifies it as a type "D" Landfill that receives less than 10 tons of solid waste daily.

Currently the Municipality of Dr. Gonzalez lacks a suitable area to dispose of their solid waste, and has an open dumpsite for disposal. The municipality proposes the construction of a landfill in the area, where they are currently disposing the solid waste, and the closure of the current dumpsite according to the guidelines established in NOM-083-SEMARNAT-2003.

The proposed landfill consists in: the construction of a trench of 80m x 40 m. (3,200 m^2) located in the central part of the site, with a depth of 3 m and 9,600 m^3 of capacity in the first phase and a similar amount in the second. To reach the project depth the earthworks will be redefined in two layers, each one in a depth of 20 centimeters with native backfill, and will be compacted to 85% Proctor and leveled to match the slope proposed for the project. The bottom of the trench will be covered with a high-density polyethylene geomembrane one (1) mm thick to prevent contamination of the aquifers.

The layout for the construction of the landfill is presented in the

following figure:



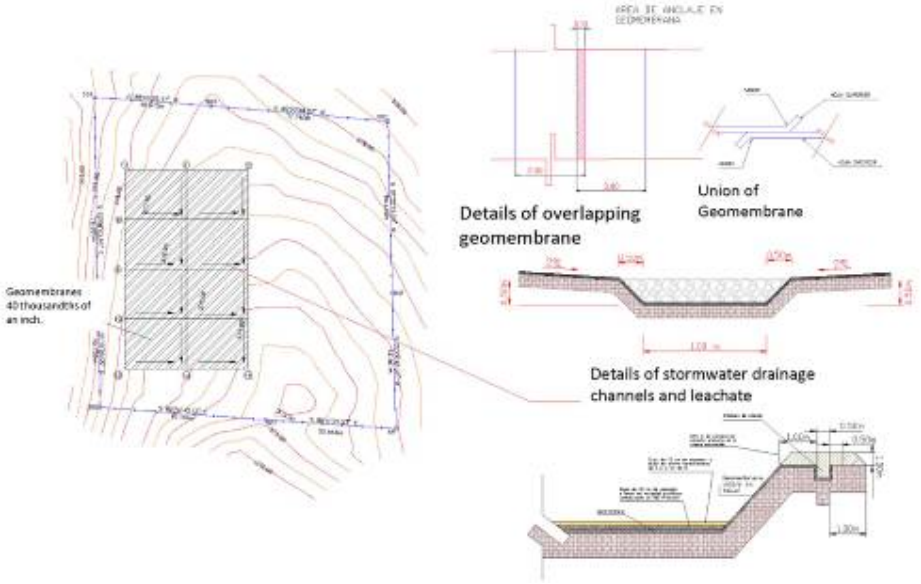
The trenching of the landfill will first involve the withdrawal of solid waste that currently exists on the surface of the dump site.

Once the trench has been excavated, a 40 cm layer of compacted material product of the excavation will be installed and will form the base for the placement of a 1 mm thick geomembrane that will prevent the passage of leachate to the subsoil.

Over this geomembrane will be placed a new layer of 40 cm of material similar to the previous one to protect the geomembrane over which the solid waste will be deposited. The geomembrane will be high-density polyethylene 1 mm thick and must meet the minimum standards required by the "Standard Number 54" Flexible Membrane Liners, of the National Foundation Listing Services.

The deposition of solid waste must follow the "ditch and area" pattern, which calls for laying of material in one of the slopes and to "close" the trench with a berm of confinement at the lower elevation level.

Details of the placement of the geomembrane in the construction of the landfill is presented in the figure below:

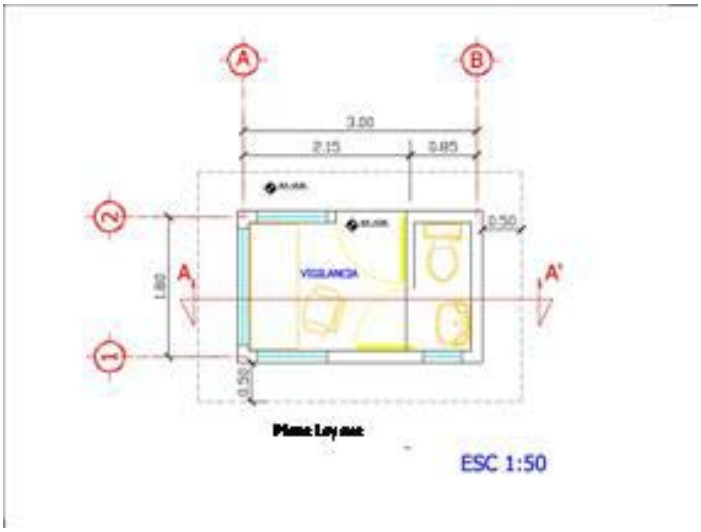


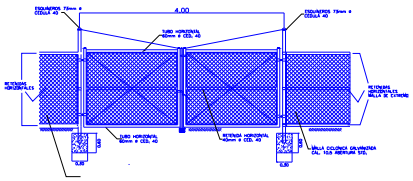
Additional tasks:

In addition, an inspection and surveillance office will be built of 1.8 m wide x 3 m long to serve to control access of vehicles and restrict access to outsiders. Also, a leachate system and the gateway to the site will be constructed.

The additional works are presented in the following figures:

a) Inspection and surveillance office and perimeter:



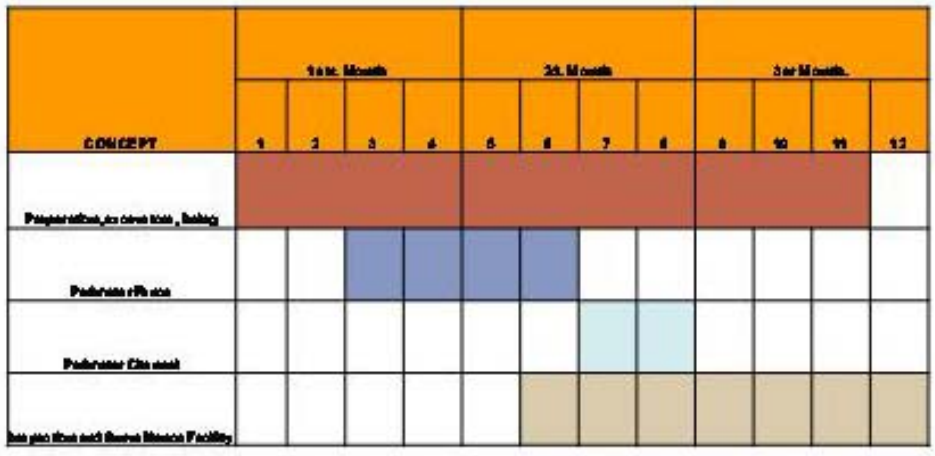


DETALLE DE PUERTAS DE ACCESO
ACOTACIONES EN MTS. SIN ESCALA

MALLA CICLONICA CAL. 10 ABERTURA STD.

Work Tasks and Schedule

Project Schedule: The proposed calendar for project implementation is as follows:



3.b Management and Operations

Project Management

Resources: SIMEPRODE will be responsible for the management, construction, and operation of the expansion of the sanitary landfill. SIMEPRODE has the adequate level of resources and staff for these tasks

Operation and Maintenance

Organization: In order to carry out its operation and administrative functions, SIMEPRODE has a very straightforward organizational chart. The vehicle operators and the staff responsible of landfill security respond to the Operations Director. SIMEPRODE's organizational chart is as follows:

Operation Plan: During the operation phase, SIMEPRODE will develop an operations and maintenance manual. The O&M manual will outline the main activities to guarantee an adequate operation of the landfill and prevention of emergencies on site.

Permits, licenses, and other regulatory requirements:	The project sponsor has the following documentation: • Technical Review Resolution for the construction of the Solid Waste Landfill in Municipality of Dr. Gonzalez. This document was issued in the official letter numbered No. OP 546/07, dated on December 10, 2007 by the Municipality of Dr. Gonzalez, Nuevo Leon, and ratified on Agreement signed by Municipality on August 27, 2007. • Municipal Council Act #16, dated July 21, 2007, and ratified by the institution which authorizes the change of land use. • The construction permit provided by the Municipality of Dr. Gonzalez issued in the official letter #547/2007 on December 10, 2007.
Reviewing agencies:	Technical review was provided by the Environmental Protection Agency of the State of Nuevo Leon. The technical review corroborated compliance with Mexican Law NOM-083-SEMARNAT-200, and via Official Correspondence No. APMARN/VII/432/2007, Control Number 5037/2007, dated December 19, 2007, issued approval.

Pending Issues:

None

Criterion Summary:

The final design was reviewed by NADB and BECC.

4. Financial Feasibility

4.a Demonstrating Financial Feasibility

Financial Conditions

Information submitted: Municipal Financial Statements.

Financial analysis results: The municipalities involved in the project are heavily dependent on Federal resources. This limits their capability for investment in new environmental infrastructure and to undertake debt. Since there is one project sponsor for all elements of the comprehensive regional solid waste project, the financing will be considered as one package of which the cost is MX $ 3,138,039 pesos.

Project Costs, Financial Structure, and Other Plans for Capital Investment

Item:

Construction cost: MX$ 3,138,039
Final cost: MX$ 3,138,039

Financial structure:

Source	Type	Amount	%
Mexico	Grant	MX$ 1,569,020	50
NADB-SWEP	Grant	MX$ 1,569,020	50
Total:		MX$ 3,138,039	100

Primary Source of Income

Source of income: SIMEPRODE contributions

4.b Legal Considerations

Project management: The project will be managed by SIMEPRODE, which has the adequate staff to procure, and construct the project, as well as to deal with any potential setbacks during operation of the facilities.

Status of funding agreements: The financing agreements for the project will be signed once the project is certified.

Pending Issues:

None

Criterion Summary:

The project was evaluated and is considered financially feasible.

5. Public Participation

5.a Community Environmental Infrastructure Projects – Community-wide Impact

Steering Committee

Date of establishment:	The Steering Committee is comprised of the Board members of SIMEPRODE (the sponsor) and members of the community at large.
Date of approval of Public Participation Plan:	BECC approved the Public Participation Plan on August 2008.

Public Access to Project Information

Public access to project information:	Technical and financial information was made available for public review in the offices of the municipality. The information will provide the community with project details.
Additional outreach activities:	
Public meeting:	The public meeting was held by the city council on September 25, 2008 to present the project to the public.

Final Public Participation Report

Final public participation report:	The Steering Committee and the applicant prepared the Final Public Participation Report to demonstrate that the proposed objectives were fully met to BECC's satisfaction.

Post-Certification Public Participation Activities

Post-certification activities:	To be developed.

Pending Issues:

None

Criterion Summary:

The project has support from local residents.

6. Sustainable Development

6.a Human and Institutional Capacity Building

Project operation and maintenance:

SIMEPRODE as the project sponsor will be responsible for the operation and maintenance of the solid waste disposal site in the Municipality of Dr. Gonzalez. The sponsor has adequate institutional capacity and staff to operate and maintain the landfill.

Human and institutional capacity building:

SIMEPRODE's institutional and human capacity will be strengthened by improving the construction of the landfill.

6.b Conformance with Applicable Local, State, and Regional Laws and Regulations and Conservation and Development Plans

Local and regional plans addressed by the project:

The proposed project conforms to the Plans and Programs described below:

- State Development Plan (SDP) 2004-2009. The SDP outlines necessary activities to provide adequate solid waste disposal services in the State of Nuevo Leon.
- The project is consistent with the Border 2012 Program, satisfying Objective 3 (Reduce soil contamination) and Goal 1 (Identify needs and develop an action plan focused to improve institutional and solid waste infrastructure capacity and prevent pollution related to solid and toxic waste in the U.S.-Mexico border. The plan of action will begin in 2005 and will conclude in the year 2012.) One of the main objectives of this program is to reduce risks to public health and conserve and preserve the natural setting.

Laws and regulations addressed by the project:

- General Law for the Environmental Equilibrium and Protection
- Law for Public Administration for the State of Nuevo Leon
- Environmental Law for the State of Nuevo Leon
- State of Nuevo Leon Environmental and Natural Resources Protection Agency Law

6.c Natural Resource Conservation

The project reduces environmental degradation by improving the solid waste collection and disposal system, and by having a sanitary landfill compliant with Mexican Law NOM-083.

6.d Community Development

The project components will reduce the potential for detrimental conditions related to the inadequate management of solid waste that can facilitate spreading contagious diseases.

	The construction of the new landfill promotes community development; since it will reduce the potential for contamination caused by inadequate solid waste disposal and thus will improve the welfare of the region.

Pending Issues:

None

Criterion Summary:

The project complies with all the sustainable development concepts.

Project Documentation Available (Only Spanish)

- Proyecto Ejecutivo para la Construcción del relleno Sanitario en el Municipio de Dr., González, en el Estado de Nuevo León.
- Resolución de la Evaluación Ambiental realizada por la Agencia de Protección al Medio Ambiente del Estado de Nuevo León para la construcción de un relleno sanitario en el Municipio de Dr. González..
- Permiso de Construcción otorgado por el Ayuntamiento de Dr. González.
- Manual de Operación y Mantenimiento del Relleno Sanitario del Municipio de Dr. González.
- Contrato de Comodato y Acta de Aceptación del Comodato por parte del Ayuntamiento de Dr. González.
- Dictamen técnico del Proyecto realizado por el Ayuntamiento de Dr. González.
- Acta de cambio de Uso del Suelo otorgada por el Ayuntamiento de Dr. González
- Informe Final de Participación Pública de Municipio de Dr. González, Nuevo León