

## Border Environment Cooperation Commission

# Comprehensive Solid Waste Management Project for Ascensión, Chihuahua

## 1. General Criteria

### 1. a Project Type

The project consists of the construction of a landfill, the closure of the two current dumpsites, and the acquisition of new collection equipment for the city of Ascensión in the municipality of the same name in the state of Chihuahua.

This project is eligible for BECC/NADB participation fitting into the project type of *Municipal Solid Waste*.

### 1. b Project Category

The project's category corresponds to *Environmental Infrastructure Projects for the community-Community-wide Impact*. The project will have a positive impact on the community due to the improvements in the handling and disposal of solid waste, the health conditions of the population will be improved, therefore contributing to the social development and in consequence the economic improvement of the region.

### 1. c Project Location and Community Profile

The state of Chihuahua is located on northern part of the Republic of México, bordering the United States of America (USA). The city of Ascensión, Chihuahua is located in the northwest part of the state, 18.5 miles from the US-Mexico border and approximately 117 miles from Cd. Juarez, Chihuahua.



Figure 1 shows the location of Ascensión, in the northern part of the state of Chihuahua.

## **Demographics**

The population projections that were performed during the development of the study “Generation, Composition and Handling of Solid Waste; Final Design for the Construction of a Solid Waste Landfill and the Closure of the existing Landfill and the Environmental Impact Document, in the City of Ascensión, Chih,” were based on the (2000) Population Census done by the *National Institute of Statistics, Geography, and Informatics* (INEGI) and data from the *National Population Council* (CONAPO). The population for the year 2007 is estimated to be 12,429 inhabitants with an annual increase rate of 1.34%. The average per-capita income of the city is \$3,720 Mexican pesos per month<sup>1</sup>.

## **Services**

### **Potable Water System**

The water system is supplied by three deep wells which average a daily volume of 1.02 million of gallons. The coverage of this service is estimated to be 92%. The total number of connections in the community is 4,800.

### **Wastewater Collection System**

Ascensión has 19% wastewater collection coverage. The system consists of sewer pipes, manholes, and mains. Residents who are not connected to the wastewater collection system dispose of their wastewater in latrines and cesspools, (48%); the rest of the population lacks drainage.

### **Wastewater Treatment System**

There is no wastewater treatment.

## **Urban Solid Waste**

### **Street Sweeping System**

To prevent the accumulation of waste along city roadways, street sweeping is done by personnel of the public services department only in the central plaza and the main road in the city. In regards to the other streets, the residents are responsible to maintain and sweep the section that corresponds to their lots.

### **Collection System**

Waste in the community is collected by garbage trucks which travel to various locations within the community, sounding a bell to inform people to deposit their garbage in the garbage truck. The collection frequency in the central area is five days a week and twice a week in the residential areas. For the collection service, the city acquired two solid waste collection trucks, which are included as part of this project.

### **Final Disposal**

The city does not offer any type of post consumer treatment to the waste although there is some separation done during the garbage truck route, in which materials such as plastics, cardboard, glass and aluminum are removed from the bulk.

The final disposal is done in an open dumpsite is property of the city and is located to the southeast of the community. The dumpsite consists of a fenced lot that was designated for use as a landfill by the city council, but does not comply with the Official Mexican Standard (Norma

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<sup>1</sup> Source: BECC's estimate based on the statistics of INEGI and the National Commission of Salaries (Comisión Nacional de Salarios).

Oficial Mexicana) NOM-083-SEMARNAT-2003, (*Specifications of Environmental Protection for the Selection of Sites, Design, Construction, Operation, Monitoring, Closure, and complementary works of Final Urban Solid Waste Disposal and Special Handling*). This site has an approximate area of one hectare and its useful life is estimated to be a year and a half. The landfill does not have any established operational standards, so it receives all types of waste; the covering is done using unprocessed substandard material at an inconsistent frequency - anywhere from once a week to once a month - which contributes to the growth of harmful fauna, leachates and biogas. Close to this dumpsite exists another partially closed dumpsite with an area of about two hectares.

### **Streets Paving**

Coverage of paved roads in the city of Ascensión is approximately 13 %.

### **1.d Legal Authority**

The sponsor of this project is the City of Ascensión, Chihuahua. The legal obligations of the city are stated in articles 6 and 9 of Chapter 1 (Competence of the State and Counties) Second Title (Concurrence of the State and Counties and of the Environmental Management) of the Environmental Balance and Environmental Protection Laws of the state of Chihuahua.

The project falls within the scope of agreements targeted at improving the environment and the quality of life of border residents, which have been signed by México and the United States. These include:

- La Paz Agreement of 1983 or Border Environment Agreement
- Integral Border Environment Plan of 1990 (IBEP)
- North American Free Trade Agreement of 1994 (NAFTA)
- Border Program 2012

The project complies with the spirit of all these agreements, and all of them have been considered since the onset of the project.

### **1.e Project Summary**

#### **Project Description**

The project consists of the construction of a sanitary landfill, the closure of existing dumpsites, and the acquisition of solid waste collection vehicles for the city of Ascensión in the municipality of the same name in the state of Chihuahua.

The cost of the solid waste landfill and the closure of the existing landfills site is estimated at \$0.62 millions of Dollars. Figure 2 and 3 shows the location of the existing dumpsites and the proposed site for the construction of the new solid waste landfill to the south of the city of Ascensión.



Based in the current and future solid waste generation rate of the City of Ascensión, the projected solid waste landfill will be Type C, in accordance with the classification specified in the Official Mexican Standard NOM-083-SEMARNAT-2003, which establishes the environmental measures for the Site Selection, Design, Construction, Operation, Monitoring, Closure, and Complementary facilities for a Solid Waste Landfill.

Total capacity of the landfill will be 234,000 m<sup>3</sup>, enough for a life span of 20 years,

### **Project Justification**

The project will improve the current solid waste collection and disposal conditions thus reducing the possibility of improper disposal as well as reducing the risks of diseases associated with the inappropriate handling of garbage and the risk of filtering leachates that could pollute the underground water. Also, the project will improve the collection service and in general contribute to improve the quality of life of the inhabitants of the city of Ascensión, Chihuahua

The lack of resources to improve the service in regards to renewal and proper maintenance of the equipment used in collection and proper disposal of solid waste constitutes another problem for this service. Due to this problem the municipal utility acquired two solid waste collection trucks which will improve the collection services and reduce the operation and maintenance costs.

The project will produce a positive transboundary impact because it will reduce the risk for fires, improving the quality of the air in the region. In addition, better controls for the operation of the landfill will avoid other hazards created by people trying to recover valuable materials from the collected waste.

Additionally, the project will allow the closure of the open dumpsite since it does not comply with the guidelines of NOM-083 and the construction of a new solid waste landfill that complies with all the guidelines under this regulation as well as the improvement of the collection equipment.

### **Important Aspects for the Certification**

The project is under the priority sectors of the BECC and complies with the basic general criteria.

### **Pending Issues**

None

## **2. Human Health and Environment**

### **2. a Compliance with Applicable Environmental Laws and Regulations**

The Final Design of the solid waste landfill and the closure of the dumpsites comply with NOM-083 specifications.

As for the Mexican Environmental Assessment Process, an environmental assessment was developed and submitted for consideration to the Environmental Department of the State of Chihuahua. Based on this assessment, this entity issued a resolution, which established that the project will not result in significant environmental impacts that may affect the area.

### **2. b Human Health and Environmental Impacts**

#### **Human Health Impacts**

The most serious problem in Ascensión, in the matter of handling and disposal of solid waste, is the lack of a solid waste landfill, since currently all kinds of waste, including waste considered as hazardous such as used oil, paint residue, and car batteries, among others, are deposited in an open pit (dumpsite) located 3.5 km of the urban area. The site's dimensions are of 15 m x 120 m x 5 m in depth, which is fenced; however, an appropriate operation does not exist and garbage picking is done in risky conditions for the workers. In addition, because there is not an appropriate operation at the site, risks to public health are created due to the growth of dangerous fauna which becomes a transmission vector of diseases for the community.

The statistics on human health in Ascensión are limited, but there is information about the high incidence of diseases such as hepatitis A, measles, shigellosis and tuberculosis, diseases that have been related to unhealthy conditions such as the ones that are caused by an inappropriate handling of solid waste. Table 1 shows a study on the subject of public health in the neighboring cities of the border between Mexico and the United States. The conditions in Ascensión are similar to the ones in the cities of New Mexico. As shown in Table 1, the incidence of diseases such as Hepatitis or Shigellosis is almost four times higher in the New Mexico border than in the rest of the United States.

**Table 1**  
**Cases and incidence of diseases in the border between the United States and Mexico**

AREA	Disease				
	Hepatitis A	Measles	Shigellosis	Tuberculosis	AIDS
General Population of the United States	12.64	11.2	10.9	10.3	16.7
Arizona Border	39.4	9.8	38.3	6.9	15.1
California Border	30.7	61.9	22.1	12.7	22.0
New Mexico Border	46.9	14.6	21.2	7.3	3.9
Texas Border	40.4	38.9	49.1	26.5	7.9

Source: National Center for Health Statistics. Centers for Disease Control and Prevention, Vital Statistics Database. HRSA, n.d. <http://bphc.hrsa.gov/bphc/borderhealth/table1.htm>

### Environmental Impacts

The proposed site to be used as a solid waste landfill will not suffer a considerable environmental impact or damages to the environmental quality of the area. The activities that will be done in the site will allow an improvement to the aesthetic qualities. Taking into consideration the characteristics of the land, no previous impact could be detected prior to beginning the work. More notably, the open dumpsite that is located on the same site has caused several negative effects especially to the soil, air, and aesthetic.

The impacts that will be caused during construction are: generation of dust and particles by the moving of the soil, changes to the physical characteristics of the land and its quality caused by digging, changes to the original structure of the landscape, an increase in the sound levels, emissions onto the atmosphere caused by the combustion engines, ground compacting caused by the traveling of the solid waste collection trucks, topographic changes by the land movement of the soil, etc. These impacts will be mitigated with measures such as the regular maintenance of the engines of the equipment used, the use of water to lower the creation of dust and allow better compacting, schedule work during the appropriate hours, among others.

The positive environmental impact will be the reduction of solid waste spread due to the lack of control, the emission reduction of methane gas caused by the decomposing organic waste, the improvement of the area's landscape, and the improvement in the collection service in the city of Ascensión.

The balance of environmental impacts is without a doubt of a positive nature, since the number and magnitude of beneficial impacts exceed with great measure the possible impacts in the stages of construction and operation of the land fill and the city's garbage service.

### Transboundary Impacts

No negative impact across the border is foreseen with the construction of the Solid Waste Landfill of Ascensión, even more, indirect benefits are foreseen due to the risk reduction of infectious diseases associated with the inadequate handling of solid waste in the area's habitants, which have a commercial, tourist, and cultural exchange with the border communities of the United States. Additionally, the fire hazards created by the people that pick the valuable materials from the trash will be reduced, so the quality of the air will be improved.

### **Formal Environmental Clearance**

Based on what is stated on the Ecological Balance and Environment protection Law of the State of Chihuahua in the Matter of Environmental Impact Evaluation Law (Ley del Equilibrio Ecológico y la Protección al Ambiente del Estado de Chihuahua en Materia de Evaluación del Impacto Ambiental) the Environmental Department of the state of Chihuahua determined that the Project required the development of an Environmental Impact Statement, this was prepared and presented to this department on June 11, 2007 and the resolution was awarded on August 22, 2007 through official communication Number DOEIA.IA-2544-2007 after determining that the project complied with all requirements for the Mexican process.

#### **Important Aspects for the Certification**

The project solves an important problem of human health and the environment.  
The required environmental authorizations have been granted.

#### **Pending Issues**

None.

## 3. Technical Feasibility

### 3.a Technical Aspects

#### Project Development Requirements

The preliminary studies and the Final Designs for the construction of the solid waste landfill and the closure of the dumpsites were developed based on the Official Mexican Standard (Norma Oficial Mexicana) NOM-083 by the BECC and were finished on May 2006<sup>2</sup>.

#### Generation of Solid Waste

The daily generation of domestic waste was estimated at 6.37 tons, 1.47 tons. of commercial waste 0.44 tons of industrial waste totaling 8.28 tons per day. Based on this information, it was estimated a daily generation of solid waste per person of 0.5272 Kg. Furthermore including the commercial and industrial wastes the daily generation was 0.6853 kg. To determine the per capita waste generation, cubic weight, reusable waste percentage and organic matter, the methodology indicated on the Mexican Standard NMX-AA-61-1985 was used.

#### Generation Projection was

### **Solid Waste Collection System**

In order to collect the solid waste in the city of Ascensión, Chihuahua, the City Council recently acquired 2 solid waste collection trucks in order to replace the units that had surpassed their useful life and required constant maintenance.

The coverage of solid waste collection provided by the City Council of Ascensión is about 90% and based on the results of the study of generation, it was determined that the equipment that they now have is enough to reach a 100% coverage.

The general characteristics of the system used for the city's solid waste collection are the following:

- ◆ The method that is used for collection includes the use of solid waste collection trucks, where the solid waste collection trucks move slowly down the city streets so the employees empty the garbage cans that they find along the collection route.
- ◆ The collection service is done by following 5 routes (considering that there are no clearly defined routes and that this is done from Monday to Friday) by which the service is provided on average once a week.
- ◆ The frequency of collection in the downtown area is of 5 times a week. This frequency is defined as such because the process of collection starts on Avenida Mexico, the most important street of the City of Ascensión, which crosses thru the downtown area of the city.
- ◆ The solid waste collection trucks in average make two trips to the final disposal site.
- ◆ The collection is done in one shift, morning from 6:00 a.m. to 12:00 p.m., on average.

Each one of the solid waste collection trucks has a collection crew, which is made up by the driver and two assistants. The assistants collect the home waste that is deposited in garbage cans as the truck moves down the street.

### **Appropriate Technology**

#### **Construction of the Solid Waste Landfill**

Among the options for the construction of the solid waste landfill the following were considered:

- a) **No action.** The first option was not to take any action in regards with existing dumpsites and the need of having a solid waste landfill. This option was reviewed and further considered as unacceptable because of its negative implications for the environment and the health of the habitants of Ascensión.
- b) **Build the solid waste landfill in the same place.** The second option was to build the solid waste landfill in the same land location. This option was evaluated and rejected due to the close distance between the solid waste landfill and a well that is nearby in order to avoid the risk of contamination.
- c) **Build the solid waste landfill in a new location.** The third option reviewed was to build the solid waste landfill inside the terrain of the dumpsite but in a distant enough site to comply with what is established on NOM-083 and in this way the risk of contaminating the agricultural well close to the solid waste landfill is minimized. This option was considered the best.

**Final Disposal Site**

According to the amount of waste generated by the community in a near future (approximately 10 tons per day), the type of solid waste landfill required for this city is the one defined by NOM-083 as class C.

The characteristics of the proposed solid waste landfill are:

- Because the city of Ascensión has a population of more than 2,500 habitants, the limits of the final disposal site must be at a minimum of 500 m starting at the limit of the existing urban limits or that contemplated in the urban development plan.
- The location between the final disposal site’s limit and a water extraction well for agricultural use must be more than 500 m.
- The solid waste landfill must have auxiliary work done such as: access roads, perimeter fence, security and access control gate, locker rooms, W.C. facilities, and a separation strip of at least 10 meters.

**Land Acquisition and Right-of-Way Requirements**

The current city administration built a cell with an approximate capacity of 9,000 m<sup>3</sup>, which can provide service to the population for an approximate period of 2 years. This cell was dug the mentioned site of approximately 24 hectares which was given to the city for the construction of a dumpsite. This site is adjacent to the former dumpsite. The legal procedures for making the land ownership official by the city are under development. According to the information given by the sponsor, the registration of the land in the National Agricultural Registry (Registro Agrario Nacional) will be done in 2007 and is expected to have all the documentation by the city briefly.

**Work Tasks and Schedule**

The project’s development has been proposed to be done in three stages during the period 2007-2028. The first stage includes the preparation of the compartments and the closure of the existing landfills and its useful life will be of 12 years. The second stage will have a useful life of 6 years while the useful life of the last stage will be of 4 years. In figure 4, the project’s schedule is shown.

TASKS		PROPOSED CONSTRUCTION TIME AND OPERATION																											
		Year																											
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29					
	<i>Solid Waste Collection</i>																												
1	Solid Waste Truck Collection Acquisition	█																											
	<i>Landfill</i>																												
2	Cell Construction (Step I)	█	█																										
3	Dumpsite closure	█	█																										
4	Operation Step I			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█										
5	Operation Step II																			█	█	█	█	█	█	█			
6	Operation Step III																										█	█	█
7	Closure																											█	

Figure 4. Schedule of the Project

**Technical Process**

The method of operation for the sanitary landfill will include the operation of the ditch-landfill and then of the surface-area landfill. In the first stage, building the ditch is intended to provide sufficient material to guarantee that there is enough coverage material during all the useful life of the sanitary landfill. Once the ditch-landfill is full, it will be followed by the surface-area development of Stages II and III, using the material that originally resulted from the ditch development for coverage and conformance with the corresponding lateral slopes.

In regards to the closure of the existing dumpsites, the Final Design includes the tasks that must be performed to comply with NOM-083 including: the collection of all waste next to the landfill, compaction of the collected waste, the installment of ventilation wells, the use of a layer of organic soil and reforestation of the area, the development of erosion control, the installation of fencing and the installation of warning signs, among other actions that are required for the proper closure of these facilities.

**3. b Management and Operations**

**Project Management**

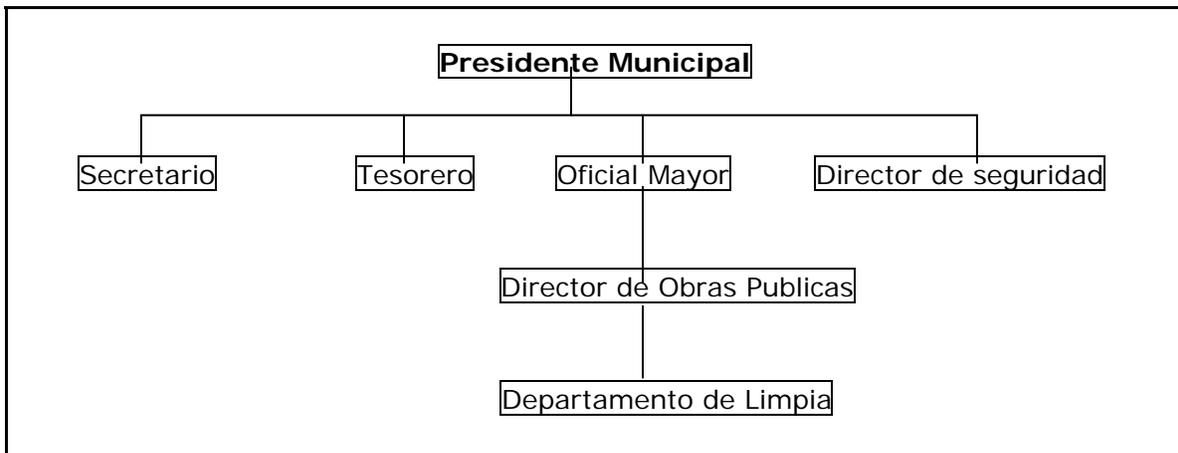
The City of Ascensión, Chihuahua (H. Ayuntamiento de Ascensión, Chihuahua.) will be responsible for the project’s management.

**Operations and Maintenance**

**Organization**

In order to achieve its operational and administrative duties, the department of Public Works has a simple staff structure. All the vehicle operators and the person in charge of supervision of the final disposal directly employed by this division.

In figure 5, the city’s<sup>3</sup> organizational structure is shown.



**Figure 5.** Current organizational structure of the City of Ascensión

<sup>3</sup> Source: H. Ayuntamiento de Ascensión(City Council)

**Operations and Maintenance**

The operation of the solid waste collection system will continue to be under the responsibility of the city (H. Ayuntamiento de Ascensión), which has the trained personnel to perform these activities. The maintenance of the solid waste collection trucks will be the responsibility of the Public Works Division (Dirección de Obras Públicas).

For the operations of the sanitary landfill, city personnel including a heavy machinery operator, an assistant, and a security guard, will be available. The necessary machinery for covering the waste and the movement of the dirt will be provided by the city's Public Works Department.

The operations plan of the sanitary landfill is included in its Final Design. The machinery's maintenance is responsibility of the Public Works Department.

**Permits, Licenses and Other Regulatory Licenses**

The city of Ascensión is responsible for the administration, collection and final disposal of urban solid waste and has the environmental authorizations for the development of the projects. The Final Designs of the sanitary landfill and the closure of the landfill have been reviewed by the BECC and the North American Development Bank (NADBANK).

**Important Aspects for the Certification**

The Final Design was reviewed by the BECC and NADBANK

**Pending Issues**

None

## 4. Financial Feasibility

### 4.a Financial Feasibility

The North American Development Bank (NADB) reviewed the financial information presented by the Project's Sponsor and, based on it, determined that the financial and structural capacity proposed by the Municipality of Ascension (The Municipality) is adequate. The information presented and the financial analysis includes, among other items:

- a) Economic and demographic information of the project area.
- b) Historical Financial Statements;
- c) 2007 Income and Expenses Budget
- d) Financial structure of the project;
- e) Capital Investment budget; and
- f) Itemized cost structure of the project

The following is a summary of the financial analysis. The total cost of the project is estimated at \$617,509 dollars, including the costs for construction and supervision.

Component	Estimated Cost* USD\$
Construction and Closure	488,116
Equipment	53,957
Supervisión and Contingencies	75,436
<b>Total</b>	<b>617,509</b>

\* For indicative purposes, the amounts are equivalent in pesos at an Exchange rate of \$11.12 pesos per dollar, quoted on August 21, 2007. Source: [www.banxico.gob.mx](http://www.banxico.gob.mx)

The analysis reveals that Ascension will be able to implement and operate the Project, but it is unable to contract any debt. It is expected that Ascension will continue to rely heavily on external funding sources, and that their funds for investment in public infrastructure will continue to be limited and not sufficient to meet its current and future infrastructure needs.

NADB and the Municipality agreed on a financial structure that includes a grant from the Solid Waste Environmental Program (SWEP), grants from the State of Chihuahua, and resources from the Municipality.

The Municipality proposes a financial structure that will allow the implementation of the project, as further indicated:



## 5. Public Participation

### 5.a Local Steering Committee

On May 25 and July 15 of 2005, meetings were held to provide information about the Project in which personnel of BECC, NADB and the city of Ascensión participated. In these meetings the creation of a local steering committee was established, which was made up by the following people:

- Dr. Héctor Sáenz E.
- Guillermina López Villalobos.
- Sandra Rico Parra. Public Accountant
- Hernán Polanco
- Humberto Fernández T.
- Ignacio Rodríguez.
- Juan Porras Cárdenas
- Humberto Baca Tena.

### 5.b Public Access to Information

#### Public Notice

The formal public notice for the First Public Meeting was published in the local newspaper on September 5, 2007 for the meeting planned to be held on October 5, 2007.

The Steering Comité prepared written information about the project with the intent of distributing them during the public meeting.

#### Additional Outreach Activities

Information meetings were held with the neighboring communities in preparation for the public meeting

#### Public Meetings

##### First Public Meeting

The first public meeting was held in October 5, 2007, in the City Council Chambers. Technical information was presented during the meeting.

##### Second Public Meeting

The second public meeting will be held at 4 pm in November 15, 2007, in the City Council Chambers. Financial information will be presented during the meeting.

### 5.c Final Public Participation Report

The Steering Committee will prepare the "Final Public Participation Report" to demonstrate that the proposed objectives were fully met to BECC's satisfaction.

**Important Issues for the Certification**

**Pending Issues**

- The second public meeting
- The final public participation report

## 6. Sustainable Development

### 6.a Institutional and Human Capacity Building

The measures related to this project that strengthen the human and institutional capacity of the city of Ascensión are the following:

- Creation of an official Solid Waste Collection Department under the Department Of City Public Works.
- Develop the needed infrastructure of the solid waste management system including the addition of solid waste collection trucks.
- Construct the city's sanitary landfill in compliance with existing regulations.
- Closure of the existing landfills in accordance with regulatory standards.

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

The 2004-2007 Development Plan of the city of Ascensión, Chihuahua, considers actions for the improvement of the solid waste management system such as acquiring solid waste collection trucks.

The project adheres to the US-México Border 2012 Environmental Program by meeting Goal 3 (Reduction of Land Contamination) and Objective 1 (Identification of the needs and development of an action plan focused on improving institutional capacity for solid waste management infrastructure, prevention of contamination related with solid and hazardous wastes and toxic substances in the Mexico and United States border. Beginning in 2005, the action plan will be applied and it will be concluded in the year 2012). One of the main guidelines of this project is to reduce high risks to public health and conserve and restore the natural settings.

### 6.c Natural Resource Conservation

The project contributes to reduce environmental deterioration by improving the solid waste collection system and having a sanitary landfill according to NOM-083. The current landfill will be closed in such a manner in which the risk of environmental impact related to the mishandling of garbage is minimized.

Air quality will be improved due to the reduction of fires created by the people that collect valuable items from the garbage in the current dumpsite because the new landfill will have better operational controls.

### 6.d Community Development

The tasks that make up this project will contribute to lowering the conditions for the growth of infectious and viral diseases related to the mishandling of urban solid waste. The installation of a site for the adequate disposal of urban solid waste promotes the development of the community since it helps reduce pollution in the city's areas and improves the quality of life of the people of Ascensión aside from promoting activities in the area such as tourism.

**Important Aspects for the Certification:**

The project complies with all the sustainable development principles.

**Pending Issues:**

None.

**Available Project Documentation**

“Diagnosis of the Environmental Infrastructure for the cities of Villa Ahumada, Ascensión, Coyame, Janos y Manuel Benavides in the state of Chihuahua”. THE BECC, 2000.

“Generation, Composition and Handling of Solid Waste; Final Design for the Construction of a Solid Waste Landfill and the Closure of the existing Landfill and the Environmental Impact Document, in the City of Ascensión, Chih,” THE BECC, 2006

“RAP of the Solid Waste Project of Ascensión, Chihuahua”. THE BECC, 2005

Official communication of the Environmental Department of the state of Chihuahua Number DOEIA.IA-2544- (August 22, 2007)