EXPANSION OF THE WASTEWATER COLLECTION SYSTEM IN THE SOUTH SECTOR OF THE CITY AGUA PRIETA, SONORA, MEXICO

ENVIRONMENTAL ASSESSMENT

January 29, 2007

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1.0 BACKGROUND

1.1 INTRODUCTION

The United States Environmental Protection Agency (EPA) administers funds for water and wastewater infrastructure projects within 100 kilometers of the international boundary between the U.S. and Mexico. EPA policy for border funds requires certification by the Border Environment Cooperation Commission (BECC) as a condition for grant award. As part of the BECC certification process, the proposed project must comply with both (1) Mexico Environmental Regulations, and (2) EPA National Environmental Policy Act (NEPA) Regulations. EPA policy for border funds requires certification and evaluation by the BECC prior to approval. The Proposed Action under consideration for EPA funding is the expansion of the public wastewater collection system of the City of Agua Prieta, State of Sonora, Mexico.

1.1.1 Legal Framework

EPA has determined that it will follow the NEPA and EPA regulations contained in 40 CFR Part 6 as reference for environmental impact in the U.S. from projects located in the U.S. or Mexico (EPA 1997a). EPA follows the U.S. Agency for International Development (AID) approach as summarized in Title 22 CFR Part 216.1-216.10 as guidance for assessing environmental impacts in Mexico. The AID regulations envision collaboration with affected countries to the maximum extent possible in developing an EA. AID regulations authorize use of either a study prepared by an international body in which the U.S. is a participant, or a concise review of the relevant environmental issues, with appropriate documentation, as a substitute for an EA.

This EA was prepared using Council of Environmental Quality (CEQ) regulations 40 CFR Parts 1500-1508 and EPA regulations (40 CFR Part 6) as guidance. A separate *Manifestacíon de Impacto Ambiental* (MIA) document customarily evaluates the environmental impacts of proposed federal actions in Mexico. However, the Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) has determined that the proposed actions are exempt from their substantive environmental review process. Therefore, although this EA will focus on the environmental consequences of the proposed federal action in the U.S., it will also document the environmental consequences of these actions in Mexico.

1.2 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

The City of Agua Prieta, Sonora (City) is developing two infrastructure projects to address wastewater system deficiencies in the southern part of the City in compliance with state and federal regulatory requirements. EPA intends to authorize the use of Border Environmental Infrastructure Funds (BEIF), for Agua Prieta to implement the first of these two projects, which will deliver wastewater collection services to the eastern half of the southern part of the City (Section B). This proposed BEIF project will cover approximately 250 acres of established housing and will protect the public health of residents living in Section B by eliminating untreated sewage discharges from cesspools in this area of the City that is currently not receiving centralized wastewater services.

Section A, which comprises the western half of the southern part of the City, plus a strip of land south of Section B will not be part of the proposed BEIF project and will not receive new service

until sometime in the future when more funding becomes available. However, because the City hopes to provide sewage collection services to Section A in the near future and is seeking U.S. federal government project funding, this EA will assess impacts to both Sections B (the proposed BEIF Project) and A (the Anticipated Project) and, unless it is necessary to distinguish them, will refer to the two of them as the 'Proposed Projects'.

This EA will address those environmental resources that would be affected in the United States and Mexico by describing the potential affected environment, or area of concern, and assessing the direct, indirect and cumulative impacts of the construction and operation of the proposed projects in Agua Prieta, Sonora, Mexico on that environment.

1.3 PROJECTS LOCATION

The proposed projects are located within the City of Agua Prieta, Sonora, Mexico. The City is located in the northeastern part of the State of Sonora, Mexico, on the U.S./Mexico border, adjacent to the town of Douglas, Arizona and serves as a municipal seat of the Municipality of Agua Prieta (Figure 1). The City of Agua Prieta is situated on the east bank of the Agua Prieta River and is bordered on the north by the City of Douglas, Arizona (Figure 2). The City spans an area of 25.94 km^2**,** and has an estimated population of 75,210 based on year 2006 data[1]. Within the City of Agua Prieta, 30.04% of the population is under the age of 19, 10.3% between 19-24, 30.06% between 25-44, 10.49% between 45-64, 3.24% above 65 and 0.75% unspecified.

The City is divided in two areas, the northern area runs from the Janos-Cananea highway to Avenida Internacional located along the U.S./Mexico border (North Area). The area to the south of the same highway to the outskirts of the City is the South Area.

The area of concern,[2] or the area that would likely be affected by implementing the proposed projects was defined by the BECC to be the South Side of the City and the area within a 6.2-mile (10-kilometer [km]) radius of Agua Prieta across the U.S. border to the north (Figure 3).

Figure 1. Agua Prieta, Sonora Location Map

[1] Consejo Nacional de Población (CONAPO) 2006. Also referenced by OOAPASAP correspondence received on April 20, 2006.
[2] Scope of Work to prepare a Transboundary Environmental Information Document compliant with the Border Environment Infrastructure Fund Requirements for the proposed expansion of the wastewater collection system in areas of the City of Agua Prieta, Sonora that are currently not served, October, 2005.

1.4 PURPOSE AND NEED FOR THE PROPOSED ACTIONS

Over the last 30 years, the border region between the United States and Mexico has experienced a surge in population and industrialization. This growth has often exceeded the capacity of the existing infrastructure, leading to inadequate potable water distribution, wastewater collection, and wastewater treatment. The South Area of Agua Prieta (both sections B & A) lacks wastewater collection and treatment services and residents must rely on cesspools and direct discharge for disposal of domestic wastewater. Cesspool failures in the south area of the City result in the discharge of raw sewage to streets, backyards, and the environment. A wastewater collection system is needed to protect public health and the environment in Agua Prieta.

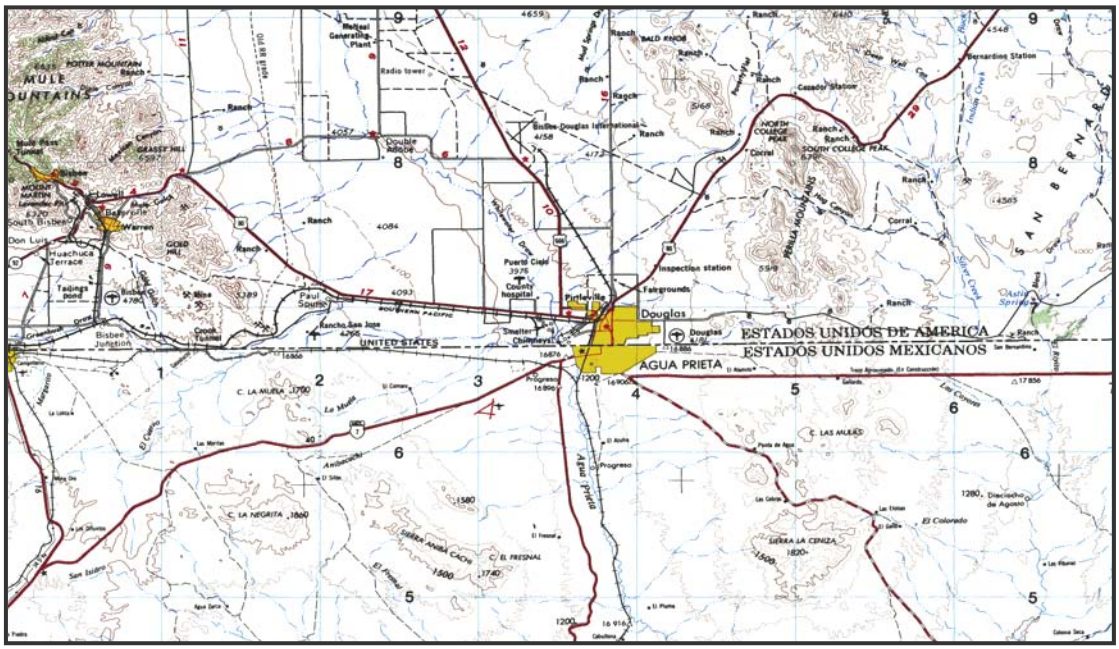

Figure 2. Douglas, Arizona and Agua Prieta, Sonora Project Location Map

Communities lacking wastewater collection and treatment frequently experience problems with respect to human health and environmental compliance. Potential problems in the unserved areas of southern Agua Prieta include but are not limited to:

- Public health and environmental problems related to contamination of surface water. Raw sewage spilling from cesspools flows to ditches and low-lying areas where water collects resulting in a high potential for contact by area residents.

- The large number of cesspools in this small, densely populated area coupled with shallow ground water increases the potential for groundwater, and source water contamination.

- Operation and maintenance costs for the existing systems are related to pumping of individual cesspools and the need for an upgrade of disposal areas. Because of the low income of area residents, pumping of cesspools either does not occur or occurs only in cases of total system failure. Similarly, replacing or upgrading the disposal areas does not happen due to the relatively high cost of such work.

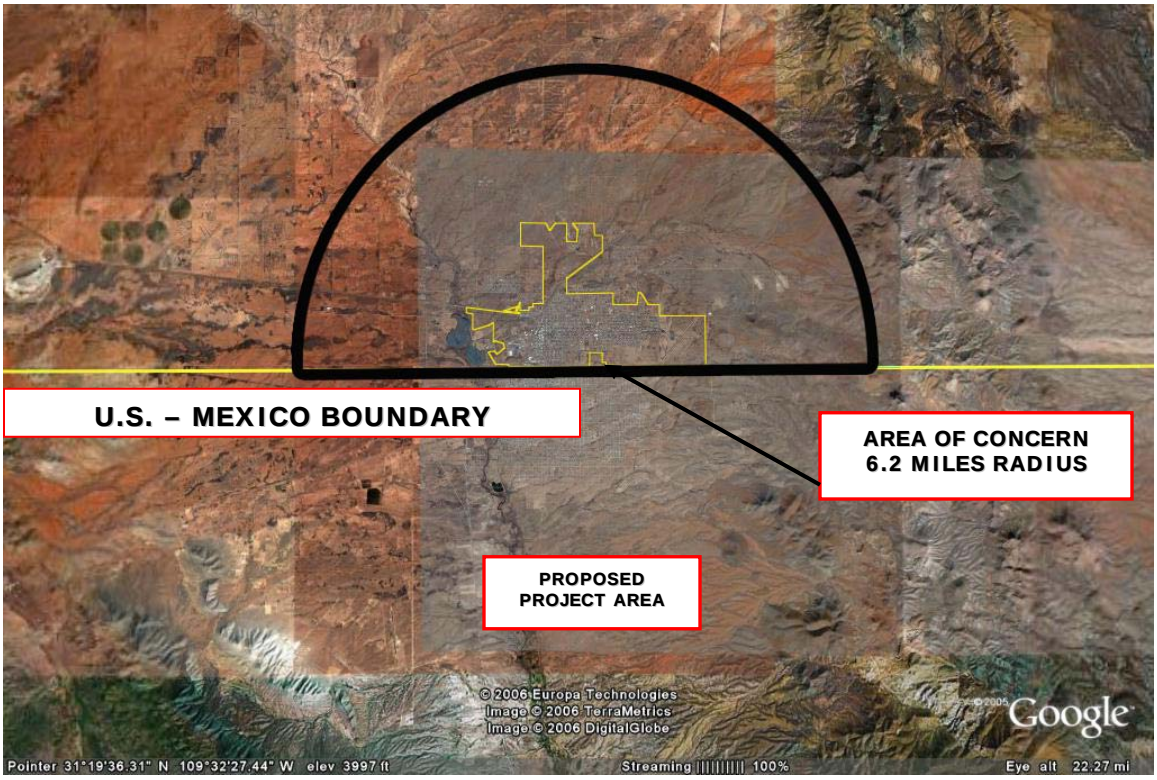

Figure 3. Area of Concern for the Proposed Action is a 6.2 Mile Radius north of U.S. Border.

1.5 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

As defined in CEQ regulations (§ 1508.25), the scope consists of the range of actions, alternatives, and impacts to be considered in a NEPA document. The scope of this EA is limited to the relevant resources within the defined area of concern in the U.S. and Mexico that may be affected by the no action alternative or one of the action alternatives.

1.5.1 Issues studied in detail

In accordance with CEQ regulations (§ 1500.4 and § 1501.7) and BECC-BEIF environmental requirements, issues to be addressed relating to this proposal, are the direct, indirect and cumulative impacts to land use, air quality, water resources, wetlands, farmlands, biological resources, scenic, historic and cultural resources, noise, traffic, socio-economic and public health conditions and environmental justice. Specific attention is given to non-land based issues, such as air and water, and to resources where there may be project-induced effects, such as public health and socio-economic resources.

1.5.2 Issues Eliminated from Detailed Study

Hazardous and solid waste, wetlands, farmlands, national landmarks and wild and scenic rivers are resources unlikely to be directly or indirectly affected by implementation of any of the alternatives and are therefore not relevant for further detailed evaluation.

2.0 PROJECT DESCRIPTION AND ALTERNATIVES

In accordance with CEQ regulations (§ 1502.14), this section of the EA: (1) presents and objectively evaluates all alternatives, including alternatives which were eliminated from detailed study and the reasons for elimination; (2) devotes substantial discussion to each alternative considered in detail so the reviewers may evaluate comparative merits; and (3) includes appropriate mitigation measures.

Based on the information and analysis presented in Section 3.0 (Affected Environment and Environmental Consequences), this section also presents the potential local and transboundary environmental impacts of the alternatives in comparative form.

2.1 DESCRIPTION OF THE PROPOSED ACTIONS

Presently there is no existing sewage collection system in the southern part of the City. The only waste disposal facilities that exist are on-site disposal units, which consist primarily of cesspools and septic tanks with no leach field, which are technically equivalent to cesspools.

The proposed projects will provide wastewater collection service to the current population that lacks this service. The trunk sewers will be designed to accommodate up to twenty years of projected growth (not to exceed 30% growth) in addition to the current population. Collection sewers will be provided for existing residents within the planning area and will not be extended into undeveloped areas.

The proposed BEIF project, covering the eastern half of the southern part of the City (Section B), will be implemented immediately. Pending the availability of funds, Section A on the western half of the City's southern side will be implemented.

Section B encompasses the area bounded to the north by the Janos - Cananea Highway, to the west by Avenida 34, to the east by Avenida 46 continuing to Avenida 44, and to the south along Calle 35. Section A includes three sections south of the Janos – Cananea Highway to the west of Section B.

The proposed wastewater collection systems would be installed to provide wastewater collection coverage to an area of approximately 500-acres and will serve approximately 20,000 existing residents once both proposed projects are completed. The proposed wastewater collection system improvements for Section B will serve 7,000 existing residents by covering an area of 250-acres by the end of 2007. Pending the acquisition of additional funding, the second part of the proposed actions would bring service to the remaining 14,000 existing users to cover a slightly larger sized area in the western and southernmost sections (Section A) south of the Cananea-Janos Highway with a planned completion in 2008 (Figure 4).

Figure 4. Proposed Action in Zona B (in red) and additional planned Zona A (,in magenta).

2.2 WASTEWATER TREATMENT PLANT

Improvements to the Agua Prieta wastewater treatment plant (WWTP) are not part of these projects and are not included in any of the Alternatives presented in this EA. However, compliance with all applicable operational and discharge regulations is a prerequisite for any U.S. federal funding and the WWTP must be in total compliance before any U.S. federal funds are awarded.

The existing WWTP, which is located 3.0 miles south of the U.S.-Mexico border in the southwest corner of the City of Agua Prieta, includes two separate oxidation ponds with a total area of 12 hectares (29.6-acres). The WWTP was designed to handle a total volume of 260 liters per second [l.p.s.] (5.94 MGD); however, recent studies indicate the actual WWTP capacity is 200 l.p.s. (4.57 MGD)[3].

Currently the WWTP is treating an average influent volume of 135 l.p.s. (3.08 MGD)[4] from domestic and non-domestic users; therefore, the City has treatment capacity to accommodate additional flows from potential expansion of the wastewater collection system in the south sector of Agua Prieta. According to the OOAPASAP, these additional flows are estimated to be 29 l.p.s. (0.66 MGD).

At the present time, around 100 l.p.s[5]. (2.28 MGD) of the 135 l.p.s. (3.08 MGD) total treated effluent, are sent to the Comisión Federal de Electricidad (CFE), Federal Commission of Electricity Power Plant for its reuse. The treated effluent is reused in the water-cooling towers. Once the effluent is reused for cooling purposes at the power plant, the remaining effluent, of approximately 40 l.p.s. (0.91 MGD) is discharged to the Rio Agua Prieta. CFE has a current discharge permit from the Comisión Nacional del Agua, *National Water Commission* (CONAGUA), allowing it to discharge (41 l.p.s.)[6] The remaining treated effluent 35 l.p.s. (0.80 MGD) produced at the WWTP, is discharged under a federal permit from CONAGUA directly to the Rio Agua Prieta and is used for irrigation purposes by the Ejido Agua Prieta. OOAPASAP presented a contract document between the Agua Prieta Municipal Administration (the City

[3] Plan Maestro COCEF pg. 53-69; RAP 2002 anexo 6-7 and OOAPASAP correspondence received on April 20, 2006.
[4] Plan Maestro COCEF pg. 53-69; Aforo COAPAES 2000 and OOAPASAP correspondence received on April 20, 2006.
[5] Aforo Planta Termoeléctrica (CFE). BECC's Cuadro-Resumén, July, 2006.
[6] CNA No. 02SON100293/09FAGC03 wastewater discharge permit.

Mayor) and OOAPASAP where authorization to use the treated effluent is granted to the municipal government. One of the clauses in the agreement is that the municipal government must comply with all federal and state health regulations related to the re-use of the subject effluent. Currently, the WWTP is operating out of compliance with its discharge permit for fecal coliforms and hydraulic load. Upgrade to the treatment process and a new or modified permit allowing larger discharges must be achieved before U.S. federal funds will be awarded for the expansion of the collection system. It is expected that the existing WWTP will reach 82 percent (3.74 MGD) of its total capacity of (4.57 MGD), by the year 2008, if implementation of the proposed projects occurs. CONAGUA recommends that planning for WWTP expansion be instituted at 85% capacity,, so improvements to increase the existing WWTP capacity will be needed in the near future for the City of Agua Prieta.

There is a possibility that the CFE will request to the City of Agua Prieta municipal government and the OOAPASAP under a memorandum of understanding (MOU), currently being discussed[7], that they be allowed to handle and use the total current and future raw sewage that is collected in the City of Agua Prieta. As such, there would be no need for future WWTP facilities in the City.

2.3 WASTEWATER COLLECTION SYSTEM

The City provides wastewater collection services to the area known as Zona Norte (North Area) which is bounded to the north by Calle Internacional, along the U.S./Mexico border to the west by Calle Margallan continuing to Avenida Ferrocarril (Railroad Avenue), to the east by Avenida 46 continuing to Avenida 44, and to the south along the Janos - Cananea Highway.

The City's wastewater collection system and treatment facilities serve approximately (66%) [8] of the 75,210[9] city residents. The City's population is expected to increase to approximately 110,522 by the year 2024. Continued population and service area growth has resulted in the need for capacity increases on the Wastewater Collection System to efficiently meet the growing demand for wastewater service.

The City currently provides wastewater collection services to approximately 50,185 residents. Therefore, more than 25,000 individuals do not have access to wastewater collection services in Agua Prieta, 21,000 of those individuals reside in the south area of the City. To date, individuals residing in the south area of the City are not connected to the wastewater collection system, and rely on private cesspools for sewage treatment and disposal (Miguel A. Santana, *pers comm*. January 17, 2006).

2.4 ALTERNATIVE 1 – NO ACTION

Under the no action alternative, proposed improvements to the existing wastewater collection system would not be completed. No construction activities would occur and wastewater collection system operations would not change. The existing wastewater collection systems would not be expanded to the south sector of the City of Agua Prieta under Alternative 1.

[7] OOAPASAP, personal interview with Miguel A. Santana, January 17, 2006.
[8] OOAPASAP, personal interview with Miguel A. Santana, January 17, 2006.
[9] Población total de los municipios a mitad de año, 2000-2030, CONAPO, 2006. www.conapo.gob.mx/micros/proymunloc

If the No Action Alternative is selected, the current situation will remain as the projects will not be engineered and constructed. Soil pollution will continue in the Projects Area, and the wastewater problems identified in the previous section are expected to worsen as the number of users increases. The No Action Alternative would not eliminate the health hazards associated with failing on-site sewage treatment units that occasionally overflow and send raw sewage onto the streets. Groundwater currently used as potable water could become contaminated because of continued use of malfunctioning septic tanks and cesspools for wastewater disposal.

2.5 ALTERNATIVE 2 –CONVENTIONAL GRAVITY (CG) SEWER SYSTEM

Alternative 2, is based on the recommendations of the City of Agua Prieta Water and Wastewater Master Plan (Miguel A. Santana 2005, 2006), and will address the wastewater collection needs of the City's south sector's 14,500 inhabitants with the implementation of a conventional gravity sewer system to be connected to the municipality's WWTP.

The proposed projects would install more than 39,526 linear meters (129,645 LF) of new sewer lines providing 96 percent coverage to the current population within the Projects' Area. Each home, most of which have been relying on cesspools for their wastewater disposal, will be connected via 6" hook-ups to a system of 8" PVC laterals that will discharge to an existing 24" subcollector that will convey flows to the WWTP. Construction and installation of new wastewater collection pipelines may involve removal of soils contaminated by cess pool sewage and transportation of impacted soils to an approved local landfill.

The majority of these wastewater collection lines will be constructed under unpaved streets, while the remainder will be placed under paved right-of-ways and existing utility easements (OOAPASAP, 2006). Table 1, presents a summary of proposed Alternative 2 wastewater collection improvement projects, year of planned implementation, and estimated costs. As mentioned in Section 1.2 of this study, this EA will be evaluating the impacts of installation of sewage lines in Section B as a stand-alone project as well as the planned additions for the expansion of the wastewater collection system to Section A proposed to be carried out between 2007 and 2008.

Under Alternative 2, wastewater collection will be extended to approximately two thirds of the current south sector residents of the City of Agua Prieta. The service area population to benefit from the implementation of the proposed projects is estimated at 14,500 based upon current water accounts (OOAPASAP, 2006). Additional daily residential wastewater flow will average approximately 29 l/s, assuming a daily wastewater production rate of 173 lpcd, an increase of approximately 21.5% over existing residential wastewater flow.

The Agua Prieta Water and Wastewater Master Plan (SEPSA, 2004) estimates that commercial land uses will generate a negligible wastewater volume, since according to the Plan Municipal de Desarrollo de la Ciudad de Agua Prieta, Sonora 1998-2003, *City of Agua Prieta Municipal Development Plan Study*, land use in the south sector of the City is authorized for housing and minor business facilities.

Table 1. Wastewater Collection System Improvements, Summary of Alternative 2, Projects and Estimated Costs of the Proposed Action and Planned Additions to be executed by 2008.

Project Name and Feature	**Year of Execution**	**Estimated Cost (U.S. Dollars) Proposed Actions**		**Total Cost (U.S. Dollars)**
		Proposed BEIF	Anticipated	
2,500 linear meters (8,200 l.f.) 24-inch polyvinyl chloride (PVC) sanitary sewer main.	2007 -2009		$147,600	$147,600
2,750 linear meters (9,020 l.f.) 18-inch polyvinyl chloride (PVC) sanitary sewer main.	2007 -2009		$135,300	$135,300
2,250 linear meters (7,380 l.f.) 14-inch polyvinyl chloride (PVC) sanitary sewer line.	2007 -2009		$95,940	$95,940
1,448 linear meters (4,750 l.f.) 12-inch polyvinyl chloride (PVC) sanitary sewer line.	2007 -2009	$52,250		$120,161
1,882 linear meters (6,173 l.f.) 12-inch polyvinyl chloride (PVC) sanitary sewer line.	2007 -2009		$67,911	
70,104 linear meters (229,940 l.f.) 8-inch polyvinyl chloride (PVC) sanitary sewer laterals.	2007 -2008	$1,103,717		$2,538,546
91,135 linear meters (298,923 l.f.) 8-inch polyvinyl chloride (PVC) sanitary sewer laterals.	2007 -2008		$1,434,829	
Hook-ups (6-inch)	2007	$65,289		$150,165
Hook-ups (6-inch)	2008		$84,876	
Total (BEIF Proposed Action)	**2007-2008**	**$1,221,256**		
Total (Future Additions)	**2007-2009**		**$1,966,456**	
Grand Total				**$3,187,712**

Source: OOAPASAP, 2006 (OPA/2006-019-DG)
Exchange rate as of 05/02/2006: 1 dollar per 10.44 pesos

2.6 ALTERNATIVE 3 – SEPTIC TANKS AND SMALL DIAMETER GRAVITY (SDG) SEWER SYSTEM

This alternative would consist of identifying existing cesspools that are experiencing some degree of failure or that are incapable of handling the present wastewater loading. Cesspools would be replaced with a small diameter gravity (SDG) system.

The majority of the existing homes within the area of concern rely on cesspools. These are located on individual private properties requiring operation and maintenance costs to be borne by the property owner. This alternative would eliminate some surface water contamination and the resulting health concerns from direct contact with raw sewage, but it might not be applicable to the smaller lots where there is no room for cesspool replacement.

An SDG system uses gravity to transport sewage, much like conventional sewers do. However, small diameter gravity sewers are always preceded by a septic tank. Refer to Figure 3. The settling that first occurs in the septic tank eliminates much of the solid matter from the wastewater. This enables the collection pipes to have a smaller diameter and a more gradual incline. The pipes used are made of lightweight plastic and can be buried at a relatively shallow depth.

The SDG system does not utilize pumps at individual septic tanks as other more sophisticated systems do. Therefore, the SDG sewers are laid at a relatively constant grade, to match the terrain. Manholes are not required for small diameter gravity systems; instead, clean out ports are used to service collector pipes. When it is necessary for the flow to be directed upwards, effluent pumps can be utilized to move the wastewater to higher elevations. High water alarms are normally installed in the septic tanks to alert property owners of any potential problems with their part of the system.

SDG sewer systems are well suited for communities where the houses are far apart, or where most houses are served by an existing septic tank. Areas with a high housing density or with extremely hilly terrain are not as conducive for the use of this type of system. Operation and maintenance costs for SDG sewer systems are comparable to those of conventional gravity (CG) systems. The only additional maintenance requirement is the periodic pump out of the septic tanks, which is usually done every three to five years.

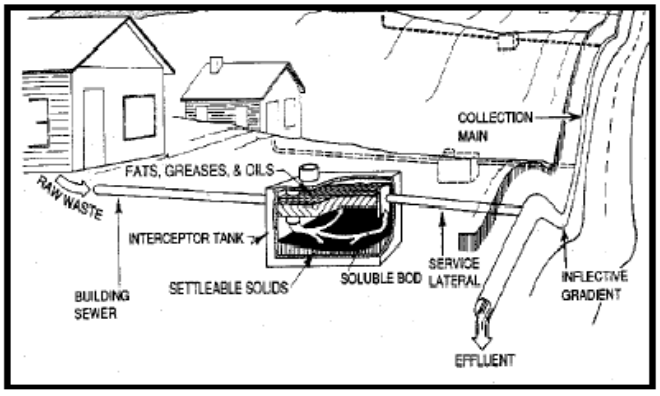

Figure 3. Septic Tanks and Small Diameter Gravity Sewer System.

Though not necessarily a disadvantage, limited experience with SDG sewer system technology has yielded some situations where systems have performed inadequately. This is more a function of poor design and construction than the ability of a properly designed and constructed SDG system to perform adequately. SDG systems cannot handle commercial wastewater with high grit or settle-able solid levels. Odors are the most common problem and are caused by inadequate

house ventilation systems and mainline manholes or venting structures. And lastly, SDG systems must be buried deep enough so that they will not freeze.

The main advantage of the SDG sewer system over the CG sewer system is low capital cost due to reduced pipe costs, cleanouts in place of manholes, reduced lift station sizes due to peak flow attenuation by septic tanks, and potential reduction in treatment costs due to septic tank pretreatment. However, construction costs for this septic tank system in Agua Prieta, in compliance with CONAGUA regulations and acceptable construction guidelines, is estimated to be around $8,500.00 pesos ($810.00 U.S. Dollars) per household[10]. The total of households to be served in the proposed projects area is 5,000; therefore, the total cost to implement this alternative would be approximately $4,050,000.00 (4.05 million U.S. dollars). The estimated total cost to implement this alternative in section B, would be of approximately 1.62 million U.S. dollars.

2.7 COMPARISON OF THE ALTERNATIVES

Table 2 compares the potential environmental trans boundary impacts to the project area of the alternatives. Refer to *Chapter3 (Affected Environment and Environmental Consequences)* for further discussion of these potential environmental impacts.

Table 2. Comparative Matrix Summary

Alternatives: / **Receptors:**	**No Action**	**Conventional Gravity (CG) Alternative**	**Septic Tanks (SDG) Alternative**
Land Use	No impact on land use.	Locations of the proposed sewer system will be constructed / installed in already disturbed areas of existing streets and right- of-ways; therefore, not disturbing additional resources. No transboundary impact.	Locations of the proposed sewer system will be constructed / installed in private property and in already disturbed area of the existing streets and right-of-ways. No transboundary impact
Air Quality	Air quality in the area of concern would not be impacted by the no action alternative.	Construction improvements associated with this alternative have the potential of some temporary pollution to the air resources in the proposed projects' area of concern. Also, there is a potential effect especially with odors in the event some of the septic tanks are removed and the contaminated	Construction improvements associated with this alternative have the potential of some temporary pollution to the air resources in the proposed projects' area of concern. Also, there is a potential effect especially with odors in the event some of the septic tanks are removed and the contaminated

[10] OOAPASAP, personal interview with Miguel A. Santana, January 17, 2006.

		soil is transported to a landfill.	soil is transported to a landfill.
Water Resources	Without access to an adequate sewer system, the population would continue discharging the wastewater into the overloaded and failing on-site units (mostly cesspools), adding to the risk of surface pooling of raw wastewater in the community and threatening ground water resources.	The implementation of the proposed action would provide service to residences lacking connection to the wastewater collection system, thereby avoiding potential contamination of the groundwater by fecal coliforms and other parasites resulting from the continued and increased use of cesspools for wastewater disposal. Resulting access to wastewater treatment would potentially eliminate sources of contamination of groundwater via infiltration.	Same as the previous action alternative. However, under this alternative protection of ground water resources would depend on the public's reliability in maintaining septic tanks.
Wetlands	No potential impact	No potential impact	No potential impact
Farmlands	No potential impact	No potential impact	No potential impact
Biological Resources	No potential impact	No potential impact	No potential impact
Cultural Resources	No potential impact	No potential impact	No potential impact
Noise	No potential impact	Construction noises tend to be short in duration and concentrated around the immediate work area. Construction related noise would be mitigated through the use of standard procedures.	Same as the previous action alternative.
Traffic and Transportation	No potential impact	Closing of a roadway or street avenues may be required during times of construction and will inconvenience the users of the City of Agua Prieta roads in the project area.	Same as the previous action alternative. Although potential effects would be minimal since related construction would take less time and part of it would be on private

			property (households).
Socio-economics	No potential impact	The implementation of the proposed action alternative would have minor positive impacts on the City of Agua Prieta economy. The number of temporary jobs that the project would generate would be relatively low.	Same as the previous action alternative.
Public Health	The health risk of waterborne disease in the project area would continue at current levels or could increase with this alternative because of the expected increase in population and the lack of efficient wastewater collection system. Transboundary impact difficult to quantify but is likely due to considerable movement of people across the boundary.	Implementation of the preferred alternative would likely decrease the health risk in the City of Agua Prieta and consequently in Douglas, Arizona. Potentially contaminated surface water and groundwater resulting from the leakage and infiltration from cesspools would be alleviated with the implementation of this proposed action alternative. With proposed action implementation, communicable infectious diseases originating in untreated wastewater in Agua Prieta will be significantly reduced thus, would minimize infections of residents in Douglas, Arizona.	Same as the previous action alternative. However, limited experience with SDG technology has yielded cases where systems have performed inadequately, which would reduce the positive impact of this alternative's implementation.

Table 3. Estimated Cost of Implementing Alternatives.

	No Action	**Proposed Action – Conventional gravity (CG) sewer system**	**Septic Tanks and Small Diameter Gravity (SDG) Sewer System**
Estimated Cost (U.S. Dollars) Section B	$0.00	$1,221,256.00	$1,620,000.00

Estimated Cost (U.S. Dollars) Section A	$0.00	$1,966,456.00	$2,430,000.00
Estimated Cost (U.S. Dollars) Total	**$0.00**	**$3,187,712.00**	**$4,050,000.00**

Source: OOAPASAP, 2006 (OPA/2006-019-DG) and Correspondence (01/24/2006) updated on 05/02/2006.

2.8 IDENTIFICATION OF PREFERRED ALTERNATIVE

Alternative 2, Conventional Gravity (CG) Sewer System, was selected as the preferred alternative by the OOAPASAP. The City is proposing a series of CG collection system improvements to provide service for existing established housing in the south sector of the City.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Section of the EA focuses on the potential environmental impacts on the area in southern Cochise County in southeastern Arizona, within a 6.2-mile radius of the proposed projects located in the south area of the City, (See Figure 2), but it also presents a concise review of the relevant environmental issues in Mexico.

3.1 LAND USE

The land in southern Cochise County, Arizona is predominantly rural, with scattered ranches and farms. Much of the land in the county is State Trust land or is owned and controlled by federal agencies, such as the Bureau of Land Management, the U.S. Forest Service, or the U.S. military. Douglas, Arizona, with a population of 14,312, is the most densely populated area located immediately across the border from Agua Prieta. Sierra Vista, the largest city in the County with a population of 37,775 is located approximately 46 miles northwest of Douglas and 16 miles north of the border. State Route 80 and U.S. Highway 191 are the major transportation corridors through the area. State Route 80 runs east to west roughly parallel with the U.S./Mexican border. U.S. Highway 191 runs north to south through the center of Sulfur Springs Valley. Development along the roads in southern Cochise County is confined to Douglas and the unincorporated town of Pirtleville, which is located, near the junction of State Route 80 and U.S. Highway 191. Other named places consist of no more than several buildings with a local gas station and perhaps an eating establishment.

The area between State Route 80 and the Mexican border is heavily patrolled by U.S. Border Patrol guards who use four-wheel drive vehicles and portable observation towers to actively survey the area. The land between State Route 80 and the Mexican border west of Douglas is the former site of the Phelps-Dodge reduction works. It was closed in 1987 and all the buildings were removed in 1990. At that time 15.6 million tons of soil from the smelting site were removed. The remaining soil was tested for heavy metals and found to meet Health Based Guidance Levels. All that remains is a 200-acre slag pile left from the smelting operations. A municipal landfill is located near the former reduction works site. There is one active mine in the area, a limestone

mine located about 10 miles west of Douglas at Paul Spur. The Bisbee-Douglas International Airport (a two-runway with a flight school that services primarily single engine, general aviation aircraft), is located 10 miles north of the border. Agriculture is a significant land use in Cochise County. There were 824 farms in the County in 1997. These are primarily livestock farms (59%) with a smaller percentage of vegetable and produce farms.

Land in Cochise County is zoned by county government in three general categories: Rural, Residential, and Commercial Industrial. The majority of the land is unincorporated. Ninety percent of the unincorporated land is zoned as Rural with minimum lot sizes for single and multi-family housing ranging from 2 acres to 36 acres. In addition to zoning, in 1996, the Board of Supervisors revised the Cochise County Comprehensive Plan County to designate growth areas that are intended to promote orderly and well-planned future development throughout unincorporated areas of the county.

The Plan delineates four growth categories (Categories A through D)[11] that describe the existing and expected intensity of growth of an area. The land around Douglas and Naco are designated as a Category B Urban Growth Area. The area around the Bisbee-Douglas International Airport, the Bisbee Municipal Airport, and an area near Double Adobe are designated as Category C Rural Growth Areas. Growth Areas B and C are areas that are designated to accommodate more densely developed land in the future.

3.1.1 Environmental Consequences

3.1.1.1 No Action Alternative - 1

Douglas, Arizona

Land use characteristics under the no action alternative would not substantially change.

Agua Prieta, Sonora

If the proposed projects were not implemented, land use characteristics under the no action alternative would not substantially change.. Currently, the largest land use category within the city limits for the south sector of the City is designated residential (single family, multi-family homes) accounting for more than 500 acres, or 12.65 percent of the total land use and 23 percent of the City currently dedicated for residential use.

3.1.1.2 Action Alternatives – 2 & 3

Douglas, Arizona

Because the projects is located 3.2 miles south of the U.S./Mexican border, they would have no direct or indirect impact on land use in the United States. The projects could have a small positive economic impact on the local economy in Douglas (see section 3.8.2) through the secondary effect of supporting further development of retail sales outlets near the Mexican border. These potential effects fall within the long-range planning and control of Douglas's existing infrastructure, which would be able to accommodate the growth. Cochise County has also designated the area around Douglas as a Category B growth area and is projected to accommodate future growth.

[11] The categories are as follows: Category A – Intensive Growth Areas; Category B – Urban Growth Areas; Category C – Rural Growth Areas; and Category D – Rural Areas.

Agua Prieta, Sonora

The main purpose of implementing these improvements for the City is to address exisiting homes without service. The proposed sewer system projects will be constructed / installed in already disturbed areas of existing streets and right-of-ways, and would have no significant direct or indirect impact on land use in the projects area.

3.2 AIR QUALITY

The climate of Cochise County is characteristic of the dry desert climate of the Rio Yaqui Basin. On average, the annual rainfall totals average 11 to 13 inches. The average annual relative humidity is 30%. Cochise County is in the Southeast Arizona Interstate Air Quality Control Region. The County is designated by the Environmental Protection Agency ("EPA") as a non-attainment area for sulfur dioxide ("SO_2") and particulates (PM-10 or pollutants particulate matter with aerodynamic diameter less than a nominal 10 micrometers). The EPA designates areas of non-attainment for six "criteria' pollutants if the ambient air concentrations of these pollutants exceed the National Ambient Air Quality Standards ("NAAQS")[12]. The County currently meets the NAAQS (i.e., is an attainment area) for ozone ("O_3"), nitrogen dioxide ("NO_2"), carbon monoxide ("CO"), and lead ("Pb").

Ambient air quality monitoring data on the criteria pollutants in southeast Arizona are available from a monitoring network operated by the Air Quality Division of the Arizona Department of Environmental Quality ("ADEQ"). Monitoring data are collected at several sites within Cochise County and Pima County (the county immediately west of Cochise County). The monitoring station most representative of the area in which the maximum projects' impacts may occur in the U.S. is the Douglas monitor (PM-10).

Historically, Cochise County's air quality was significantly affected by the Phelps Douglas Reduction Works (a copper smelting plant), which was located on a 2,000 acres site about 1 mile west of Douglas. In 1989, the Arizona Air Quality Office reported that the Reduction Works emitted 450 tons per day of sulfur dioxide in 1984 and, 308,000 tons per year ("TPY") in 1985 and 247,600 TPY in 1986 from two 600-foot stacks. Phelps Douglas Reduction Works closed permanently in 1987 and the smelter facility was demolished and removed in 1990[13].

Air quality in Cochise County is affected by activities in Mexico. The average annual wind speed is 8.3 mph from the southeast out of Agua Prieta, Sonora, Mexico; winds shift and blow towards Mexico in the evening. Studies of particulate emissions indicate that 60 percent of the PM-10 in the Douglas area originates in Mexico due in great part to unpaved road dust (81.4 %) followed by agricultural activities (11.9 %)[14]. The remaining sources of dust emissions were paved roads, agricultural burning, cleared areas, windblown agricultural land, off-road vehicles and unpaved parking lots. This fugitive dust contributes to Cochise County's non-attainment status for particulates (PM-10).

[12] NAAQS sets thresholds concentrations for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead.
[13] Auer, A.H., "Correlation of Land Use and Cover with Meteorological Anomalies". Journal of Applied Meteorology, Volume 17, pp. 636-643, May 1978.
[14] U.S. Environmental Protection Agency, Region IX. Douglas, Arizona Wastewater Collection and Potable Water Distribution Improvement Project Environmental Assessment. April 16, 2001

3.2.1 Environmental Consequences

3.2.1.1 No Action Alternative - 1

Douglas, Arizona

The no action alternative would have no direct or indirect impact on climate and air quality.

Agua Prieta, Sonora

Construction activities that result in particulate matter and hydrocarbon emissions would not be initiated because improvements associated with implementation of the proposed action would not occur. Air quality in the area of concern would not be impacted by implementation of the no action alternative.

3.2.1.2 Action Alternatives - 2 & 3

Douglas, Arizona

Air quality impacts were considered for construction of the project. Construction of the proposed action could contribute to temporary fugitive dust emissions due to the disturbance of dry soils during construction. The fugitive dust emissions could impact both ambient PM-10 concentrations and visibility in the immediate vicinity of excavations, but would not be expected to significantly contribute to air quality degradation in the City of Douglas, and would also be negligible, in wilderness areas around Chiricahua National Monument.

These impacts would be minor and would be limited to the construction period. Standard dust suppression techniques such as watering of active construction areas, aggregate piles and cleared areas would substantially minimize these air quality impacts. There would be no significant indirect impacts to air quality.

Agua Prieta, Sonora

Construction and operation improvements associated with this alternative have the potential for temporary adverse impacts to air quality in the proposed project area. During construction, emissions would be produced on-site by earthmoving equipment and by vehicular traffic traveling throughout the construction site. Appropriate construction methods would be used to keep the generation of dust and fine particulate matter to a minimum. The quantity of these emissions would also vary and be dependent on the types and level of activities occurring and the weather conditions.

The selected contractor will be required to submit a construction-phasing plan for approval by the City. During construction, periodic wetting of the area will control the generation of dust and particulates. Immediately after the sewer system installation, the contractor will backfill the trenches and repave / re-grade / re-vegetate the trenches as soon as possible.

3.3 WATER RESOURCES

Surface Water

White Water Draw is the only surface water body in the Sulphur Springs Valley. Surface water flows primarily in response to seasonal rain events. Monsoon-like rains can create flash flood conditions, but for the balance of the year there is little or no surface water flow. Hence, flow

volumes vary greatly in the river. During drought the river flow is non-existent; during the rainy season large volume flows are present. Flow data at the Douglas Station on the White Water Draw (the name changes to Rio Agua Prieta when it crosses the border into Mexico) shows a maximum flow of 3,019 cubic feet per second ("cfs"). However, average maximum flows are only 14 cfs. Minimum average flows are less than half a cubic foot per second (0.28 cfs). Records from the 1960-1995 show a dry river 45.8% of the time in Mexico just upstream of the Agua Prieta sewage lagoons. The drought season lasts an average of 5.5 months from January to June. Discharges from the Douglas, Arizona municipal sewage treatment plant contribute significant flow in the White Water Draw/Rio Agua Prieta just as it crosses the border. The plant's maximum capacity is 2.6 million gallons per day ("MGD"). Peak discharge is 2.1 MGD. The average discharge is 1.7 MGD. Low flow discharge is 1.1 MGD. About 35 of the 135 lps (3.08 MGD) currently discharged from the Agua Prieta sewage lagoons flows into the Rio Agua Prieta further downstream. If the CFE electrical power plant does not increase it's take from the WWTP (either raw or treated) and the facility continues to discharge to the Rio Agua Prieta, the City will have to upgrade the WWTP and bring effluent quality into compliance with all applicable regulations before any additional flows resulting from these proposed projects are delivered to the facility, if U.S. federal funds are to be used.

Groundwater

The principal water resource in southern Cochise County is the Douglas basin, an alluvial valley 35 miles long and 15 miles wide covering an area of about 750 square miles in southeastern Arizona. It trends under Sulphur Springs Valley in a northwest/southeast direction and is bounded on the east by the Swisshelm (elevations to 7,185 feet), Pedrogosa, and Perilla Mountains (elevations to 6,390 feet), on the west by the Mule and Dragoon Mountains, and on the south by the U.S./Mexican border. An arched series of small, unnamed hills extending from near Pearce, Arizona, to the Swisshelm Mountains form the basins northern boundary. The valley slopes down from elevations ranging from 4,350 feet AMSL in the northern hills to 3,900 feet AMSL at the U.S./Mexican border. Precipitation in these mountains is the main source of groundwater recharge in the Douglas basin. High evaporation rates and impermeable clay and caliche soil layers impede downward percolation of water so that neither rainfall nor irrigation water on the valley floor are recharged to the groundwater. Streambed infiltration along the course of White Water Draw and ephemeral washes in the valley contribute only a small amount of recharge.

The alluvium is a minimum of 1,600 feet thick in the central valley; but gets shallower along the mountain fronts. The groundwater flow direction is from the mountain highlands toward the central portion of the valley, and then south into Mexico. Groundwater pumping creates cones of depression in the natural flow. In Douglas there is a shift in gradient to the southeast and toward the city's water supply wells.

Most groundwater pumped in the Douglas basin is used for irrigation. Livestock and domestic withdrawal is minor except near Douglas, Arizona, where withdrawal by the city of Douglas for domestic use is significant. The city is totally dependent on ground water for its public water supply and operates eight wells with yields ranging from 800 to 1500 gallons per minute ("GPM"). Since the late 1940's, the Douglas basin has been severely over drafted. This is largely attributed to demands from agricultural irrigation. In 1965, the State Land Commission declared much of the basin's central valley a Critical Groundwater Area due to large water level declines associated with the severe overdraft conditions. The Commission prohibited drilling new irrigation wells except to replace existing wells. The Critical Groundwater Area became the Douglas Irrigated Non-Expansion Area ("INA") with the passage of the 1980 Groundwater Code.

The Arizona Department of Water Resources reports that the chemical quality of groundwater is considered suitable to marginal for most uses, including irrigation and domestic water supply. Groundwater samples taken from the main aquifer between 1987 and 1990 show elevated levels of fluoride (an inorganic chemical regulated by the EPA's National Primary Drinking Water Standards) and total dissolved solids ("TDS") (a contaminant listed in the EPA's National Secondary Drinking Water Regulations). Fluoride concentrations averaged 1.1 mg/l, however, the highest concentrations (up to 8.5 milligrams per liter ["mg/l"]) make the water marginal for use as drinking water (EPA's maximum primary contaminant level for fluoride in drinking water is 4.0 mg/l. The secondary standard for fluoride is 2.0 mg/l.). Fluoride concentrations in City of Douglas wells average about 2.0 mg/l. One well reaches as high as approximately 3 mg/l, but since the withdrawal from the city's eight wells is blended, the city has no difficulty meeting the primary drinking water standards. Samples collected from the groundwater for TDS showed an average concentration of 390 mg/l (500 mg/l is the EPA's recommended secondary maximum contaminant level TDS)[15].

3.3.1 Environmental Consequences

3.3.1.1 No Action Alternative - 1

Douglas, Arizona

The no action alternative would have no impact on surface water, nor on groundwater resources in the United States since surface and groundwater flow in the Silver Spring Valley and the White Water Draw/Agua Prieta River is from north to south.

Agua Prieta, Sonora

Current operational activities would remain the same with this alternative. Construction activities associated with the improvements to the wastewater collection system would not occur. Without access to an adequate sewer system, the population would continue discharging mostly untreated wastewater to the environment, increasing the risk of contact with contaminated surface water and contamination of groundwater resources.

3.3.1.2 Action Alternatives - 2 & 3

Douglas, Arizona

The proposed action would take place downstream from the U.S./Mexican border; therefore, since the flow of both surface water and groundwater is to the south, it will have no direct or indirect effect on the U.S. water resources.

Agua Prieta, Sonora

Surface Water - Surface water resources located within the area of concern are limited to the Rio Agua Prieta and an intermittent drainage channel, which carries water only during and immediately after rainfall. Construction activities associated with the proposed action alternatives would not have direct impacts to the Agua Prieta River since all construction activities would occur along the existing wastewater collection right-of-ways (ROW). Soils excavated and placed near the trench could be washed into intermittent drainages and subsequently the Agua Prieta River by rain events and cause increases in total suspended solids

[15] Secondary Standards are set for contaminants that may affect the taste, color and/or odor of a drinking water supply. They are not considered to present a threat to human health at the secondary maximum contamination level.

(TSS). Hay bales or silt fences would be placed along the edge of the construction ROW to ensure that siltation and/or subsequent increases in TSS would not result from construction activities.

Currently, effluent discharges from the Agua Prieta wastewater treatment lagoons fail to comply with the Mexican discharge standards NOM-002-ECOL-1996 for fecal coliformes, and the plant's hydraulic load limits. The action alternatives would increase flows to the lagoons and consequently increase non-compliant discharges, resulting in increased fecal contamination in the river and an increased risk of enteric infections. The local Comisión Federal de Electricidad (CFE) Power Plant is now diverting most of the effluent for use in tower cooling and has expressed interest in the diversion of additional flows. If the power plant diverts all flows added to the system by the action alternatives, there would be no significant direct impact to the river. If the power plant does not divert all added flows, the wastewater treatment lagoons will be upgraded to meet all effluent standards and the plant's discharge permit will be modified before the proposed projects will be connected to the system. If the power plant does divert additional flows, an indirect impact will result from the discharge of the cooling tower brines to the river, however, these discharges have been and would likely remain in compliance with the plant's discharge standards."

Groundwater - The implementation of the proposed action would provide service to residences lacking connection to the wastewater collection system, thereby avoiding potential contamination of the groundwater by fecal coliform bacteria and other parasites resulting from the continued and increased use of cesspools for wastewater disposal. Resulting access to wastewater treatment would potentially eliminate sources of contamination of groundwater via infiltration. The new wastewater collection system in the south sector of the City would enhance the quality of life of up to 8,000 households currently residing within the area of concern south of the Janos – Cananea Highway.

3.4 BIOLOGICAL RESOURCES

The biological environment includes the biotic or living components of the ecosystem present within the projects area of concern. Biotic components include vegetation; special aquatic sites such as wetlands; wildlife; and threatened, endangered, or other special status species. The affected environment and environmental consequences for each of these components are described below.

3.4.1 Vegetation

The Projects Area is located in the semi-desert grassland biotic community, which transitions into the Chihuahuan desert scrub community east of Douglas (Brown, 1994). The landscape is typical semi-desert grassland consisting of short grasses intermingled with a variety of large, well-spaced scrub-shrub perennials. Perennial grasses common to this grassland type include black grama (*Bouteloua eriopoda*) and other grama species (*Bouteloua* spp.), *Muhlenbergia porteri*, *Aristida* spp., *Triachachne californica*, and *Panicum obtusum*. Sotals (*Dasylirion* spp.), agaves (*Agave* spp.), yuccas (*Yucca* spp.), and beargrasses (*Nolina* spp.) may also be found in semidesert grassland. Dominant scrub-shrub species can include mesquite (*Prosopis* spp.), one-seed juniper (*Juniperus monosperma*), graythorn (*Zizyphus obtusifolia*, *Condalia spathulata*), and Mormon or Mexican tea (*Ephedra trifurca, E. Antisyphilitica*). Important cacti species include barrel cactus

(*Ferocactus wislizenii*), cane cholla and prickly pears (*Opuntia* spp.), and pincushions (*Mammillaria* spp.). The Chihuahuan desert scrub community, which borders the semidesert grassland of Douglas, is shrub-dominated. Creosote bush (*Larrea tridentata*), tarbush (*Flourensia cernua*), and whitethorn acacia (*Accacia neovernicosa*) are common, as are yuccas, agaves, sotols, and beargrasses. Surface water drainage within the Project Area flows southward via Whitewater Draw in the U.S. and Rio Agua Prieta in Sonora, Mexico.

3.4.2 Wildlife and Threatened and Endangered Species

Typical wildlife species found in the semidesert grassland include small mammals such as blacktailed jack rabbit (*Lepus californicus*); spotted ground squirrel (*Spermophilus spilosoma*); Ord's, banner-tailed, and Merriam's kangaroo rats (*Dipodomys ordii*, *D. spectabilis*, *D. merriami*); badger (*Taxidea taxus*); and coyote (*Canis latrans*). Common birds of the semidesert grassland include Swainson's hawk (*Buteo swainsoni*); prairie falcon (*Falco mexicanus*); mourning dove (*Zenaida macroura*); scaled quail (*Callipepla squamata*); road runner (*Geococcyx californianus*); loggerhead shrike (*Lanius ludovicianus*); and meadow lark (*Sturnella magna*).

Herpetofauna are more prevalent than mammals in the Chihuahuan desert scrub community bordering the semidesert grassland. Typical species include the Texas banded gecko (*Coleonyx brevis*); roundtail horned lizard (*Phrynosoma modestum*); spiny lizards (*Sceloporus* sp.); trans-Pecos ratsnake (*Elaphe subocularis*); western hooknose snake (*Ficimia cana*); and Mohave rattlesnake (*Crotalus scrutulatus*).

USFWS identified 15 endangered species, six threatened species, and two species proposed for listing under the Endangered Species Act of 1973, as amended, that may be found in Cochise County, Arizona (USFWS 2005)[16]. Three candidate species were also identified by USFWS as potentially occurring within Cochise County; however, no critical habitat for any listed, proposed, or candidate species was identified within the Project Area. Threatened, endangered, proposed, and candidate species identified by the USFWS for Cochise County are as follows:

Endangered Species (E)

Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)
Canelo Hills ladies' tresses (*Spiranthes delitescens*)
Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurva*)
Jaguar, United States Population (*Panthera onca*)
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)
Northern Aplomado falcon (*Falco femoralis septentrionalis*)
Ocelot (*Leopardus [=Felis] pardalis*)
Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)
Southwestern willow flycatcher (*Empidonax traillii extimus*)
Yaqui chub (*Gila pirpurea*)

Threatened Species (T)

Beautiful shiner (*Cyprinella formosa*)
Chiricahua leopard frog (*Rana chiricahuensis*)

[16] http://www.fws.gov/ifw2es/endangeredspecies/lists/ListSpecies.cfm

Cochise pincushion cactus (*Coryphantha robbinsorum*)
Mexican spotted owl (*Strix occidentalis lucida*)
New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)
Yaqui catfish (*Ictalurus pricei*)

Proposed Endangered Species (PE)

Gila chub (*Gila intermedia*)

Candidate Species (C)

Huachuca springsnail (*Pyrgulopis thompsoni*)
Lemon fleabane (*Erigeron lemmonii*)
Yellow-billed Cuckoo (*Coccyzus americanus*)

No documented occurrences of the aforementioned species were found in the Project Area by a review of the Arizona Department of Game and Fish's Heritage Data Management System (ADGF 2006). No species considered endangered by Mexican authorities are found within the Project Area (Santana, *pers. Comm*. 2006)[17].

3.4.2.1 National Wildlife Refuges

There are two National Wildlife Refuges ("NWRs") located in Cochise County. San Bernardino NWR is located 17 miles east of Douglas along the United States/Mexico border. Leslie Canyon NWR is located approximately 16 miles north of Douglas at the southern end of the Swisshelm Mountains. The 2,309 acre San Bernardino NWR was acquired by the U.S. Fish and Wildlife Service in 1982 to protect the water resources of the San Bernardino Valley and provide habitat for endangered and threatened native fishes such as the Yaqui chub, Yaqui top-minnow , Yaqui beautiful shiner and Yaqui catfish. More than 270 species of birds can be seen at San Bernardino NWR, including great blue heron, green-backed heron, Virginia rail, ringneck duck, Mexican duck, sandhill crane, magnificent hummingbird, Costa's hummingbird, yellow warbler, blue grosbeak, phainopeplas, white-crowned sparrows, and Gila woodpeckers. Raptors include gray hawk, zone-tailed hawk, golden eagle, Swainson's hawk, kestrel, sharp-shinned hawk, and peregrine falcon. Reptiles are also commonly observed including the Sonoroan whipsnake, western diamondback rattlesnake, black-tailed rattlesnake, Chiricahua leopard frog, Gila monster, Madrean alligator lizard, checkered and Mexican garter snakes and horned toad.

Leslie Canyon NWR is located approximately 16 miles north of Douglas at the southern end of the Swisshelm Mountains. This 2770-acre refuge was established in 1988 to protect habitat for the endangered Yaqui chub (*Gila purpurea*) and Yaqui topminnow (*Poeciliopsis occidentalis sonorensis*). The refuge also protects a rare velvet ash-cottonwood-black willow gallery forest.

Mammals found in both the San Bernardino and Leslie Canyon NWRs include mule deer, whitetail deer, javelina, mountain lion, raccoon, coyote, bobcat, gray fox, antelope ground squirrel, badger, jackrabbit, cottontail rabbit, kangaroo rat, and coatimundi. None of these are listed as threatened or endangered by the U.S. Fish and Wildlife Service.

[17] Ing. Miguel A. Santana-Corrales, Director General, OOAPASAP, Agua Prieta, Sonora. Personal Interview on January 17, 2006.

3.4.3 Environmental Consequences

3.4.3.1 No Action Alternative - 1

Douglas, Arizona

The implementation of the no action alternative will have no direct or indirect transboundary impact on flora, fauna and threatened and endangered species in the United States.

Agua Prieta, Sonora

Under the No Action Alternative, flora, fauna and threatened and endangered species in the area of concern would not be affected because construction would not occur.

3.4.3.2 Action Alternatives - 2 & 3

Douglas, Arizona

The proposed alternatives will have no impact on flora, fauna and threatened and endangered species in the United States because the proposed construction activities will be located 3.2 miles south of the U.S./Mexican border within the Agua Prieta City limits in an already disturbed area.

Agua Prieta, Sonora

Biological resources in the project area would not be affected by habitat loss because construction of the wastewater collection system would occur in areas that have been previously disturbed. Rio Agua Prieta habitat may be impacted slightly by increases in total dissolved solids (TDS) from the power plant discharge if that facility increases the flow through its cooling tower.

3.5 SCENIC, HISTORIC AND CULTURAL RESOURCES

Cochise County is an area rich in historic, scenic, recreation, and cultural resources. Much of the early history is tied to the early Native American settlements in the area. Place names like Cochise, Apache and Chiricahua reflect that history. The nearby Coronado National Forest with the Chiricahua Wilderness Area, the Chiricahua National Monument, and the San Bernardino National Wildlife Refuge are recreation destinations for tourists. Mining is also a significant part of the area's history and culture. The discovery of copper in the Mule Mountains west of Douglas in the late 1870s and the growth of Bisbee as one of the most important copper mining regions in the country have left a lasting impression on the region's history. Overall the County has 72 properties listed on the National Register of Historic Places. Sixteen of these listings, primarily structures and buildings, are located in Douglas.

The Archaeological Site Files of the Arizona State Museum (ASM) and the Arizona State Historic Preservation Officer (ASHPO) were reviewed to identify previously recorded cultural resources located within the proposed area of concern. There are no National Register-listed historic properties within the area of concern. ASM lists seven cultural resource sites and 10 archaeological survey projects in the City of Douglas. Four of the identified resources are historic and include the old State Route 80, the abandoned Southern Pacific Railroad Line, and an old power line. The remaining three resources are prehistoric archaeological sites, consisting of potsherds and lithic scatters. ASHPO identified 16 cultural resources within the few locations that have been systematically inventoried for cultural resources within the area of concern in Douglas. An historic site has been identified in the area near the site of the Pan-American sewer line,

within the Douglas city limits. This site consists of a foundation of an historic structure, two concentrations of mining slag, a pit and five mounds. The mounds are between 2.0 and 5.0 m in diameter and between 0.2 and 1.2 m in height and consist of dirt and historic objects. According to the Arizona State Museum records, items found at the site include glass, nails, concrete, bucket, wire, china, and red ware[18].

Cochise County is an area of significant scenic beauty. The contrast between the flat dessert valley floor and the mountain ranges that surround it contributes much to the character of the area. Though there are no designated scenic outlooks, the elevation of major roadways above the flat dessert valley afford uninterrupted views across miles of dessert valley floors to distant mountain ranges visible from numerous vantage points throughout the area. Disruptions to the natural beauty of these views include evidence of ongoing or past mining activities, though these areas themselves provide an interesting twist on the relationship between the history of mining and the scenic beauty of the area. For example, the abandoned Turquoise open pit copper mine, immediately adjacent to State Route 80 in Bisbee has a roadside turnoff with a designated Scenic overlook adjacent to the pit.

The State of Arizona, Cochise County, and the city of Douglas have laws and ordinances in place to minimize or prevent adverse affects of new lighting sources on the night sky. The city of Douglas contributes significantly to lighting the night sky. Sections of the U.S./Mexican border are also brightly lit. Limestone mines in both the U.S. and Mexico are lit at night.

3.5.1 Environmental Consequences

3.5.1.1 No Action Alternatives - 1

Douglas, Arizona

The implementation of the no action alternative will have no direct or indirect impact on scenic, historic and cultural resources in the United States.

Agua Prieta, Sonora

Construction activities associated with the proposed action that have the potential to disturb surface/subsurface cultural resources, would not occur with the implementation of the No Action Alternative. As a result, cultural resources would not be affected with the selection of the No Action Alternative.

3.5.1.2 Action Alternatives – 2 & 3

Douglas, Arizona

The projects will be constructed and operated in Mexico and will have no direct or indirect transboundary impact on the historic or cultural resources of the United States. The projects are located 3.2 miles from the U.S. border and construction and its associated activities will not be visible from the United States.

The proposed action alternatives will not have any impact on the scenic quality of the surrounding landscape in the U.S. There are no designated scenic outlooks that will be disrupted by the proposed action.

[18] Douglas AZ Wastewater Collection and Potable Water EA, CDM 2001

Agua Prieta, Sonora

Since the proposed construction areas for the wastewater collection system are located within previously disturbed sections of the City of Agua Prieta, it is unlikely that cultural remains are present on or near the surface.

Cultural resources were not found during a visual search of the proposed sites where the proposed wastewater collection systems are to be installed. However, a very low possibility for subsurface cultural remains generally exists in both urban and rural areas. Construction activities that require subsurface excavation would include the stipulation that, if any subsurface cultural materials are identified, work should cease and the appropriate personnel from the Instituto Nacional de Arqueología e Historia, *The National Institute of Archaeology and History,* (INAH) would be contacted to determine the appropriate course of action. Impacts to cultural resources in the U.S. are not anticipated because all of the construction activities associated with the implementation of this alternative would occur only in Mexico. No impacts would be expected to occur to cultural resources with implementation of the proposed action alternatives.

3.6 NOISE

The sites are in a suburban area with little ambient noise. Small engine planes from local airports contribute some level of noise. Car and truck traffic on State Route 80 is also a source of noise. Existing background noise levels within the area of concern in Douglas are probably affected by the following sources: wind, traffic, occasional construction activities, and other common city noises.

3.6.1 Environmental Consequences

3.6.1.1 No Action Alternative - 1

Douglas, Arizona

The implementation of the no action alternative will have no impact on noise levels in the United States.

Agua Prieta, Sonora

Existing noise levels would not change because construction activities associated with the proposed improvements would not occur. Therefore, implementation of the no action alternative would not impact noise levels in the area of concern.

3.6.1.2 Action Alternatives - 2 & 3

Douglas, Arizona

Noise levels at the proposed construction sites will be within regulated levels. Due to attenuation and the location of the project in Mexico over 3.2 miles from the border, there will be no negative impacts on ambient noise levels in the United States. Therefore, none of the action alternatives are expected to generate transboundary noise impacts in the U.S.

Agua Prieta, Sonora

None of the action alternatives are expected to impose significant long-term noise impacts on the proposed project area. Background noise levels may be elevated during construction activities associated with the proposed action. Construction noises tend to be short in duration and concentrated around the immediate work area. Construction related noise would be mitigated through the use of standard procedures such as specific, weekday hours of operation and the use of mufflers on construction equipment.

3.7 TRAFFIC AND TRANSPORTATION

State Route 80 and U.S. Highway 191 are the major transportation corridors through the area. State Route 80 branches off Interstate 10 (the main road to Tucson) at Benson and runs southeast to Bisbee. At Bisbee it passes through the Mule Mountains toward the U.S./Mexican border then runs east to west roughly parallel with the U.S./Mexican border before heading northeast toward New Mexico. U.S. Highway 191 runs north to south through the center of Sulfur Springs Valley. These roads are predominantly single-lane in each direction with minimal shoulder area. State Route 80 widens to double-lane in each direction for about a two-mile stretch outside of Douglas toward Bisbee. State Route 80 is the main road to Tucson, but because of the sparse population, traffic volume on the road is generally light.

Douglas is a major U.S./Mexican border crossing and therefore a transportation route to Mexico from the United States. Pan American Drive, the entrance road from Douglas to Agua Prieta, is a modern double lane road for about a one-mile stretch between State Route 80 and the border crossing. Between 160,000 and 200,000 vehicles per month crossed the border from June 2005 to January 2006. Traffic delays on both the north and south sides of the border can occur as vehicles undergo border inspections, but there is more than sufficient roadway north of the border to accommodate backups.

3.7.1 Environmental Consequences

3.7.1.1 No Action Alternative - 1

Douglas, Arizona

The implementation of the no action alternative for the proposed project will have no impact on traffic and transportation in the United States.

Agua Prieta, Sonora

Existing traffic and transportation would not change because construction activities associated with the proposed improvements would not occur. Presently no more than 10 percent of the streets within the proposed projects area in the south sector of the City of Agua Prieta are paved, while the remainder lack pavement infrastructure, which in part, depending on wind direction and intensity, would continue to contribute to the non-attainment of the PM-10 ambient air quality standard for the City of Douglas. Associated air quality issues would probably remain the same with the implementation of the No Action Alternative.

3.7.1.2 Action Alternatives – 2 &3

Douglas, Arizona

The projects will have no impact on traffic and transportation in the United States. Construction workforce will be made up of Mexican workers who will not be using U.S. roads. Transportation for workers will be provided within the city of Agua Prieta.

Although unrelated to the projects, the expected initiative by the city of Agua Prieta to eventually pave some of the currently unpaved streets within the proposed project area is expected to have a positive impact on U.S. air quality. The City of Agua Prieta has been working closely with the city of Douglas, Arizona to lay out and implement a plan to pave priority streets in Agua Prieta. This initiative may extend to the south sector of the City. Douglas has assisted Agua Prieta in preparing grant applications to the Border Environment Cooperation Commission for funding on transportation projects. Douglas, which has its own municipal asphalt plant, has agreed to provide paving material to Agua Prieta at affordable costs in order to expand the amount of paving in Agua Prieta as much as possible.

Agua Prieta, Sonora

Closing of a roadway or street avenues may be required during times of construction and will inconvenience the users of the City of Agua Prieta roads in the project area. Construction of the proposed projects will not affect the long-term automobile, railroad, or air traffic patterns and the time of the closing of roads will be for only a few hours. No new roadways will be constructed as a result of the proposed action's construction work.

3.8 SOCIO-ECONOMIC CONDITIONS

3.8.1 Demography

Cochise County had an estimated 2004 population of 130,220[19]. It is the seventh largest of 14 counties in the state. Forty-one percent of the population (53,390 people) lives in unincorporated, predominantly rural parts of the County. The largest city is Sierra Vista with a population of 42,805[20]. Douglas is the second largest city with a population of 16,740[21]. Bisbee is the county seat and has a population of 6,390. The small Mexican-American community of Pirtleville, which is located about 2 miles west of Douglas, had an estimated 1990 population of 1200. The population of Douglas is predominantly Hispanic (86%) or Mexican (71.6%). Population age is fairly evenly distributed amongst age groups.

3.8.2 Economic Activity

Douglas' economy has been undergoing a significant transition in its economic base over the past twenty years. Historically, mining was the major source of employment in the city. When the Phelps-Dodge Reduction Works closed in 1987 an estimated 800 people were put out of work. The Phelps-Dodge Company also moved its corporate headquarters, formerly in Douglas, out of the area. A period of high unemployment followed. Today Douglas still has the highest unemployment rate in Cochise County, but a record low of 8.3% in August 2001 is down from a high of 16% in January 1998.

Today, the public sector is the major employer in the Douglas area. About 2800 people work in local, state, county, or federal government jobs. The recent push to curtail the entrance of illegal

[19] http://www.azcommerce.com/doclib/commune/douglas.pdf (Cochise County)
[20] http://www.azcommerce.com/doclib/COMMUNE/sierravista.pdf (Sierra Vista)
[21] http://www.azcommerce.com/doclib/commune/douglas.pdf (Douglas)

aliens across the border has meant an increase in the number of border patrol agents. Currently, about 500 border patrol agents are stationed at the Douglas Border Patrol station. The Arizona state prison employs just over 700 workers and Cochise College employs 835 workers.

Since the closing of the Phelps Dodge Reduction Works in the late 1980s, the economy of Douglas has become more closely connected with the growth of Agua Prieta. The official population of Agua Prieta was estimated in 2000 at 60,420 people.

One reason for the rapid growth of population in Agua Prieta is the establishment of *maquiladoras*, which are American headquartered factories with manufacturing plants in Mexico near the border. The expansion of these plants, population growth, and the stability of the Mexican peso have had a positive impact on Douglas' economy. The result is that portions of Douglas's economy are closely tied to the economy of Agua Prieta and Mexico. Douglas is a major port of entry into the United States from Mexico. From June 2005 to January 2006, between 250,000 and 360,000 people, predominantly of Mexican origin, crossed the border between Mexico and the United States through Douglas every month. A large number of these entries were to purchase goods and services in the city of Douglas. An estimated 30 to 40 percent of all retail sales in Douglas are attributable to Mexican consumers who cross the border, some on a daily basis, to purchase goods in the United States. Douglas businesses, including major national store chains such as Kmart, Wal-Mart, and Safeway have located within the first five blocks north of the border in order to cater to Mexican consumers. Clothing and apparel are the major items purchased, but there are significant sales in automobiles, auto parts, building materials, and food. Over the past seven years the growth in retail sales establishments has outpaced all other business types in the community. For some of these businesses up to 70% of all sales are attributed to Mexican consumers. In 2003, Mexican consumers spent an estimated $38 million in Douglas on retail and food purchases.

Agriculture is a significant contributor to Cochise County's overall economy. A 1997 survey of agriculture in Cochise County showed 824 farms. Cattle ranching was the predominant activity both in the number of farms (59% raise cattle and calves) and revenues (approximately $17 million). Food crops, such as sweet corn, vegetables, and melons, were the second most valuable farm products in the county ($16,546,000). There is also significant cultivation of crops for animal feed.

3.8.3 Housing

There are 4,526 occupied housing units in Douglas. Sixty percent of them are owner occupied and 40% are rental units. The vacancy rate in the rental market is 12%. Two bedroom units with about 1100 square feet rent for about $500 per month. The vacancy rate is high in the existing units. However, in order to provide more high-end units to accommodate the recent increase in well paying jobs for government workers, such as border patrol agents and prison workers, the city of Douglas recently completed an 80-unit, market rate rental housing development. High end, premium two-bedroom units in this complex rent out at $695 per month. One-bedroom units rent out at $495 per month.

3.8.4 Environmental Consequences

3.8.4.1 No Action Alternative - 1

Douglas, Arizona

With the implementation of the no action alternative, the number of jobs and the total workforce in the area of concern would remain the same. Therefore, no impact on local economy in the City of Douglas would occur with the implementation of the no action alternative.

Agua Prieta, Sonora

With the No Action Alternative, the total workforce in the area would remain about the same. Therefore, no impact on local employment or the economy would occur with this selection. Demand for housing and vacancy rate would not be expected to change with the implementation of the no action Alternative.

3.8.4.2 Action Alternatives – 2 & 3

Douglas, Arizona

Demography

Construction of the proposed action alternatives will not have an impact on the Douglas or southern Cochise County population. An estimated 100 workers will be employed during construction. These will consist mainly of Mexican workers, most of whom already reside in the city of Agua Prieta. Some specialty trade workers are expected to move to the area during construction.

Economic Activity

The influx of jobs to the Agua Prieta area due to the implementation of the proposed action alternatives, although relatively low compared with the total employed population in Agua Prieta, should have a small but positive impact on the Douglas economy. As described in Section 3.8.2 an estimated 30 to 40 percent of all retail sales in Douglas are attributable to Mexican consumers who cross the border, some on a daily basis, to purchase goods in the United States. It can be expected that some of the estimated 100 paid construction workers to be employed by the proposed action will travel to Douglas to shop.

Housing

Construction workers for the projects will be housed in Agua Prieta and therefore will not affect the availability or affordability of housing in Douglas or southern Cochise County.

Agua Prieta, Sonora

Demography

The number of jobs that the proposed projects would generate would be relatively low, and it is unlikely that a large number of workers and their families would relocate to the region as a result of the implementation of the proposed action. Therefore, there would be no impacts on

population in the region. Improvements to the wastewater collection system may create a more desirable place to live, which could result in a slight increase in population, but this increase would likely be less than significant.

Economic Activity

The implementation of the proposed action alternative would have minor positive impacts on the City of Agua Prieta economy. Under the implementation of the action alternative the number of temporary jobs that the project would generate would be relatively low. The total number of new jobs directly related to project construction and maintenance activities would be around 100, representing 0.44 percent of the total workforce in the area. Therefore, the construction activities associated with implementation of the proposed action alternative would also have minimal impacts on local employment.

Housing

It is assumed that the labor supply in the area is sufficient and construction workers would not need to relocate from outside the area to implement the proposed action. Because it is likely that most, if not all, construction workers would be local residents, demand for housing is not expected to change and the housing vacancy rate would not be affected. No significant impacts on housing would be expected with implementation of the proposed action alternative.

3.9 PUBLIC HEALTH

The majority of the wastewater generated south of the Janos – Cananea highway, which covers approximately 500 acres of established housing in the south sector of the City is not collected or adequately treated. Most of the untreated wastewater flows into the Agua Prieta River via open partially unlined canals, is diluted and used for irrigation, or is drained into open cesspools. Although evening prevailing winds, and ground and surface water direction carry odors and contaminants away from the area of concern, untreated wastewater has the potential to support a variety of microscopic and submicroscopic organisms and parasites that cause infectious and communicable diseases, many of which are potentially fatal. Although prevailing winds blow to the north during the day, the chance of people becoming infected by airborne organisms out of the wastewater sources is very slight. Among the most common organisms or parasites found in untreated wastewater are E. coli (*Escherichia coli*), cholera (*Vibrio cholerae*), hepatitis A (*Enterovirus ssp*), Giardia (*Giardia lamblia*), Cryptosporidium (*Cryptosporidium parvum*), and helminth eggs. People can become ill by drinking water contaminated with these organisms or parasites, by eating raw or undercooked foods that have been in contact with contaminated water, and by poor personal sanitation that allows the spread of diseases either directly or indirectly through interhuman contact.

Current health concerns are associated with discharges of raw sewage in the neighborhoods, either from failing septic systems or open cesspools. The City is also concerned about health issues associated with a lack of reliable potable water sources for residents not connected to the municipal system.

Helmintiasis, an intestinal disease caused by helminth eggs, is the most common disease worldwide. In rural areas of Mexico, where untreated wastewater is used for irrigation, a study has shown that 43 to 94 percent of the population has intestinal helmintiasis (Cisneros et al. 1996). Although the Cisneros study was conducted in rural areas near Mexico City, the same

potential exist in Agua Prieta where crops are irrigated with diluted untreated wastewater. Wastewater provides organic matter and nutrients to the soil, increasing crop yields. However, the risk to the public health is increased due to the potential of transmitting parasites and protozoa such as helminth eggs and fecal coliforms to agricultural workers as well as consumers.

The close association between the populace of the "area of concern" (as represented by Douglas, Arizona) and Agua Prieta is indicative that communicable infectious diseases originating in untreated wastewater in Agua Prieta would affect the residents of Douglas, Arizona.
Approximately 5 to 7 percent of the working population of Agua Prieta crosses the border regularly to work. As mentioned in previous section 3.8.2. Economic Activity, of this EA, from June 2005 to January 2006, between 250,000 and 360,000 people crossed the border between Mexico and the United States through Douglas every month. Therefore, up to 12,000 people cross the border daily.

A diagnosis frequency analysis from the National Health System, from the Mexican Health Secretariat at the General Directorate of Epidemiology indicated that communicable diseases that caused acute diarrhea distress in patients from 2002 through 2005 in the "area of concern" were potentially attributed to waterborne causation in most cases. Although, the total number of communicable diseases diagnosed with acute diarrhea dropped 64% from 3,913 to 1,374 cases registered[22]. However, the potential risk to human health in the "area of concern" is exhibited by data that indicates residents from rural and semi-rural Mexican border communities, between 1990 and 1994, were almost three times as likely to die from communicable diseases as residents of the United States border communities (Pan American Health Organization 1999).

3.9.1 Environmental Consequences

3.9.1.1 No Action Alternative - 1

Douglas, Arizona

The health risk for waterborne disease in the area of concern would continue or potentially increase with the implementation of the no action alternative. Waterborne diseases would probably increase in the area of concern because of the expected increase in population and the lack of an efficient wastewater collection system. Implementation of the no action alternative could result in slight negative impacts to public health in the U. S.

Agua Prieta, Sonora

Implementation of the no action alternative would result in a continuation of public health and safety concerns within the project area in the City of Agua Prieta. Without proper maintenance, septic tanks will continue to fail and residents will not be able to replace them, unless they dig alternative containments to replace the saturated tank and thus solve their wastewater disposal needs. The small lot size typically found in the project area in southern Agua Prieta does not have room for replacement septic tanks and this may continue to result, as it has in the past, in sewage overflows coming from the septic tanks and reaching backyards and unpaved streets.

3.9.1.2 Action Alternatives – 2 & 3

Douglas, Arizona

[22] Servicios de Salud de Sonora, Hospital Integral Agua Prieta, Epidemiología – Expediente 11, 01/25/2006.

Impacts to public health are difficult to assess because of insufficient data to identify the initial source and vectors of the disease/illness. Untreated wastewater has the potential to support a variety of organisms and parasites that cause potentially fatal infectious and communicable diseases (Cisneros et al. 1996). The interactive populations would also be less likely to be impacted by waterborne communicable diseases resulting from exposure to contaminated water supply if the projects are implemented, resulting in a potentially positive indirect transboundary impact.

Agua Prieta, Sonora

Implementation of the proposed projects would likely decrease the health risk in the area. Untreated wastewater supports a variety of organisms that can cause infectious diseases. Potentially contaminated surface water and groundwater resulting from the leakage and infiltration from failing septic tanks and cesspools would be alleviated with the implementation of the proposed action alternative.

3.10 CUMULATIVE IMPACT

Cumulative impact, according to CEQ §1508.7**,** is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Implementation of this EA's proposed projects would still leave the City with more than 10,000 residents without wastewater collection and treatment services. It is reasonable to expect that the City intends to provide those services pending sufficient funds. These additional users will further burden an already compromised wastewater treatment facility and will most likely force an expansion. The combined impact of future collection system and possible treatment plant expansion to meet the unmet needs of the existing community would probably be minimal. Aside from the possible short term impacts due to construction, the broader implication would be positive because the unserved needs of existing residents would be addressed, thereby increasing the quality of the municipality's wastewater system effluent without increasing the quantity. It is unclear how or if these collection system expansion projects or others in the future would coincide with expansion of the local power plant. It is unlikely that availability of collected wastewater, whether treated or not, would be the limiting factor in any power plant expansion decisions.

Agua Prieta has embarked on a road paving project, which in the long term will reduce concentrations of PM10 in the affected area. However, in the short term, it is possible that the road paving in combination with the trenching associated with this EA's projects may produce local air quality impacts (both particulate matter and other contaminants due to fumes from construction equipment). The particulate impacts will be minimized with the use of conventional methods to keep dust down.

4.0 CONCLUSION

The NEPA guidance recommends that the evaluation of an action alternative should include consideration of means to reduce, or mitigate adverse environmental impacts. Mitigation measures are identified to ensure that an action does not create any significant adverse effects.

The identified potential negative or adverse effects associated with the implementation of the action alternatives could be minimized through the implementation of appropriate practices and technologies. Construction activities should be conducted in a manner sensitive to potential environmental impacts. Generation of dust and PM_{10} emissions should be minimized using appropriate and accepted methods. Construction activities should be limited to normal weekday working hours to minimize the potential effects to local residents associated with construction noise.

The following positive effects would be realized by implementing the proposed projects:

- Elimination of leakage and infiltration of untreated wastewater from cesspools into groundwater resources;
- Reduction of human pathogens in surface waters and in the shared transboundary environment and a concomitant reduction in community health risks;
- Reduction of offensive odors;

Therefore, this EA, prepared for the EPA in compliance with the NEPA, after considering a wide range of regulatory, environmental (both human and natural) and socio-economic factors, has identified no significant impacts to the environment resulting from the implementation of the proposed projects alternative.

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7.0 ACRONYMS

ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
AgI	Agricultural irrigation
AgL	Agricultural and livestock
A&W	Aquatic and Wildlife
A&Wc	Aquatic and Wildlife cold water
A&Ww	Aquatic and wildlife warm water
AQCR	Air Quality Control Region
AU	Arizona Upland

BECC	Border Environment Cooperation Commission
BMPs	Best Management Practices
BOD	Biological Oxygen Demand
C	Candidate
ºC	Degree Celsius
CAA	Clean Air Act
CFE	Comisión Federal de Electricidad
CONAGUA	Comision Nacional del Agua (National Water Commission)
CEC	Commission for Environmental Cooperation
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
Cfu/100ml	Colony Forming Units per 100 milliliters
CO	Carbon monoxide
COAPAES	Comisión de Agua Potable y Alcantarillado del Estado de Sonora
COD	Chemical Oxygen Demand
CWA	Clean Water Act
CWS	Community Water Systems
DWS	Domestic Water Source
E	Endangered
EA	Environmental Assessment
E. coli	Escherichia coli
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ER	Export Restricted
ESA	Endangered Species Act
gal/min	Gallon/minute
FBC	Full Body Contact
FNSI	Finding of No Significant Impact
FR	Federal Register
FSN	Fixed station Network
FWPCOA	Federal Water Pollution Control Act
GIS	Geographic Information System
IAQCR	Intrastate Air Quality Control Regions
IBC	International Boundary Commission
IBEP	Integrated Environmental Plan
IBWC	International Boundary and Water Commission
HR	Highly Restricted
HS	Highly Safeguarded
INE	Insitututo Nacional de Ecologica
INEGI	Instituto National de Estadistica Geografia e Informatica
Km	Kilometers
km^2	Square kilometers
LAPS	Land Acquisition Priority System
MCL	Minimum Contamination Level
ml	Milliliters
mgd	Millions of Gallons per Day
mg/l	Milligrams per liter
msl	Mean sea level
NAAQS	National Ambient Air Quality Standards
NADBank	North American Development Bank
NAFTA	The North American Free Trade Agreement

NESHAPS	National Emission Standards for Hazardous Air Pollutants
NEPA	National Environmental Policy Act
NPS	Non Point Source
NBEP	Northern Border Environmental Program
NNS	No Numeric Data
NSPS	New Source performance Standards
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWPCP	National Wetlands Priority Conservation Plan
O_3	Ozone
OOAPASAP	Organismo Operador de Agua Potable, Alcantarillado y Saneamiento de Agua Prieta
Pb	Lead (Pb)
PBC	Partial Body Contact
PM-10	Particulate matter
POTWs	Publicly Owned Treatment Works
ppm	Parts per million
PSD	Prevention of Significant Deterioration
PSI	Pollutant Standard Index
R.C.	Rio Colorado
SA	Salvage assessed
SEMARNAP	Secretaria de Medio Ambiente Recursos Naturales y Pesca
SNA	State Natural Area
SO_2	Sulfur dioxide
SpC	Species of Concern
SR	Salvage Restricted
STAT	Statute
T	Threatened
TSP	Total suspended particles
TSS	Total Suspended Solids
SWMU	Surface water monitoring Units
$\mu m/m_3$	Micrograms per cubic meter
U.S.C.	Unites States Code
U.S.	United States
*u*g/m3	Micrograms per square meter
USDOC	U.S. Department of Commerce
USGS U.S.	Geological Survey
USEPA U.S.	Environmental Protection Agency
USFWS U.S.	Fish and Wildlife Service
VOCs	Volatile organic compounds
WMA	Wildlife Management Area
WQA	Water Quality Act
WWTP	Waste water treatment plant