

VIII. IDENTIFICATION OF THE METHODOLOGY INSTRUMENTS AND TECHNICAL ELEMENTS THAT SUSTAIN THE RESULTS OF THE ENVIRONMENTAL IMPACT STATEMENT

VIII.1 PRESENTATION FORMATS

VIII.1.1 Location maps

In the annex “Maps” the following maps are included, where the project’s location can be observed.

TABLE VIII.1 LIST OF LOCATION MAPS

NAME	MAP
General Map	PHVE-1B-01, Map 1 from 2
General Map	PHVE-1B-01, Map 2-2
Affectation mosaic Map	PI-01

VIII.1.2 Photographs

In the annex “Photographic Report” a photographic sketch is included and the report includes photographs of the field survey.

VIII.1.3 Videos

No videos were recorded.

VIII.2 OTHER ANNEXES

a) – Legal Documents

The annex legal documents:

- Includes the Articles of Incorporation of the corporation agreement of Electricidad del Golfo S. de R.L. de C.V.
- Includes the owners list of the lands to be occupied

TABLE VIII.2 SURFACE AFFECTED BY THE RESERVOIR

NAME	HECTARES	SURFACE (m ²)
Adalberto Fermín Cano Lara	05-18-40	1,004.91
Delfino Lara Acatzihua	5-51-25	1,548.28
José Del Carmen Lara Hernández	5-41-50	1,060.96
Isidro Lara Cano	5-38-75	1,467.53
Isidro Lara Cano	5-47-31	1,124.22
Melecio Lara Hernández	6-38-00	2,192.52
Rosa Lara Cano	5-28-95	865.98
Adelaido Lara Dolores	05-03-00	1,062.78
Melecio Lara Hernández	21-86-00	8,460.16
Fidel, Honorio y Adelaida Tlaxcalteca Amayo	41-60-00	13,844.00
TOTAL		32,631.35

TABLE VIII.3 SURFACE AFFECTED BY THE PROPOSED INFRASTRUCTURE

No.	NAME	D. HORZ.	FROM KM	TO KM	SURFACE (m ²)
CONDUCTION TUBE					
1	Tomas Hernández Aurióles	150.000	0+000	0+150	3,000.00
2	Carmen Nopaltecatl Martínez	130.000	0+150	0+280	2,600.00
3	María Rosario Martínez Tiel	40.000	0+280	0+320	800.00
4	Joaquín Hernández Lara	200.000	0+320	0+520	4,000.00
5	Juan Zepahua Chimalhua	120.000	0+520	0+640	2,400.00
6	Crispín Tepole Xalamihua	180.000	0+640	0+820	3,600.00
7	Joaquín Hernández Lara	630.000	0+820	1+450	12,600.00
8	Rufino Martínez Núñez	320.000	1+450	1+770	6,400.00
9	Joaquín Hernández Lara	50.000	1+770	1+820	1,000.00
10	Leonor Martínez Sánchez	340.000	1+820	2+160	6,800.00
	TOTAL				43,200.00
TUNNEL					
1	José Carmen Lara Hernández	30.00	0+000	0+030	180.00
2	Delfino Lara Acatzihua	30.00	0+030	0+060	180.00
3	Alberto Fermín Lara Cano	30.00	0+060	0+090	180.00
4	Humberto Hernández Lara	50.00	0+090	0+140	300.00
5	Ezequiel Lara Hernández	50.00	0+140	0+190	300.00
6	Sidonio Lara Hernández	100.00	0+190	0+290	600.00
7	Hilario Lara Luna	150.00	0+290	0+440	900.00
8	Eduardo Cano Lara	50.00	0+440	0+490	300.00
9	Ezequiel Lara Hernández	150.00	0+490	0+640	900.00
10	Virgilio Gálvez Lara	200.00	0+640	0+840	1,200.00
11	Francisco Javier Hernández Quechulpa	200.00	0+840	1+040	1,200.00
12	Isidro Lara Cano	300.00	1+040	1+340	1,800.00

No.	NAME	D. HORZ.	FROM KM	TO KM	SURFACE (m2)
13	Anselmo Gálvez Muñoz	500.00	1+340	1+840	3,000.00
14	Luis Zopiyactle Núñez	100.00	1+840	1+940	600.00
15	Gaudencio Gálvez Muñoz	200.00	1+940	2+140	1,200.00
16	Jorge Luis Gálvez Hernández	200.00	2+140	2+340	1,200.00
17	Antonio Martínez Martín	450.00	2+340	2+790	2,940.00
	TOTAL				18,180.00
TRANSMISSION LINE EASEMENT					
1	Erasmó Delgado Guerra	421.038	0	421.038	9,262.836
	Camino	8	421.038	429.038	
2	Erasmó Delgado Guerra	654.613	429.038	1083.651	14,401.486
3	José Domínguez Mellado	355.000	1083.651	1438.651	7,810.000
4	Estela Domínguez Mellado	157.000	1438.651	1595.651	3,454.000
5	Juan Domínguez Contreras	533.940	1595.651	2129.591	11,746.680
6	Javier Domínguez Contreras	86.280	2129.591	2215.871	1,898.160
7	Tobías Pérez	69.043	2215.871	2284.914	1,518.946
8	Magdaleno Pérez Maldonado	154.036	2284.914	2438.950	3,388.792
9	Modesto Pérez Maldonado	61239	2438.950	2500.189	1,347.258
10	Guadalupe Pérez	64.562	2500.189	2564.751	1,420.364
11	Cipriano Domínguez Pérez	140.415	2564.751	2705.166	3,089.130
12	Adolfo Flores Sosa	261.584	2705.166	2966.75	5,754.848
13	Alejandro Alfaro González	308.635	2966.750	3275.385	6,789.970
	Camino	7.000	3275.385	3282.385	
14	Ramón Alfaro Guerra	25.130	3282.385	3307.515	552.860
15	Abundio Zavaleta Lara	500.206	3307.515	3807.721	11,004.532
16	Ma. Del Carmen Alfaro Hernández	269.387	3807.721	4077.108	5,926.514
17	Alberto Vargas Hernández	42.918	4077.108	4120.026	944.196
	TOTAL				90,310.572
POWER HOUSE AND SUBSTATION					
1	Héctor Domingo Mellado				968.36
2	Serafín Pilar Domínguez Alfaro				36,184.00
	TOTAL				37,152.36
PROPERTIES FOR LEFT OVER DEPOSIT					
1	Constantino Lara Tzanahua				10,000.00
2	Jesús Martínez Martín				12,283.67
	TOTAL				22,283.67

b) –Consulted cartography (INEGI, Secretaria de Marina, SAGAR, etc.)

Consultation to INEGI in digital and printed from of:

Orizaba Topographic Map	esc. 1: 50,000 E 14B67
Orizaba Topographic Map	esc. 1,250,000 E 1406
Mexico Edaphologic map National Coverage	esc. 1:1,000,000

Mexico Geologic Map National Coverage esc. 1:1,000,000
 Orizaba underground Hydrologic map esc. 1:250,000 E 1406

c) -Maps

The project includes in the Annex “Maps ” the following ones:

TABLE VIII.4 MAP LIST

NAME	MAP
General Map	PHVE-1B-01, Map 1 from 2
General Map	PHVE-1B-01, Map 2-2
Affectation mosaic Map	PI-01
Camp in the community of Puente de Porres (Power House)	s/n
Camp area	s/n
Affectation map	R-1A
Affectation map	R-2A
Affectation map	R-1B
Affectation map	R-2B
Geological Map	General and Details (Map 1)
Geologic section	River Reservoir Zone (Map 2)
	Dam wall axis (Map 3)
	Conduction Tunnel (Map 4)
	Pressure Tube (Map 5)

d) -Diagrams and other graphic material.

The other diagrams and images are included in the research body, as the same were needed.

e) – Satellite images (optional).

Downloads of images were used via Internet from Google Earth images © 2008.

- **Specification on your geographic reference based on the INEGI’S cartographic system and the relevant scale.**

For the preparation of images and maps digital data of INEGI, 2005 and of the National Statistic and Geography Information System (Sistema Nacional de Información Estadística y Geográfica) INEGI, 2008 were consulted.

• **Software in which it was processed.**

For the manipulation process of images and maps the programs Autocad, Power Point, Excell, IRWIS OPEN SOURCE and ARC VIEW 3.2 A were used.

f) - Results from the laboratory analysis

The result of the physical-chemical analysis corresponding to the amount of water of the Apatlahuaya river were the reservoir will be placed is included.

Muestra: Agua de Río, Punto de muestreo: -
Muestreo realizado por El Cliente (José Mario Gutierrez) el día Agosto 7 de 2008. Muestra recolectada con Recipiente de plástico de - 1 pza[s] (aprox. 5 lts.).

Fecha de Muestreo	Hora de Muestreo	ph (unidades de PH)	Conductividad (uS/cm)	Temp. Ambiente (°C)	Temp. Muestra (°C)
2008/8/7	15:00 hrs.	-	-	-	-

Observaciones muestreo: -

Tipo muestreo: Instantaneo **Tipo de Análisis:** FISICOQUÍMICO
Clave de identificación: 00037/AP/OR **Fecha de Ingreso:** Agosto 8 de 2008

"Estos Resultados Corresponden Únicamente a la Muestra Analizada"

Determinación	Resultado	Unidades	Límite	Referencia
Bicarbonatos	171,99	mg/L	N/A	NMX-AA-036-SCFI-2001
Carbonato (CO3)	0,00	mg/L	N/A	NMX-AA-036-SCFI-2001
Cloruros (como Cl-) •	8,93	mg/L	250,00	NMX-AA-073-SCFI-2001
Dureza Total (como CaCO3) •	137,56	mg/L	300,00	NMX-AA-072-SCFI-2001
pH	7,35	u. pH	6,5 - 8,5	NMX-AA-008-SCFI-2000
Sólidos Disueltos Totales	199	mg/L	1000	NMX-AA-034-SCFI-2001
Sólidos Suspendidos Totales	20	mg/L	N/A	NMX-AA-034-SCFI-2001
Sulfatos (como SO4=)	19,95	mg/L	400,00	NMX-AA-074-SCFI-1981

Observaciones: Límite Permisible según NOM-127-SSA1-1994. El resultado reportado como (<) "menor que" indica el límite de detección del método.

Muestra: Agua de Río, Punto de muestreo: -
Muestreo realizado por El Cliente (José Mario Gutierrez) el día Agosto 7 de 2008. Muestra recolectada con Recipiente de plástico de - 1 pza[s] (aprox. 5 lts.).

Fecha de Muestreo	Hora de Muestreo	ph (unidades de PH)	Conductividad (uS/cm)	Temp. Ambiente (°C)	Temp. Muestra (°C)
2008/8/7	15:00 hrs.	-	-	-	-

Observaciones muestreo: -

Tipo muestreo: Instantaneo **Tipo de Análisis:** ABSORCION ATÓMICA
Clave de identificación: 00037/AP/OR **Fecha de Ingreso:** Agosto 8 de 2008

"Estos Resultados Corresponden Únicamente a la Muestra Analizada"

Determinación	Resultado	Unidades	Límite	Referencia
Manganeso	0,01736	mg/L	0,15	NMX-AA-031-SCFI-2001

Observaciones: Límites permisibles de acuerdo a la norma NOM-127-SSA1-1994. El resultado reportado como (<) "menor que" indica el límite de detección del método.

Muestra: Agua de Río, Punto de muestreo: -

Muestreo realizado por El Cliente (José Mario Gutierrez) el día Agosto 7 de 2008. Muestra recolectada con Recipiente de plástico de - 1 pza[s] (aprox. 5 lts.).

Fecha de Muestreo	Hora de Muestreo	ph (unidades de PH)	Conductividad (uS/cm)	Temp. Ambiente (°C)	Temp. Muestra (°C)
2008/8/7	15:00 hrs.				

Observaciones muestreo:

Tipo muestreo:	Instantaneo	Tipo de Análisis:	FISICOQUÍMICO
Clave de identificación:	00037/AP/OR	Fecha de Ingreso:	Agosto 8 de 2008

"Estos Resultados Corresponden Únicamente a la Muestra Analizada".

Designación	Resultado	Unidades	Límite	Referencia
Calcio •	48,53	mg/L	N/A	3500-Ca Standard Method 20a.

Observaciones: Ninguna

SUMMARY

PHYSICAL-CHEMICAL FEATURES OF THE APATLAHUAYA RIVER

PARAMETERS	RESULTS				UNITS	NOM127-SSA-94
	APR-08	AUG-08	SEP-08	OCT-08		
Smell	Agreeable				Agreeable
Taste	Agreeable				Agreeable
Nitrates	3				mg/l	10
Calcium	52,48	48,53	52,57	54,26	mg/l	NA
Carbonate	14,34	0,8	0	0	mg/l	NA
Bicarbonates	130,18	171,9	154,96	136,01	mg/l	NA
Magnesium	25,56		2,91	3,1	mg/l	
Color	less 10				u-Pt-Co	20
pH	8,2	7,3	7,93	7,94	Unid	6.5 - 8.5
Temperature				16	°C	
Sulfates	17,68	19,9	27,08	17,09	mg/l	400
Total Hardness	141,16	137,5	141,55	146,43	mg/l	500
TDS	150	199	128	60	mg/l	1000
Chlorides	6,4	8,9	17,37	4,92	mg/l	250
Conductivity	286				mg/l	NA
Total solids	155	20	299	221	mg/l	NA
Manganese		0,01			mg/l	0,15
DBO				70	mg/l	
DQO				77,5	mg/l	

g) – Analysis and/or field works results

For the description of the physical, biotic and socio-economic environment field and acknowledgement visits were carried out in the zone where the project will be developed. Descriptive methods as of the specialized bibliographical consultation and the in field corroboration were used.

h) – Technical researches

It is not the case. The researches carried out were performed by contractors specialists in each subject.

i) Data tables.

The data tables are included within the development of each chapter as required for a better understanding of the project.

VIII.3 GLOSSARY OF TERMS

Agribusiness area: Land used for the agricultural production or the cattle breeding, which has lost the original vegetation due to the anthropogenic activities.

Industrial, urban equipment or services area: Urban land or land near a urban area, where a group of real properties, premises, constructions and movable properties are installed, and used to render urban services to the population and to develop economic activities.

Maneuver area: Area used for the pre-arming, mounting and dressing of support structures the dimensions of which depend on the kind of structure to be used.

Rural area: Zone with population nucleus frequently scattered, of less than 5,000 inhabitants. Generally, in these areas agribusiness activities are predominant.

Urban area: Zone featured by presenting concentrated human settlements of more than 15,000 inhabitants. In these areas the public administration, the organized commerce and the industry are settled and any of the following services is present: drainage, electric power and drinking water network.

Beneficial or prejudicial: Positive or negative.

Biodiversity: Is the variability of living organisms of any source, including, among others, the terrestrial ecosystems, marine ecosystems and other aquatic ecosystems and the ecological complexes from which the same are part; it includes the diversity within each species, among the species and the ecosystems.

Maneuver and patrolling gap: Strip of land located on the central axis of the right-of-way throughout the trajectory of the transmission line or electric sub-transmission, used to transport personnel, materials and the equipment necessary for the construction works and for the surveillance and maintenance of the line during its operation.

Canal: The canals are works for the conduction of water impounded, from its source until the place where it will be used. The canals may be in the open, closed, without coating and coated with concrete.

Critical environmental components: Will be defined in accordance with the following criteria: fragility, vulnerability, importance in the structure and system function, presence of flora species, fauna species and other natural resources considered in any protection

category, as well as those importance elements from the cultural, religious and social point of view.

Relevant environmental components: Will be determined based on the importance that the system balance and maintenance have, as well as on the foreseen project-environment interactions.

Environmental damage: Occurs on any environmental element as a consequence of an adverse impact.

Damage to ecosystems: Is the result of one or more environmental impacts on one or several environmental elements or ecosystem processes that break out an ecologic unbalance.

Gross damage to the ecosystem: It causes the loss of one or several environmental elements, that affect the structure or function, or that modifies the ecosystem's evolutional or successive tendencies.

Right-of-way: Is the strip of land located throughout each air line, the longitudinal axis of which coincides with the line's topographic outline. Its transversal dimension varies in accordance with the kind of structures, with the magnitude and lateral shifting of the arrow and with the operation electric tension.

Gross ecological unbalance: Substantial alteration of the environmental conditions, the ecosystems destruction, isolation or fragmentation.

Dike: Wall to contain fluvial or maritime water and to regulate the direction thereof.

Duration: The time the impact lasts; for example, permanent or temporary.

Difficult regeneration species: The species vulnerable to the biological extinction due to the specificity of their habitat requirements and of the conditions for their reproduction.

Fluvial: Relative or pertaining to rivers.

Environmental impact: Modification of the environment caused by human or nature action.

Accumulative environmental impact: El effect in the environment resulting from the increase in the particular actions' impact caused because of the interaction with others occurred in the past or that are happening in the present.

Residual environmental impact: The impact persisting after the application of mitigation measures.

Significant or relevant environmental impact: The one resulting from the human or nature action, that provokes alterations in the ecosystems and their natural resources or to the health, hindering the existence and development of humans and of the other living beings, as well as the continuity of the natural processes in which accumulative, synergic and residual impacts to be caused are foreseen.

Synergic environmental impact: The one produced when the collective effect of the simultaneous presence of several actions implies an environmental incidence greater than the addition of the individual incidences separately contemplated.

Importance: Indicates how significant the impact's effect in the environment is. The following is considered in connection thereto:

- a) The status of the environmental elements or components that will be affected.
- b) Relevance of the affected function(s) in the environmental system.
- c) The site's environmental quality, the impact's incidence in the deterioration processes.
- d) The environmental capacity expressed as the impact assimilation potential and the system's regeneration and self-regulation capacity.
- e) The degree of concordance with the land uses and/or of the current and projected natural resources.

Irreversible: The effect of which implies the impossibility or extreme difficulty to return through natural means to the situation existing before the action producing the impact was performed.

Transmission line: Is the one that conducts the electric power with tensions of 161 (one hundred sixty one) kV or more.

Magnitude: Impact's extension in respect to the influence area throughout the time, expressed in quantitative terms.

Compensation measures: Group of actions the purpose of which is to compensate the environmental damage caused by the environmental impacts associated with a project, thereto helping to reestablish the environmental conditions prevailing before the project's activities were carried out.

Prevention measures: Group of actions to be executed by the petitioner to avoid foreseen effects of environmental damage.

Mitigation measures: Group of actions to be executed by the petitioner to mitigate the environmental impact and to reestablish or compensate the environmental conditions prevailing before the perturbation to be caused with the performance of a project in any of its stages.

Contention wall: Its function is similar to a dike, that allows the damming of water corps or also to avoid the sliding of soil or another material.

Impact's nature: Refers to the beneficial or adverse effect of an action on the environment.

Conduction works: Are works required for in order to transport water impounded, from the source to the storage, regulation, treatment or distribution place.

Pluvial: Relative to rain.

Storage Dam: These dams, as indicated by its name, have the function to store water to be a reliable supply of the water source throughout the year, specially in dry seasons. It has a

multiple function and may be useful to irrigate agriculture zones, to be supplied to industrial and urban zones and to produce electric power, mainly. They are established by intercepting the dripping of a permanent flow, so the continuous filling of the dam is ensured.

Reservoir: Synonym of dam or reservoir.

Reversibility: Occurs when the alteration caused by the impacts generated by the performance of works or activities on the environment may be assimilated by the environment due to the functioning of natural processes of ecologic succession and of the environment's self-depuration mechanisms.

Environmental system: Is the interaction among the ecosystem (abiotic and biotic components) and the socio-economic sub-system (including the cultural aspects) of the region where the project intends to be established.

Total surface: Sum of the surface per stretches (stretch's length times the right-of-way).

Natural vegetation: Group of arboreal, shrub-like and herbal elements present in the area to be affected by the electric infrastructure works and those associated thereto.