

環境チェックレポート

(1) プロジェクト名

水力発電プロジェクト

(2) 実施場所

コロンビア共和国 アンティオキア県

(3) プロジェクト概要

水力発電所を建設するもの。

(4) カテゴリ分類

カテゴリ「A」

(5) カテゴリ分類の根拠

本事業は、環境ガイドラインに掲げる影響を及ぼしやすいセクター、影響を及ぼしやすい特性及び影響を受けやすい地域に該当するため。

(6) 環境許認可

同国制度に基づきEIAが作成され、環境・住宅・国土開発省（MAVDT）により承認されている。

(7) 汚染対策

工事中の大気質及び操業中の水質の計画値は、現地基準を満たす。

(8) 自然環境面

サイト周辺には貴重種が確認されているが、発見された場合には適切な対応により保護、移動される。

(9) 社会配慮面

本プロジェクトにより発生する住民移転は、環境許認可取得の際に MAVDT により承認された移転プログラムに従って行われる。

(10) その他・モニタリング

工事中は、大気質及び騒音につきモニタリングを行う。操業中は水質、生態系及び移転対象住民の生活状況につきモニタリングを行う。

以上

## Questions

**Q1.** Please provide the address of the project site.

Address of the project site : Amalfi, Anorí, Gómez Plata and Guadalupe, Antioquia, Colombia  
Antioquia, Colombia

**Q2.** Please provide brief explanation of the project.

The site of the Porce III hydroelectric project is on the Porce River, approximately 147 km northeast of the City of Medellín, in the Department of Antioquia, in the jurisdiction of the towns of Amalfi, Anorí, Gómez Plata, and Guadalupe.

The Project consists of the impoundment of the Porce River by construction of a 151 m-high CFRD dam with a 400 m-long crest, with its spillway built on the left abutment, having a discharge capacity of 11,350 m<sup>3</sup>/s, controlled by four radial gates and a ski jump-type deflector. The general scheme is complemented by the dam diversion works, the low-level outlet and power generation components comprising the headrace tunnels and shafts, an underground powerhouse composed of two caverns (turbine-generator and trans-formers), ventilation, gate and cable galleries and a tailrace tunnel that returns the flow back to the Porce River through a dissipation channel. The powerhouse has an installed capacity of 660 MW distributed in four units, producing 4,254 GWh / year (3,444 GWh / year firm). The first generation unit is scheduled to enter into commercial operation in the second half of 2010; the rest during the 2011.

**Q3.** Will JBIC loan be applied to a new project or an executing project? In case of executing project, please inform the presence of strong claims by local residents.

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> New Project            | <input type="checkbox"/> Executing Project (with Claim) |
| <input type="checkbox"/> Executing Project (without Claim) | <input type="checkbox"/> Others (Please specify )       |

**Q4.** In case of this project, is it necessary to execute Environmental Impact Assessment (EIA) based on the laws or regulations? If necessary, please inform the progress of EIA.

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Required (Completed) | <input type="checkbox"/> Required (Under execution or under planning) |
| <input type="checkbox"/> Not Required                    | <input type="checkbox"/> Others (Please specify )                     |

**Q5.** In case that EIA is already completed, please inform whether EIA report is already approved based on the environmental assessment system or not. If EIA report is already approved, please provide the date and name of authorities of the approval.

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Approved (without condition) | <input type="checkbox"/> Approved (conditional)   |
| <input type="checkbox"/> Under approval process                  | <input type="checkbox"/> Others (Please specify ) |

Date of Approval : 16 May 2003 \_\_\_\_\_

Name of Authorities : Ministerio de Ambiente, Vivienda y Desarrollo Territorial \_\_\_\_\_

**Q6.** If environmental permit(s) other than EIA is required, please provide the name of required permit(s). Have you obtained required permit(s)?

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Obtained | <input type="checkbox"/> Required, but not obtained yet |
| <input type="checkbox"/> Not required        | <input type="checkbox"/> Others (Please specify )       |

Name(s) of required permit(s) : Environmental License (Ministerio de Ambiente, Vivienda y Desarrollo Territorial ) and Declaratoria de Utilidad Pública (Ministerio de Minas y Energía)\_\_\_\_\_

Q7. Will the loan be used for the undertaking that cannot specify the project at this stage (e.g. export or lease of machinery that has no relation with specific project, or Two Step Loan that cannot specify the project at the time of loan agreement)?

NO

If you answered "Yes", it is not necessary to reply to the following questions.  
If you answered "No", please reply to the following questions.

Q8. Are there any environmentally sensitive area shown below in and around project site?

YES

If you answered "Yes", please select applicable items by marking, and reply to following questions.  
If you answered "No", please reply to questions 9 and after.

- (1) National parks, protected areas designated by government (coastal areas, wetlands, habitats of minorities or indigenous populations, heritage sites, etc.)
- (2) Primeval forests, tropical natural forests
- (3) Ecologically important habitats (coral reefs, mangrove, tidal flats, etc.)
- (4) Habitats of endangered species of which protection is required under local laws and international agreements.
- (5) Areas that have risks of large scale increase in soil salinity or soil erosion
- (6) Desertification areas
- (7) Areas with special values from archaeological, historical and/or cultural viewpoints
- (8) Habitats of minorities, indigenous populations, nomadic people with traditional life style, or areas with special social value

Q9. Does the project involve following elements?

YES

If you answered "Yes", please describe the scale of applicable elements, and reply to the questions 10 and after.  
If you answered "No", please reply to questions 11 and after.

- (1) Involuntary resettlement (Number of resettlers: 2689 ) The total number of resettlers will be 494 families and 650 miners. So far, 474 families and 637 miners have been resettled. According to current schedule, it is expected to complete all the resettlements before the plant operation.
- (2) Pumping of groundwater (Scale: ton/year)
- (3) Land reclamation and/or development (Scale: 5200 ha)
- (4) Deforestation (Scale: 550 ha)

Q10. Please reply to this question only in case that the project involves some of the above (1) to (4) elements. In the country where the project is planned, are there any regulations on a scale of the elements asked in question 9? If the country has such regulation, please answer whether the project satisfies the regulation or not.

- Regulation is applicable ( satisfied  not satisfied)  No regulation  
 Others (Please specify )

The Colombian Ministry of Mines and Energy (Ministerio de Minas y Energía) shall proclaim the area required

for the construction of the Project as a public utility and social interest zone. This was done by means of Executive Resolution 050 del 16/April/2003. Then, according to regulations, a tripartite committee was established, composed of three members, one designated by the Colombian Agustín Codazzi Geographic Institute (Instituto Geográfico Agustín Codazzi), one designated by local communities and the third one designated by EPM. This committee agreed on and produced the "Unitary Prices Manual", which was validated and approved by the Ministry of Mines and Energy. The "Unitary Prices Manual" contains thorough criteria and prices to calculate prices of land, indemnifications, etc.

Before the commencement of works, the Colombian Ministry of Environment (Ministerio de Ambiente, Vivienda y Desarrollo Territorial) granted the Environmental License, by means of Resolution 0561, 16/May/2003, which contains the Environmental Management Plan (Plan de Manejo Ambiental -PMA). The resettlement program is included and was approved within this PMA.

Please reply to questions 11 and after.

**Q11.** Will JBIC share in the project be equal or less than 5% of the total project cost, or the total amount of JBIC loan equal or less than SDR 10 million?

NO

If you answered "Yes", it is not necessary to reply to the following questions.  
If you answered "No", please reply to questions 12 and after.

**Q12.** Does the project belong to either of the sectors that impact on the environment is deemed immaterial or is not anticipated under normal conditions (e.g. maintenance of the existing facilities, non-expansionary renovation project, acquisition of rights or interest without additional plant investment)?

NO

If you answered "Yes", it is not necessary to reply to following questions.  
If you answered "No", please reply to the questions 13 and after.

**Q13.** Does the project belong to the following sectors?

YES

If you answered "Yes", please specify the sector by marking, and reply to questions 14 and after.  
If you answered "No", it is not necessary to reply to the following questions.

- (1) Hydro power plant, Dam or water reservoir
- (2) Thermal power plant
- (3) Mines
- (4) Development of oil and gas
- (5) Pipeline
- (6) Steel industry (with large scale furnace)
- (7) No-ferrous metal refining
- (8) Petrochemical (including manufacturing of raw materials and petrochemical complex)
- (9) Terminal of oil, gas and chemicals
- (10) Petroleum refining
- (11) Paper and pulp
- (12) Manufacturing and/or transportation of hazardous substances (specified by international agreement)
- (13) Road, railway or bridge
- (14) Airport
- (15) Port
- (16) Waste material processing or treatment

- (17) Treatment of sewage and/or waste water that includes hazardous substances or executed at environmentally sensitive area
- (18) Power transmission and/or distribution lines (including large scale involuntary resettlement, large scale deforestation or submarine cable)
- (19) Tourism (Construction of hotel, etc.)
- (20) Forestry or tree planting
- (21) Agriculture (large scale project and/or project including irrigation)

**Q14.** Please provide information on the scale of the project (project area, area of plants and buildings, production capacity, amounts of power generation, etc.) Further, please explain whether an execution of EIA is required on account of the large scale of the project in the country where the project is implemented.

**Dam:**

Type: concrete face rockfill dam (CFRD)  
 Height: 151 m.  
 Crest length: 400 m.  
 Crest width: 8m  
 Total reservoir volume: 170 hm<sup>3</sup>.  
 Basin area up to the intake: 3 756 km<sup>2</sup>  
 Maximum operating level: 680 masl  
 Total foundation excavation volume: 110,000 m<sup>3</sup>  
 Total plinth excavation volume: 455,000 m<sup>3</sup>  
 Total dam rockfill volume: 4,136,000 m<sup>3</sup>

**Intake:** submerged; design flow: 235 m<sup>3</sup>/s. The minimum level of intake is 604 masl. The maximum operating water level is 680 masl. Then, the maximum intake submersion is 76 m.

**Spillway:**

Type: open channel (chute) controlled by 4 radial gates.  
 Location: left abutment.  
 Discharge capacity: 11 350 m<sup>3</sup>/s  
 Type of dissipation structure: ski jump deflector (radial).  
 Total Length: 730 m.  
 Width of the channel: 62 m.  
 Total excavation volume: 4,700,000

**Underground works:**

Underground conveyance works	Area (m <sup>2</sup> )	Length (m)
Dam diversion tunnel	98.4	667
Headrace tunnel	86.4	12,452
Lower headrace tunnel	86.4	274
Pressure shaft	83.3	159
Tailrace tunnel	93.4	828
Construction adit 1	32.1	521
Construction adit 2	32.1	649
Construction adit 3	32.1	705
Access tunnel	43.7	493

The powerhouse will have an installed capacity of 660 MW distributed in four units, producing 4.254 GWh / year (3.444 GWh / year firm).

According to Colombian law 99/1993, the Environmental License is required for Porce III Project. It was also required the EIA (Environmental impact assessment), which included the following aspects:

- Project description
- Environment description (physics, biotic and social)

- Identification of environmental impacts
- Evaluation of environmental impacts
- Management and Control of impacts (Environmental management actions, Monitoring plan, Contingency plan, Estimated cost of the environmental management plan)
- Public participation (information and consults with communities)
- Judgment by environment authorities (in order to get the environmental license).