

UNITED NATIONS

ECONOMIC COMMISSION
FOR LATIN AMERICA
AND THE CARIBBEAN



1948 - 1988

ECLAC

Distr.
LIMITED

LC/L.469
13 December 1988

ENGLISH
ORIGINAL: SPANISH

REPORT ON MEETINGS ON THE ENVIRONMENTAL MANAGEMENT
OF ECUADORIAN OIL AND NATURAL GAS PROJECTS

88-11-1635

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1. Introduction

The Economic Commission for Latin America and the Caribbean (ECLAC), working through its Joint Unit for Development and Environment ECLAC/UNEP, carried out the ECLAC/UNEP project entitled "Technical co-operation for integration of environmental considerations in development projects and programmes in Latin America and the Caribbean", between 1 March 1986 and 31 March 1988.

As part of this project, a work programme in environmental management in petroleum and natural gas projects, was designed and carried out in Ecuador by the Department of the Environment (DIGEMA) in the Ministry of Energy and Mines, advisory services being provided by ECLAC.

This document presents a summary of the results of two seminars and of the Colombia/Ecuador Meeting on the Environmental Dimension in Petroleum Exploitation. The three meetings were held under the ECLAC/DIGEMA work programme. The respective reports on them are reproduced in annexes 1, 2 and 3 to this document.

2. Objectives of the work programme

The general objectives of the work programme in Ecuador were:

- To strengthen the institutional capacity of the Department for the Environment of the Ministry of Energy and Mines of Ecuador with a view to incorporating the environmental dimension into the management of the development of key sectors of national activity, including petroleum and natural gas, mining, and water energy projects.
- To strengthen the professional capacity of the DIGEMA team of officials in the area of evaluation and environmental management of the sectoral projects in their purview, and in coming up with alternatives for minimizing environmental deterioration and for mobilizing available intersectoral resources in order to ensure that the areas affected benefit as much as possible from the activities carried out in them with regard to the extraction of oil and natural gas.

3. Stages of the work programme

The ECLAC/DIGEMA programme of work was divided into five major stages in the following order:

1. Selection of the case to be studied. For the purpose of making a general diagnosis, the geographical sequence of the production line (Shushufindi-pipeline-Esmeraldas Terminal) was observed, and the Shushufindi area was chosen for an in-depth, on-site exercise.

2. Environmental statement exercise. This consisted in conceptualizing and making a qualitative analysis of the environmental effects of the petroleum and natural gas industry in the area. To identify these effects, a seminar was held on 15 and 16 July 1987; in it matrices were devised to show the relationship between the components of the environment and the phases and components of the programme under review and these relationships were discussed. (See the report on the first seminar contained in annex 1 to this paper.) The seminar was followed by meetings and analysis of the available bibliographical and cartographical information with a view to preparing a preliminary report on the study.

3. Field work: environmental study exercise. For the purpose of consolidating the preliminary diagnosis and acquiring more detailed knowledge of the zone of influence of the activities carried out at Shushufindi with regard to oil and natural gas (production, refining, secondary recovery of petroleum and the gas works) and taking into account the limited amount of information available, the work programme was designed on two fronts: the socioeconomic and cultural front and the biophysical front.

A group of experts in the field was formed to develop each of these two approaches. Experts from the Ecuador Museum of Natural Sciences a branch of the Cultural Centre of Ecuador (Museo de Ciencias de la Casa de la Cultura Ecuatoriana), participated in the biophysical study, while the socioeconomic and cultural aspects of the programme were broached through contacts with the rural and urban community of the Centre of Shushufindi and interviewing the staff of various governmental and non-governmental units which work in the area. The background material obtained was compared with the secondary data processed in the previous stage.

4. Proposal for an environmental management plan. An environmental diagnosis of the area was prepared on the basis of the findings obtained in the first three stages. That study provided the background material for a second seminar held from 29 September to 1 October 1987 to discuss formulas for solving problems detected and the proposals made in respect of environmental management. (See the report on the second seminar contained in annex 2.) The presence of representatives of various social organizations and groups at this seminar meant that consideration could be given to operating mechanisms and their legal and institutional aspects in order to make the proposals viable.

5. Revision and presentation of results. With the results of the second seminar in hand, the DIGEMA team of professionals set out to draw up a proposal for an appropriate environmental protection, research and management policy with regard to petroleum projects in the Amazon region. To this end, they proceeded to prepare more detailed specifications concerning the measures proposed and to estimate the costs of putting them into practice and the inputs required in that connection.

The programme was structured in such a way that it was possible to prepare a study incorporating the environmental diagnosis, the study on environmental impact and the proposed environmental management plan. DIGEMA plans to present these documents officially at an inter-agency meeting.

4. Appraisal and conclusions of the seminars

The meetings made a valuable contribution to the achievement of the objectives of the ECLAC/DIGEMA programme on environmental management in oil and natural gas projects. The participation of professionals in various disciplines from a number of institutions made it possible to increase the understanding of the various aspects of the quest to ensure sustainable development where petroleum activities are being carried out.

The participants shared their knowledge and experience in the debates. Not only was this mutually beneficial, but --and this is particularly important in an integrated effort-- it made it possible for them to identify and evaluate the environmental effects of the petroleum industry in specified zones of influence and also to pinpoint the environmental indicators most appropriate for the study.

The meetings contributed to the institutional strengthening of DIGEMA and fostered horizontal co-operation among institutions in the purview of the Ministry of Energy and Mines and other bodies operating in the project zone. The experiences exchanged created greater awareness of the need for smooth and continuous communication among agents of the private sector, the community and the institutions related to the planning and implementation of development programmes and projects. This is basic to the fulfilment of the plans and programmes of the national government and relates to their sustainability and to the contribution they make to a better quality of life in the area covered.

The seminars were a pioneer experience in Ecuador insofar as the dissemination of information about the nature and modes of operation of environmental studies is concerned. The statements made by the ECLAC advisor and the work done in interdisciplinary groups made it possible to integrate methodological concepts and considerations into the exchange of professional experience among the participants. Emphasis was placed on the advantages of incorporating environmental studies at their various levels (statement of impact, environmental diagnosis, and management plans) into studies of development projects which change the environment in which they are carried out significantly.

In addition, it became clear that there was a need to construct a legal framework to ensure that efficient environmental management was provided in development projects, both public and private. The debates showed up the constraints experienced in this connection as a result of the absence of adequate inter-agency co-ordination.

Great importance was given to initiatives to incorporate educational mechanisms for spreading and promoting the acquisition of knowledge about the environment throughout the educational system, especially at the university

level. Another matter brought to the fore in the meetings was the need to promote adequate forms of community participation in which non-governmental organizations play an important role.

In view of the value of the exercise, it was recommended that the results of the ECLAC/DIGEMA programme on environmental management in oil and natural gas projects should be disseminated widely and that an attempt should be made in the future to conduct similar exercises in sectors such as mining and hydroelectricity.

Annex 1

FIRST SEMINAR:

"IDENTIFICATION AND ASSESSMENT OF ENVIRONMENTAL EFFECTS"Place and date

On 15 and 16 July 1987, the seminar on identification and assessment of environmental effects was held at Quito in the auditorium of the Ecuadorian Institute for Educational Credit and Scholarships (IECE).

Attendance

The meeting was attended by 41 persons from various national institutions whose activities pertained to environmental studies on oil and natural gas projects.

Opening meeting

The meeting was opened by Mr. Nelson Suquilanda, Director-General for the Environment in the Ministry of Energy and Mines.

Agenda

The following items were considered at the meeting:

- a) Presentation of the ECLAC/DIGEMA programme on environmental management in oil and natural gas projects.
- b) Importance of studies and plans relating to environmental management and their characteristics.
- c) Technical geophysical description of petroleum projects.
- d) The identification of the environmental effects of selected oil and natural gas projects.

Summary of the work of the Seminar

The debates at the Seminar were moderated by Mr. Carlos Fonseca, ECLAC Advisor for the ECLAC/UNEP project "Technical co-operation for integration of environmental considerations in development projects and programmes in Latin America and the Caribbean". On the DIGEMA side, Mr. Arturo Hernández and Ms. Julia Vera de Bonilla helped to co-ordinate the meeting.

First, Mr. Arturo Hernández introduced the CEPAL/DIGEMA programme on environmental management in oil and natural gas projects.

After Mr. Hernández' introduction, Mr. Carlos Fonseca noted the importance of environmental studies and the design of environmental management plans and gave a description of them. In addition to introducing the methodological and institutional aspects of the studies, he explained the role which the seminar should play in the context of the CEPAL/DIGEMA programme. He suggested that its primary objective was to promote the increase of knowledge concerning the relationship between the oil and natural gas projects selected and the natural and human environment of their zone of influence and also to obtain an assessment of the effects of such projects through an exchange of information and opinion in the multidisciplinary group present at the meeting.

Mr. Arturo Hernández, one of the DIGEMA co-ordinators, was responsible for giving a geophysical description of the petroleum activities analysed, a task he performed using photographic support material. He covered the following points:

- The Shushufindi production field, in Napo Province in Ecuadorian Amazonia, consisting in facilities for the refining and secondary recovery of petroleum and a commercial gas-works.
- The Trans-Ecuador pipeline (SOTE), which crosses Ecuador from east to west (with special attention given to the zone affected by the earthquake of 5 March 1987).
- The Balao terminal and the Esmeraldas refinery, on the Pacific coast.

The seminar then met in interdisciplinary groups made up of representatives of the various institutions taking part in the meeting. The following tasks were performed:

- Detailed description of the sequence of activities carried out in the petroleum projects (seismic and geological exploration, exploratory drilling, development of production wells, piping and refinery facilities, etc.).
- The preparation of guidelines as regards the relationship between petroleum activities carried out in the area under consideration and its environment.
- The preparation of guidelines for dealing with conflicts among the different socioeconomic and cultural sectors in the area influenced by the project concerning the use of natural resources.

On the basis of the results of the tasks outlined above, a list was drawn up of the effects of oil and natural gas activities on components of the environment in the areas affected by the project and specifically on biotic, water, geospheric and atmospheric components.

The participants were asked to fill in a form for assessing the effects identified by the group, taking the following factors into account, in each case: first appearance, type, duration, probability, area affected, tendencies, intensity and implications. The replies were later sent to DIGEMA for processing. A matrix was prepared containing a summary of the answers, and it constituted the base used in verifying the environmental effects initially hypothesized, which are contained in the environmental diagnosis in the study resulting from the ECLAC/DIGEMA programme.

The seminar was thought to be especially valuable in establishing a common environmental frame of reference for all the participants, given the variety of their professions, experience, and degree of knowledge of the area covered by the study.

Annex 2

SECOND SEMINAR:

DESIGNING A PLAN RELATING TO ENVIRONMENTAL MANAGEMENT FOR OIL AND
NATURAL GAS PROJECTS IN THE SHUSHUFINDI-AGUARICO AREAPlace and date

The second seminar was held from 29 September to 1 October 1987, at the site of the Youth Foundation (Fundación Mundo Juvenil) in Quito.

Attendance

It was attended by 48 persons, most of them from institutions which had been represented at the first seminar.

Opening and closing meetings

Mr. Manuel Horra the Under-Secretary for Mines, was responsible for the opening meeting. Mr. Nelson Suquilanda, Director-General for Environmental Affairs in the Ministry of Energy and Mines, welcomed the participants and was in charge of the closing ceremony.

Agenda

The following items were considered:

- a) Characteristics of oil and natural gas exploration and exploitation in the Shushufindi-Aguarico area.
- b) Socioeconomic and cultural dimensions of petroleum projects.
- c) Findings obtained by processing the forms used at the first seminar for identifying and assessing effects.

Summary of the work of the Seminar

As in the first seminar, the debates were directed by Mr. Carlos Fonseca, an ECLAC Advisor, who was supported in his task by Mr. Arturo Hernández Proaño and Ms. Julia Vera de Bonilla from the staff of DIGEMA.

Consideration was given first to the technical and planning aspects of petroleum production in the Amazon region, with special reference to the Shushufindi area. Statements were made by Mr. Marco Olmedo, Mr. Carlos de

Soto and Mr. José Reina of the National Department of Hydrocarbons (DNA) and centred on the following points:

- Petroleum reserves of Ecuador: developed, undeveloped, proven, probable and possible.
- Procedures for identifying reserves.
- Importance of the management of deposits.
- Technologies used in artificial lifting and secondary recovery of petroleum production wells.
- Characteristics of the secondary recovery processes found at Shushufindi.

Secondly, consideration was given to the socioeconomic and cultural dimensions of petroleum projects. The item was introduced by Ms. Ana María Oquendo, an advisor in the Ministry of Energy and Mines. She referred to methodological approaches borrowed from sociology which provided alternative ways of interpreting the socioeconomic aspects of the processes of environmental deterioration occurring in the Shushufindi area. Mr. Carlos Viteri, representing the Confederation of Indigenous People from the Amazonian region of Ecuador (CONFENIAE) and Mr. Jorge Trujillo, from the Catholic University at Quito, participated in the debate held under this item.

The participants also considered the processed results of the forms used at the first meeting for identifying and assessing environmental effects. Subsequently, the integration of the technical and the socioeconomic and cultural aspects of the environmental study for the Shushufindi area was discussed in the light of the contributions made in the debates in the past few days.

As a follow-up on the second seminar, workshops were held within DIGEMA to process the results of the seminar and to design the socioeconomic and environmental survey for the Shushufindi area. An attempt was made to focus the research done in the field on factors related to the flow of energy and materials and to productivity, the constraints encountered and the degree to which the urban and rural inhabitants of the area perceive the reality of the situation. As a result of the workshops, two types of survey were designed, one for the urban sector, where the economy is at the secondary and tertiary levels and the other for an economy which is basically rural and primary. Both were used in the field work provided for in the ECLAC/DIGEMA work programme.

Annex 3

COLOMBIA/ECUADOR MEETING ON PETROLEUM
AND THE ENVIRONMENTPlace and date

The Colombia/Ecuador meeting on petroleum and the environment was held on 5 August 1988 in the facilities of the Pichincha Provincial Council.

Attendance

It was attended by some 40 persons whose work related to the petroleum industry or the universities. Many of them had participated in the seminars whose reports are contained in annexes 1 and 2. Also present were representatives of the Diplomatic Corps, ministers of State and executives and technicians from the petroleum companies operating in the country.

Opening ceremony

The meeting was opened by Mr. Manuel Horra, Under-Secretary for Mines of the Ministry of Energy and Mines of Ecuador, and by Mr. Rafael Caicedo Espinosa, the Ambassador of Colombia in Ecuador.

Summary of the debates

The purpose of the meeting was to provide the participants with information on the experience acquired in Ecuador and Colombia with regard to environmental management of petroleum projects.

During the opening ceremony emphasis was placed on the co-operation between the two countries in petroleum activities, and, in particular to the recent joining of the trans-Ecuadorian pipeline to the Putumayo pipeline in Colombia in order to transport 55 000 barrels of crude per day to meet the emergency created by the earthquake of 5 March 1987. The participants were also informed of the initiation of joint petroleum exploration activities on the border between the two countries by the Ecuador Petroleum Corporation (CEPE) and the Colombian Oil Company (ECOPEIROL).

Environmental experiences in the field related to the petroleum industry in Ecuador were described by Mr. Nelson Suquilanda. Mr. Hernán Orjuela (sent to the meeting especially by Occidental de Colombia, Inc.) and Mr. Carlos Fonseca spoke on the specific tasks of the private and the public sector in the field of environmental management.

Mr. Orjuela described the environmental policies, strategies, programmes and projects implemented by the OXY-ECOPETROL-SHELL Association of Colombia, whose CAÑO-LIMÓN-COVENAS petroleum project, the largest in the country, comprised production fields, 800 kilometres of pipeline and a shipping port. He drew attention in particular to the organizational chart for environmental and industrial security and the budgetary allocation made to the activities carried out in that respect and to the procedure followed in meeting environmental emergencies.

Mr. Fonseca gave an analysis of the progress made in environmental management in the different sectors of the Colombian economy, referring, in particular, to the creation of offices dealing with the environment in the Ministry of Mines and Energy and the Ministry of Public Works and in decentralized agencies. He also explained the ways in which they operated and the institutional arrangements which had been made to facilitate the consideration of the environmental aspects of development projects.

The day after the meeting, at the request of the Minister of Energy and Mines of Ecuador, Mr. Orjuela addressed 25 officials of the Ministry, giving a detailed explanation of the contingency plan for the oil CAÑO-LIMÓN-COVENAS pipeline, which is now regarded as the most advanced pipeline in the world in terms of solving the difficulties presented by mountainous and tropical regions.

