Mexican Electoral
Districting

IFE
INSTITUTO FEDERAL ELECTORAL

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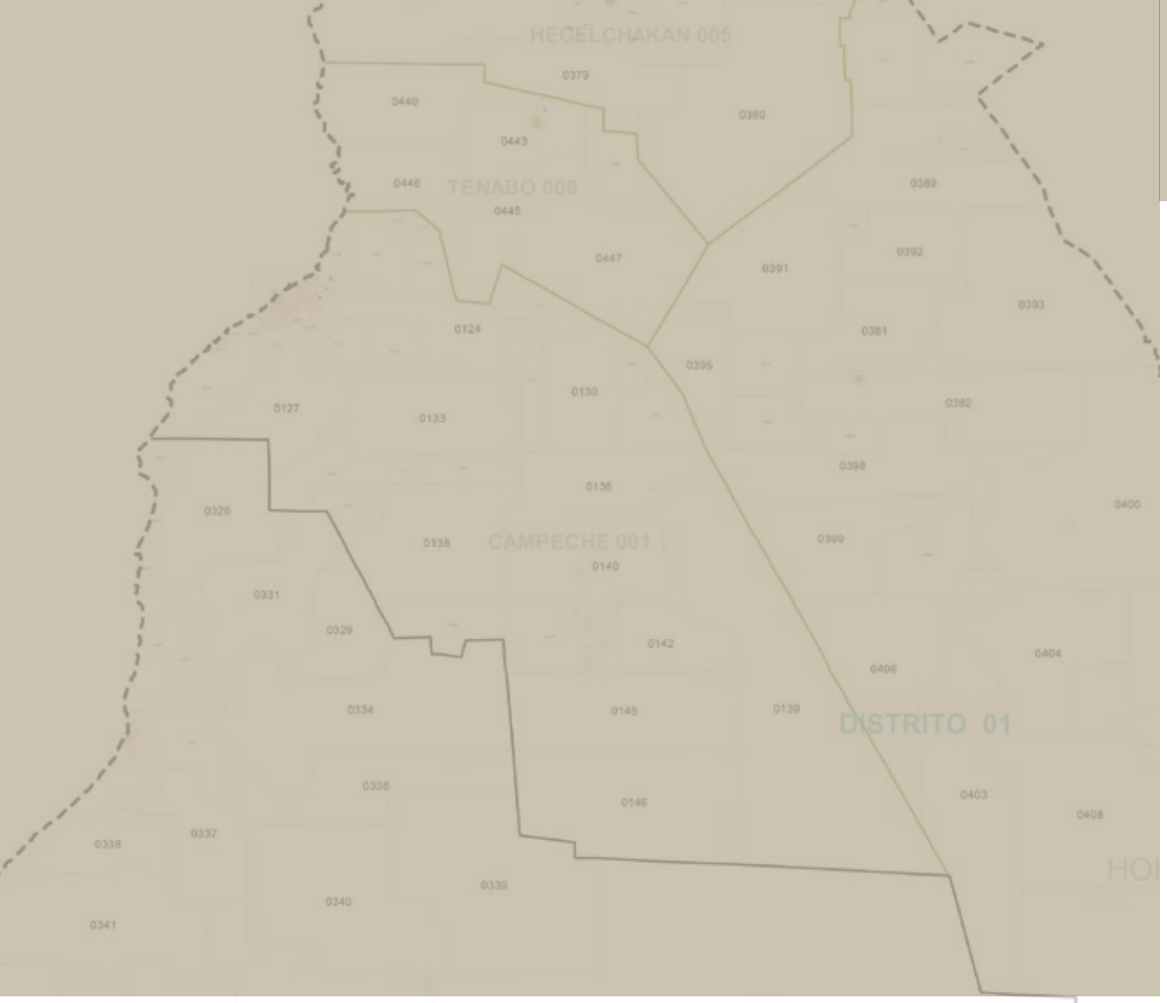

Mexican Electoral Districting

April 2009

Printed in México

ISBN 970-695-107-5

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FOREWORD

Currently, with a democratic aim, Mexico promotes free and plural competition amongst political parties, as well as the occurrence of elections to hold ordinances and public functions. The latest years of the political history of the country account for unprecedented democratic transformations which are reflected in its electoral system. Such an evolution is the reflection of a society with a new political culture, expressed through institutional changes and a new citizens' behavior, who witness a political transformation.

It is the duty of the institutions in charge of the organization and assessment of the elections, to match –in a transparent fashion to the eyes of the citizenship– the fundamentals of democracy to the everyday practice. Trusting the institutions is a key factor towards the legitimacy of the democratic processes and their results.

In 1990, by means of a number of constitutional reforms, it was determined that the organization of federal elections –operated by the State and exercised by the Executive and Legislative Branches, with political parties and citizenship participation,– would be carried out by a public organization endowed with its own juridical personality and patrimony, and whose performance would be framed by the principles of certainty, legality, impartiality, objectivity and autonomy: the Federal Electoral Institute (IFE, by its acronym in Spanish).

In August, 1990, The Federal Official Gazette published the Federal Electoral Institutions and Procedures Code (COFIPE by its acronym in Spanish); it establishes that the IFE will be responsible for organizing the federal elections in order to renew the members of the Legislative and Executive Branches of the Union and the representatives to the Federal District Assembly, as an autonomous and permanent organization with electoral authority.

The Code points out that the main tasks of the IFE are to: contribute to the development of democracy; preserve the strengthening of political parties system; integrate the Federal Registry of Electors; assure that the citizens are able to exercise their political and electoral rights and watch the fulfillment of their obligations; guard the authenticity and effectiveness of the vote; and collaborate with the promotion and disclosure of the political culture.

The Mexican Political Constitution establishes in articles 50, 51 and 52, regarding the division of powers, that the Legislative Branch relies on a General Congress, which shall be divided into two Chambers, one of Deputies and one of Senators; that the Deputies Chamber or Lower Chamber shall be composed of representatives

of the nation, to be totally elected every three years and shall be conformed by 300 deputies elected by the principle of relative majority by means of a single-member electoral districts system, and 200 deputies elected by the principle of proportional representation, by means of a regional lists system elected within multi-member circumscriptions.

It is also a Constitutional mandate (article 53) the territorial delimiting of boundaries for the 300 federal single-member electoral districts and the 5 multi-member electoral circumscriptions within the country.

According to the COFIPE, the Executive Directorship of the Federal Registry of Electors (DERFE, by its acronym in Spanish), has, as one of its main duties, and based upon the research made, to outline the division of the national territory into 300 single-member electoral districts, as well as the 5 multi-member circumscriptions.

Districting is the process by which electoral circumscriptions are delimited, as a geographical electoral space in which a candidate is postulated and elected for an elective post, considering the number of inhabitants and geographical features of the territory. The key principle of districting is citizens' representation, through legislative authority under the principle of one citizen, one vote.

According to the current electoral legislation, to integrate the bodies of national popular representation, two principles or formulas are used: the first one is of relative majority and the second one of proportional representation. In the case of the Senate, the principle of first minority is applied to assign a seat in each state.

Under the principle of relative majority, the candidate who wins the majority of the total votes cast in the corresponding election, directly occupies the election post. This is the principle by which the President, 300 of the 500 deputies and 64 of the 128 senators are elected.

According to the proportional representation principle, the posts are distributed amongst the registered candidates according to the number of votes obtained by each political party with respect to the total of votes cast in the corresponding election; by this principle, 200 of the 500 members of the Lower Chamber and 32 of the 128 senators are elected.

It is worth mentioning that the latest National Census was held in 2000, and used as the base to carry out the districting process to be used for the federal elections of 2006 and 2009.

The election of the 200 deputies by the principle of proportional representation is made by dividing the national territory into multi-member circumscriptions. Currently, there are 5 multi-member circumscriptions, in each one of them, 40 deputies are elected.

This document, along with the districting system, by which each one of the scenarios may be reproduced and inputs may be consulted (disc annexed), constitutes the memoir of the districting process carried out by the IFE during years 2004-2005. The reading accounts for the magnitude of the task carried out and is the cornerstone for other similar exercises to be performed periodically to guarantee that Mexican citizens concur to the ballots to vote for their rulers with the certainty of being part of a complex yet transparent political process, which enables us to fully execute our democratic rights and responsibilities.

The election of the 200 deputies by the principle of proportional representation is made by dividing the national territory into multi-member circumscriptions.

The Memoir is integrated as follows: a PRESENTATION conformed by insights and opinions of the President Councilor of the IFE, Luis Carlos Ugalde Ramírez, Ph.D.; of the Electoral Councilor Rodrigo Morales Manzanares who presides the Federal Registry of Electors Commission; and, of the Executive Director of the Federal Registry of Electors, Alberto Alonso y Coria. Each intervention reflects the significance of this democratic exercise, the participation of the political parties, the institutional efforts conveyed by this new electoral geography as well as the part played by specialists and political actors in the definition and attainment of the new districting.

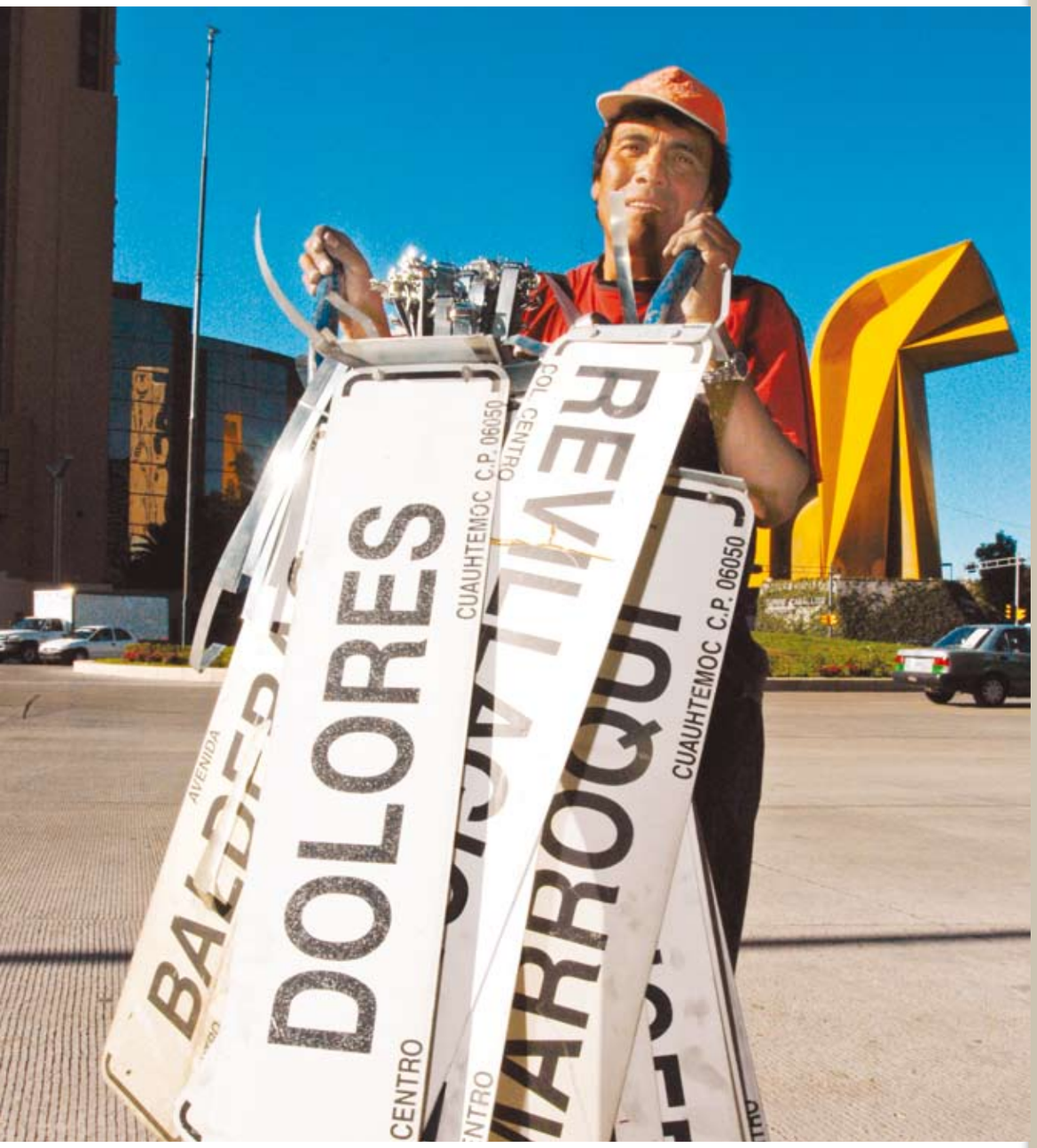
The chapter Foreword, includes the prolegomena of districting. The third chapter, Districting Strategy, explains the course of action to draw the new electoral boundaries within the country. The fourth chapter, Work and Follow-up Groups, describes the

topics, operation and main conclusions drawn by specialists and political actors after analyzing and discussing the most relevant topics in terms of districting. The fifth chapter, Districting Criteria: Agreement of the General Council of the IFE, explains the agreement reached by the general Council of the IFE, after the working and follow-up groups had issued their conclusions. The sixth chapter, Technical Works for the Districting, provides the reader with a general overview of the methodology development, the mathematical and computing processes carried out by technical teams supervised by the Technical Committee for the Following and Assessment. Chapter seven, Districts' Administrative Centers, includes the variables and the methodology for their selection. Chapter eight, called Technical Committee for the Following and Assessment of the Districting Works, includes the duties and general operation of such committee; and finally, the ninth chapter, Districting Scenarios, shows the first, second and final scenarios for the State of Chihuahua in order to exhibit the improvements attained through the collaboration with political parties' representatives.

The section called Districting In Numbers, depicts data inherent to the districting process. Finally, it includes a summary of the number of meetings and hours devoted to sessions at the CNV, the technical Committee and the working groups with the political parties.

This document is evidence of the efforts and dedication devoted to such a sensitive task, as the key foundation to pursue the path that both, the Constitution and the electoral laws have marked for democracy to outstand in our country. ◆

I. Presentation



The Electoral Districting of 2004-2005

Luis Carlos Ugalde
(President Councilor 2003-2007)
Federal Electoral Institute

Any representative democracy bases its legitimacy in the basic principle of equality of the citizens in terms of the value of their votes. Population dynamics are different in the diverse geographical zones, and with time, induces demographic imbalances reflected in over and sub political representation. Therefore, the importance of a regular review of the population balance within the 300 single-member federal electoral districts established by the Constitution. This adjustment is carried out by means the so called electoral districting. The population in Mexico was increased by more than 16 million inhabitants between 1990 and 2000. From 81,249,645 to 97,483,412 inhabitants and such growth occurred in a concentrated way, many times, in municipalities as well as in conurbated areas. In electoral matter, this meant that many electoral districts included more population than others and, therefore, such demographic imbalances resulted in districts with unequal population and whose representatives were elected either with less or more votes in comparison to other geographic units.

As a result of the Population Census of 2000, the geo-electoral measurements clearly indicated that thirteen federal entities (slightly above one third of the country) showed important population changes in relation to the inhabitants considered in the previous districting (1996). The Federal District, Veracruz, Durango, Guanajuato, Guerrero, Michoacan and Zacatecas showed a decreasing tendency in their population (and, therefore, in the number of districts), whereas Morelos, Nuevo Leon, Puebla, Quintana Roo, Baja California and the State of Mexico had increasing tendencies. Thirty four percent of the districts had a population variation above 15 percent, the limit considered as acceptable in the 1996 districting, therefore, they were considered as out of range. According to the data obtain in the Population Census of 2000, 103 out of the 300 districts were out of the ranges established by the previous districting. Hence, it was essential to redraw the limits established for the former districting in 1996, to improve the political representation of our country.

To this population complexity, other considerations had to be added, such as the legitimate demands of a multi-ethnic and multi-cultural country that were recognized in the Constitution by the Congress of the Union at the beginning of the decade. With the new districting, by incorporating the inclusion of electoral districts with indigenous population, the Federal Electoral Institute stands out as one of the Mexican State instruments that contributes to the strengthening of the representation of the indigenous population and therefore promotes their development in all areas.

This is the origin of the new electoral districting. The districting itself, involves re-dimensioning the geographical space in geo-electoral areas which contribute to

a population balance for the true representation of the popular elected posts. This task is, on the other hand, inevitable, because of the dynamic nature of population, whereas migration, births, deaths, or geopolitical changes, needing a regular recalculation to avoid distortions in the electoral processes that might damage equity in political representation. Reliable, timely and accurate information is key to guarantee the principles of legality and certainty required by our electoral processes. So, any gerrymandering could result in a legislative representation far from not only the popular wish, honored by the Constitution, but also the principles of equality and competence that all electoral contest should bear.

THE DISTRICTING ITSELF, INVOLVES RE-DIMENSIONING THE GEOGRAPHICAL SPACE IN GEO-ELECTORAL AREAS WHICH CONTRIBUTE TO A POPULATION BALANCE FOR THE TRUE REPRESENTATION OF THE POPULAR ELECTED POSTS.

The diverse ways in which countries have decided to carry out their electoral districting processes stand out by the use of a number of methodologies; by the technological tools employed; by the diversity of logistics proposed; and by the different actors who intervene in the process, with the sole purpose of reaching the electoral scenario with an equity feature. Since the beginning of last century, the districting process has changed dramatically. In many countries, it began as a manual and scarce exercise, and has incorporated the use of modern technology towards a totally automated process.

Currently, districting is carried out in different countries by one of the following means: manually, automated or by a combination of both processes. Mexico has chosen to carry out this task in a combined fashion, that is, the one resulting from the application of sophisticated mathematical models which allow the comparative analysis of many million possible scenarios, as well as, their objective rating that was afterwards complemented with the views of political parties' specialists. In this way, advantages were obtained departing from a strict mathematical process alongside a human vision of the social and political questions of the country, in such a way that these two approaches enriched the final scenario of the electoral geography. It can be said, strictly speaking, that there is a Mexican districting model which was developed within this Institute under a rigorous technical model that initially incorporated the features that any district should have, as well as the faults that should be avoided and that was at all times unconnected to any particular political motivation.

So was the task undertaken by the Federal Electoral Institute over the past months with a concrete view to the presidential election of 2006, besides, it leaves a long term vision on the usefulness of such practice. The General Council of the IFE noticed the population changes signs in our country, and being aware of the implications for representative democracy, resolved to start and strengthen the districting works. The Federal Registry of Electors Commission and the corresponding Executive Directorship (DERFE) were the institutional cornerstones on which an ensemble of studies and related activities were developed to define the methodological procedure and criteria used by the General Council to base the electoral re-drawing of the country.

The districting process was rather complex from a political and social point of view, and constituted a political and technical challenge of multiple dimensions for the Federal Electoral Institute. By the massive use of computers and technological advance of the cybernetic space at the beginning of the XXI Century; the Internet, satellite communications, high resolution graphics, interconnected databases and the possibility of storing huge amounts of information, among other advances, the Institute displayed significant up-to-date innovations. At all times, the districting process distinguished by its transparency and broad participation of all individuals involved and committed to electoral democracy.

The planning, instrumentation and operation works lasted a little more than 25 months to reach the final decision of the General Council on districting, towards February, 2005. Hundreds of people participated in such a task –including political parties' representatives– from technicians and analysts of the Federal Registry of Electors to specialists from education and research centers on diverse mathematic and humanities branches, as well as government agencies officers.

The participation of political parties' representatives during the whole process was fundamental, from their contribution in the analyzing of districting questions to the design and direct handling of the computing systems to obtain the best scenarios. The Institute is certain that this practice, besides contributing to more experi-

ence and knowledge on the electoral geography and population of the country, has constituted an example of systematic discussion, well-organized and inclusive with the clear purpose of strengthening democracy, with an unprecedented result of not having nowadays, electoral districts with out of range population resulting in sub or over political representation before the Congress, of those elected by the principle of relative majority.

It is not in the way to repeat the meaning of the new districting from the view of the responsibilities of the Federal Electoral Institute. It is a strategic action which favors the citizens because, regardless their geographical situation, their residence in urban or rural areas, their ethnical condition their economic or social position, the value of their vote in 2006, will be the most equitable in the electoral history of the country.

In this way, the electoral districting constitutes the achievement of a renewed spirit that guarantees the Mexican society, the certainty and impartiality of the political representation geography for the following elections, setting off from the true and basic meaning of democracy: one citizen, one vote. ◆

Political Parties' Participation in the Electoral Districting

Rodrigo Morales Manzanares
(Electoral Councilor 2003-2008)
President of the Commission of the Federal Registry of Electors

Our current electoral system was created with the purpose of reverting distrust in elections. Both the citizenship and the political parties tended to think and expect any election to have a dishonest outcome, lack of cooperation and fraud, especially after the results observed in 1988. This thinking shaped a system of interpreting reality that had to be dismantled to reconstruct the democratic legitimacy.

Since the electoral reform in 1990, the government and political parties headed towards this reconstruction. Constitutional changes, the elaboration of a new electoral code and the consequent structuring of the Federal Electoral Institute, shaped the key elements of the new institutional framework amongst the political actors. The main objective was to build trust in the new electoral system.

Such process necessarily comprised the configuration of the electoral instruments and particularly the Electoral Roll, which had to be a precise and true listing of the citizens entitled to exercise the right to vote. For this roll to be reliable, it had to be constructed under the surveillance and validation of the political parties.

That is, in the making up of the Electoral Roll and the issuing of the photo voting-cards, a technology was involved to make the database construction and card production: efficient, impartial, neutral and accurate. All the prior necessary but not enough without the political parties validation regarding the technology as well as its implementation in the specific case, to avoid mistrust and suspicion.

To achieve so, the participation of the political parties was institutionalized. Firstly, the National Vigilance Commission (CNV by its acronym in Spanish) was created, with wider faculties than its predecessor the Technical and Surveillance Committee, afterwards, its supporting branch known as Technical Advisors for the Political Parties was substituted by the National Supervision and Evaluation Committee (CONASE by its acronym in Spanish).

This operative fashion, installed by the Federal Electoral Institute (IFE) made clear the complementary role of technologies and the building of trust; such a combination

made possible the construction of an Electoral Roll, technically able and politically reliable in a record time.

This electoral instrument has undergone a constant process of refinement (e.g. eliminating deceased and duplicated citizens), updating and registering, all the above under the constant surveillance of the CNV and the CONASE. Results have been positive, the Electoral Roll has managed to keep its high technical and reliable standards.

This process has created a series of expectations amongst the actors involved. It is expected that the IFE contributes with the most efficient and reliable technology in the making up of any electoral instrument, whereas the political parties expect to be considered for the implementation process.

In this framework, the re-drawing of the districts required designing a suitable strategy. Although the Federal Electoral Institutions and Procedures Code establishes in article 166(*) that the CNV will know of the works on electoral districting, the implementing of this mandate needed to make sure that the political parties had a sound knowledge, from the very beginning, on all aspects to avoid any sign of mistrust. This event had a special significance if we consider that this districting shall be the first to be carried out by the IFE with a General Council where only the Electoral Councilors vote; it was essential to eradicate any source of questioning.

For the first time, a public discussion on the main factors to be considered for defining the criteria to rule districting, was carried out

Therefore, an including and transparent route was employed, to generate certainty, objectivity and impartiality, without a doubt on the legality of the process. For the first time, a public discussion on the main factors to be considered for defining the criteria to rule districting, was carried out. That's why, four groups were organized, with a total of twenty working sessions, for functionaries of the Federal Registry of Electors, political parties representatives and experts in the matter from academic and public offices, to contributed with their views, information and analysis.

The districting criteria were defined by the Federal Registry of Electors and subject to the comments of the CNV, and afterwards discussed and approved by the General Council of the Institute. It is worth mentioning that no political party challenged this decision before the Electoral Tribunal of the Federal Judicial Branch.

(*) Article 202 of the current electoral law, issued on January 2008.

Likewise, to guard that during the development of the duties the criteria were respected, a Technical Committee for the Following and Assessment of the Districting Works, constituted by well known demographers, mathematicians, actuaries and social anthropologists. The constitution of this committee was analyzed by the political parties.

The methodological considerations of the criteria included that the structuring of the districts would be made by applying a mathematical model, known as *"simulated annealing"*. Both, the members of the committee as well as the political parties representatives had access to the model programming and could state that the criteria and application hierarchy were respected.

The model caused two sequenced scenarios. The first one was generated in presence of the political parties and afterwards, presented before the members of the 32 local surveillance commissions. The comments of the parties were evaluated by the Committee and were incorporated when the scenario was improved.

Based on the above, a second districting scenario was generated. For its discussion, an alternative was designed to favor participation, even more, by assembling a group in which the parties exposed their comments directly to the members of the Committee. The exchange of views brought a clarification of the approaches and was possible for the Committee to issue more knowledgeable technical opinions.

During this working sessions, the parties outlined more than 200 comments, from which, 70 were accepted, since they included relevant technical contributions for the districts re-drawing.

The final scenario was again presented before the CNV and subsequently discussed and approved by the General Council of the IFE and supported by all the parties. The Electoral Tribunal of the Federal Judicial Branch confirmed this decision by considering as inadmissible the challenges presented by political parties as well as a number of citizens, therefore, the agreement of the General Council in which the districting process was approved, remained firm.

In short, the definition of the electoral districts was a process in which technology and politics were used as raw materials to build trust. It is important to point out that all parties had chances to propose changes and all their demands were answered by the Technical Committee, with strict adherence to the criteria defined by the General Council.

We can conclude that the new districting is technically able, politically reliable and legally supported. Therefore, it constitutes a solid basis for the organization of the elections of 2006 and 2009. ◆

Materialising Districting

María del Carmen Alanís Figueroa

(Executive Secretary 2004-2005)

In ordinary session of January 30, 2002, the Institute's General Council approved the agreement CG07/2002, which ordered to use the territorial demarcation for the 300 Single-member Federal Electoral Districts for the intermediate elections of 2003, which was approved by the General Council in July 31, 1996. Also in the next paragraph, the Executive General Board was assigned to elaborate projects and studies in order to divide again the 300 federal electoral districts and in that way developed a new districting after the federal electoral process of 2003.

At the same time, on August 22, 2003, the Institute's General Council, approved the proposal presented by the Executive Board about the General Policies and Programs of the IFE for 2004, in which it was established that the Executive Directorship of the Federal Registry of Electors would make cartographic analysis and studies, demographic, operative and statistics that allow modifications to the limits of the Federal Electoral Districts. The Executive Board approved the agreement JGE59/2004 as well, in which the procedures and the criteria that would be used in the districting were established.

This way it formally proceeded to begin with the jobs for the new territorial demarcation of the three hundred Single-member Federal Electoral Districts. At the same time, it was developed a process that forced to put in practice two major and opposite levels in which the results would have an impact in both, the short and the long run; such as in the structure of the own Electoral Authority as well as in the electoral strategies of all the actors of the Mexican Political System.

Apart from the inherent topics of the own districting process such as the geography, demography, the computer science, the mathematics or the politics, it has been a common place to listen and read in the specialized electoral domains of the repercussions of the Districting in the electoral job of the political parties, the benevolence and the technological support of the computing system developed and installed for this end, from the enormous labor of the DERFE's personnel and from the political parties. Nonetheless, it has been less common to consider the administrative and human impact that supposes a new arrangement of this nature. For this reason, it is necessary to think and reflect about the administrative and human challenges that the

new electoral geography of the country implies, as well as the implemented activities to face them.

Having finished the technical works, once the General Council approved unanimously the agreement that established the new territorial demarcation of the three-hundred Single-member Federal Electoral Districts in which the country was divided for its use in the electoral federal processes 2005-2006 and 2008-2009, and while they nourished the jurisdictional proposals before the Electoral Tribunal of the Federal Judiciary, the Executive Directorships, the Technical Units under the coordination of the Executive Secretary, worked to identify the institutional challenges that were close to appear. In this sense, the definition of strategic planning was a priority since it faced effectively and efficiently the own effects of the Districting process.

A first step was the constitution of a work group, coordinated by the Executive Directorship of Administration, in which representatives of all the areas of the Institute participated, and that continues to meet periodically, to define and solve the institutional problems that have presented. A second step was the definition of a chronogram of work that was defined in terms for each of the stages the Districting. The following actions have taken place in these stages:

- Identification of the affected districts.
- Identification of the affected personnel.
- New distribution of the personnel.
- Identification of the affected real state.
- Location and renting of the real state.
- Improving of the conditions of the buildings.
- Transfer of the personnel and furniture.

From the analysis made, it was identified that the new Districting had made an impact in seventy eight districts; what was immediately translated into seventy eight changes of Districtal Seats. From these, twenty six (38%) matched to the district Boards in the electoral sections that before of the new demarcation were found inside another district, which meant a duplicity of District Boards in a same district; seventeen (25%) to changes in the districts Seat; ten (15%) that correspond to the new assignation of the districts to other entities and the last fifteen (22%) to the reconfiguration of the districts in the interior of the federal entities.

These changes have affected 408 members of the Electoral Professional Service, whom have had to change their working place; many of them will do it in the same municipality or, its case, a place near its address. Nonetheless, about 60 workers will change houses form a state to another, as a result of the 10 disincorporations.

We know that an action of this nature does not always accomplish everyone's expectations. However, it has been the Institute's priority to make sure that the working rights of all its workers are respected. This way, it has taken care for the conservation of the greatest number of personnel, evaluating and analyzing all the elements within our reach.

Something is certain: the decisions have been made trying to benefit both, the interests of the personnel as well as the Institute's.

On the other hand, with the purpose of giving certainty to the Districting, the Executive Board approved the Districting Guidelines 2005. These included all the aspects related to material resources, services, acquirement and disincorporation of goods, implementation of the budget of new Distrital seats, personnel administration,

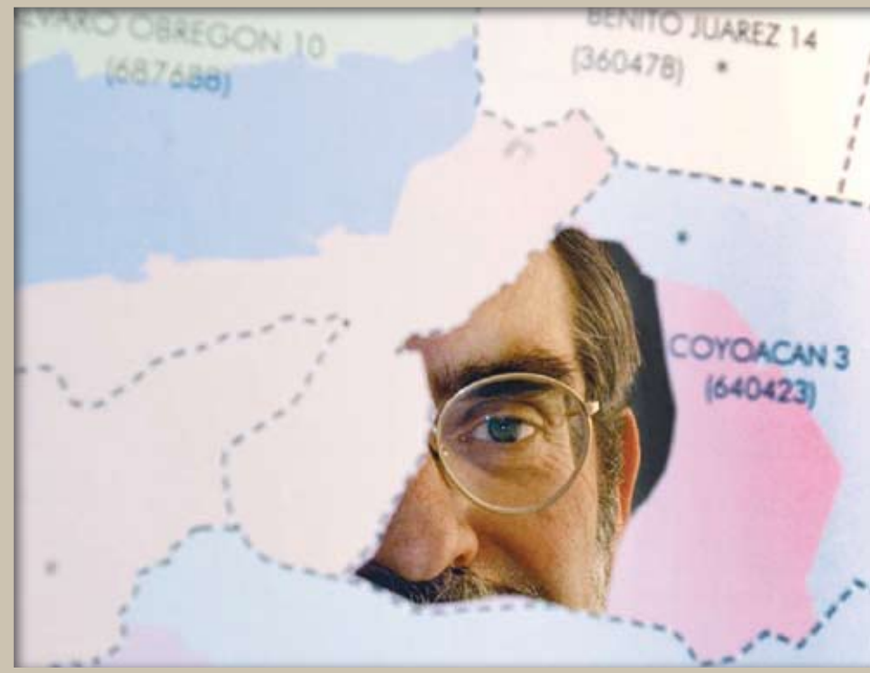
> We know that realizing the Districting works is an enormous task, nonetheless we are convinced that we will go forward and above all, we will face overall success of the electoral process 2005-2006.

procedures for the delivery–reception, computing services, dimensions, characteristic and conditions for the new properties. We know that there will always be questions and doubts; this is why also a help desk was installed, so the local and distrital Boards could make reference about the administrative process for the new Districting. This desk searches to give an immediate answer to all the doubts and necessities that could be developed, and, above all, to be a direct contact will all the personnel.

In the IFE, both in the central level as in the decentralized organs, we know that realizing the Districting works is an enormous task, nonetheless we are convinced that we will go forward and above all, we will face overall success of the electoral process 2005-2006. Not only we have a good Districting, but also we have the best women and men willing to go forward.

Districting and the Human Value

Alberto Alonso y Coria
Executive Director of the Federal Registry of Electors



Although it's true that the use of new analytical technologies and tools allowed this districting process to set a specific difference in respect to similar practices inside and outside our country, it is worth analyzing from our institution's point of view that this experience is enriched when considering the role that each and every one of the persons involved played to some extent throughout the project.

Within this human universe it must be said that the participation of academic specialists, directive and technical personnel, worked hard and continuously to define criteria as well as to prepare the data to feed the computational system, carry out tests with the diverse variables, analyze results, make proposals and make objective decisions.

The highly qualified academic and professional specialists set the specific model to our work. In the process, from a broad analysis frame, two specific and important moments could be mentioned in which the performance of these personalities was relevant: during the Thematic Working Sessions (prior to the defining Agreement of the General Council) and their collegiate performance within the Technical Committee for the Following and Assessment of the Districting Works.

Within the work-plan for the DERFE, the IFE's General Executive Board approved during an extraordinary session held on April 13, 2004, the agreement which established the procedure for the definition of the criteria to be used in the formulation of the districting project. Under this mandate, the Federal Registry of Electors set up Work and Analysis Sessions where an ample discussion was held on topics related to districting. The analysis took place around four main topics that were fundamental to the new districting: Cultural Identity, Population, Geographical Framework and Urban Districts.

This analytical practice, besides the direct participation of the electoral councilors and the deliberating organisms of the Federal Registry or Voters, as well as the National Vigilance Commission and the respective Local Commissions, and executive directions and technical units of the Institute, was pervaded of a multidisciplinary and inter-institutional approach, academically speaking. More than thirty specialists from different areas participated, coming from well known institutions such as: National Autonomous University of Mexico, the Metropolitan Autonomous University, the Technological Autonomous Institute of Mexico , the College of Mexico, the College of the Northern Border, the University of Guadalajara, National Institute of Statistics, Geography and Informatics of Mexico, the Center for Research and Advanced Studies

on Social Anthropology, the Latin American Faculty of Social Sciences, the National Population Council (CONAPO) as well as the National Commission for the Development of the Indigenous Population (CDI). This conceptual discussion was witnessed by the political parties' representatives, at all times.

During the debate, some topics stood out such as, multi-ethnicity and multi-language within the indigenous communities of our country; definitions and delimitations of the urban, metropolitan and conurbated areas; territorial accessibility by communication means, demarcation of political and administrative problems regarding municipal and state bordering and the political-administrative territorial dynamics related to the creation, transformation or disappearance of the political administrative units (municipalities).

The topic that caused more debate was the use of population forecasts as raw material for the districting project, the proposal of using forecasts was based on the intention of updating the data of the National Census, that for the following electoral process would be six years out of date. The relevance of the topic implied calling to a specific analysis by renowned legal experts.

Political parties participated at all times and were given the source and executable programs of the system to fully audit its operation and results, providing total certainty and guarantee of impartiality to the derived scenarios that make up the new district proposal. While giving the same tool to all political parties, the same conditions were searched for the development of proposals and comments that the parties made.

The activities for the definition of the drawing of the districting went on until February 11, 2005, when the General Council unanimously approved the new electoral districting to be applied for the federal electoral processes of 2006 and 2009.

During the months in which the districting process took place, the political parties and electoral authorities developed tasks with total transparency and inclusion of the participants; from the first districting scenario, generated with the support of the mentioned informatics system, and the audited and raw materials approved by the political parties under the supervision of the Technical Committee, until the final definition of the new districts, by means of comments made by the parties representations adjusted to the criteria defined by the General Council. The activities for the definition of the drawing of the districting went on until February 11, 2005, when the General Council unanimously approved the new electoral districting to be applied for the federal electoral processes of 2006 and 2009.

The specific tasks of the electoral districting occurred with the close and accurate presence of the Technical Committee that supervised and evaluated each one of the phases. The Committee which consisted of renowned specialists on different matters, undertook an outstanding task of direct interaction with the parties' representatives, who could expose, one by one, the comments they considerer appropriate on the scenarios proposed. The Committee assessed in detail all proposals and made adjustments when needed, following at all times, the General Council's criteria.

The districting process of 2004 offered outstanding contributions from a conceptual and technical point of view, going through innovative organization and logistic modalities.

The districting process of 2004 offered outstanding contributions from a conceptual and technical point of view, going through innovative organization and logistic modalities. For the theoretical-methodological development that preceded its implementation, a number of ideas were put together and formalized from diverse fields, such as: geography, demographics, mathematics and computing. In regards with the technical aspect, a complex, modern and efficient system was implemented, and from a human resources point of view, an interdisciplinary team that contributed with knowledge on different areas, was integrated and trained.

The automation of the electoral districting process and the use of geographical information systems were relevant and signify an advance in the way citizenship represents itself. But, perhaps more important than theses advances, that are indeed a significant contribution in terms of electoral districting itself, has been the joint and transparent participation of specialists and political parties that undertook their corresponding role by drawing up concise comments that, in many cases, helped improve the scenario proposed by the system developed by the Institute. This coordination of technical and human efforts constitute the institutional learning that districting left as an added value besides the unprecedented fact of providing our electoral system with a reliable tool for the consolidation of our democracy. ◆

II. Preceding

2.1 The IFE and the districting process

The Federal Electoral Institute was founded in 1990 as a public organization, autonomous, responsible for the state task of organizing federal elections, those related to the election of the President of the United Mexican States as well as deputies and senators who integrate the Congress of the Union.

The greatest achievement of the institution has been to attain trust from the citizenship and restore the credibility of citizenship in the electoral processes.

Once in office, the IFE undertook one of its biggest tasks: the configuration of a new Electoral Roll which allowed a reliable registry of citizens. Another outstanding mission faced in 1996, was to regionalize the Mexican Republic's territory with the purpose of achieving an adequate citizen's representation before the Lower Chamber.

During the first part of the XX century, the task of districting in Mexico was a responsibility of governors, local congresses, party leaders, municipal and city hall authorities. The geographical configuration of the districts was made by hand and the only official criteria was to try to integrate areas with a balanced number of inhabitants. Without a systematic procedure, unreliable statistics were used and maps were printed in which municipalities were added or removed to make up the districts.

In 1996, it was clear that the prevailing districting made in 1977 –19 years before– was obsolete. Demographic changes, migration movements and economical dynamics of the country during that period of time, altered the distribution of the population. Therefore, there was a serious unbalance in the conformation of each one of the electoral districts. This resulted in a Lower Chamber which did not accurately reflect the citizens representation.

On July 31, 1996, the General Council of the Federal Electoral Institute unanimously approved a new redrawing of the electoral districts, fulfilling the Constitutional mandate established in article 53.

The IFE decided –in 1996 and also in the following administration– that the districting process shall be supported by a solid scientific and technical team, resting on technology to develop in a transparent and reliable way the districting scenarios. Considering this scheme consisted in at the same time the views of the political parties, that were to participate in the agreements to establish the criteria, as well as be informed of the development of the tasks and propose improvements of the possible scenarios.

The Institute took irreversible steps regarding transparence by using computing resources and up-to-date geographical information for the districting process. This operation fashion allows very few, if any, manipulation possibilities and guarantees the citizen a clear process. According to Castellanos (2003) the decision of encouraging the active participation of parties, guarantees the citizenship that the process is balanced in terms of political sense.

vThe districting of 1996 departed from the constitutional principles that establish the number of deputies to integrate the Lower Chamber, the territorial frame based on the states within the country, as well as a basis to establish the target population or number of citizens that each one of the districts should ideally have.

The IFE developed a methodology and a geographic information system, granting the computing systems with a wider use by implementing a heuristic algorithm that was relevant at being considered the central element that would guaranteed the neutrality of the geographical conformation of the districts. All the above resulted in a serious research work undertaken by a professional team; presented and discussed in a number of bodies within the institution –juridical, technical and political–, and analyzed, edited and agreed with the diverse political parties and councilors.

2.3 Technical criteria in 1996

The General Council of the IFE agreed in the session held on January 23, 1996 the following criteria:

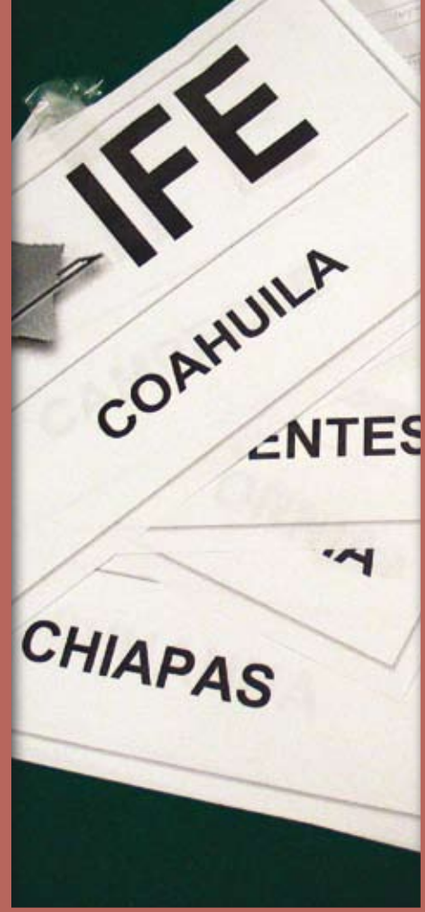
1. No single-member federal electoral district may comprise territory of two or more federal entities;
2. To determine the number of single-member federative electoral districts to be comprised in each state, the Sainte-Laguë distribution formula shall de applied, based on the results of the National Census of 1990;
3. To determine the internal district boundaries of each state an heuristic model shall be used;
4. Based on the demographic balance, the municipalities besides the Federal District, that may include one or more single-member electoral districts, shall be determined;
5. The distribution of the districts shall de carried out from North to South and West to east, respecting, whenever possible geographical unevenness and outstanding roads to include whenever possible complete towns, neighborhoods, residential areas, and indigenous population communities, integrated according to socio-cultural aspects, etc.;
6. The electoral districts that due to their population density must comprise the territory of more that one municipality, will be constituted of complete municipalities, preferably;
7. Geographic unity of the electoral districts shall be favored;
8. Infrastructure of the communication routes and transport time from the electoral sections to the district administrative center shall be considered;
9. In the delimitation of the electoral districts, compactness will be sought, characteristic consisting of a regular polygon shaped perimeter;
10. The variation margin of population within each district in relation to the distribution quotient, cannot exceed in general terms, 15% the inside of each state, considering as a special case those that due to geographic-population reasons exceed the variation range marked;
11. The current sectional distribution shall be respected. District administrative centers shall not be fixed beforehand, allowing their determination by applying criteria such as more population, communication routes and public services.

Table 1

Electoral geographic framework by state.
Before and after the 1996 districting

Entity	Districts before the 1996 districting	Districts in 1997	Difference in districts
Aguascalientes	2	3	+ 1
Baja California	6	6	–
South Baja California	2	2	–
Campeche	2	2	–
Coahuila	9	12	+ 3
Colima	10	9	- 1
Chiapas	7	7	–
Chihuahua	2	2	–
Federal District	40	30	- 10
Durango	6	5	- 1
Guanajuato	13	15	+ 2
Guerrero	10	10	–
Hidalgo	6	7	+ 1
Jalisco	20	19	- 1
Mexico	34	36	+ 2
Michoacán	13	13	–
Morelos	4	4	–
Nayarit	3	3	–
Nuevo León	11	11	–
Oaxaca	10	11	+ 1
Puebla	14	15	+ 1
Querétaro	3	4	+ 1
Quintana Roo	2	2	–
San Luis Potosí	7	7	–
Sinaloa	9	8	- 1
Sonora	7	7	–
Tabasco	5	6	+ 1
Tamaulipas	9	8	- 1
Tlaxcala	2	3	+ 1
Veracruz	23	23	–
Yucatán	4	5	+ 1
Zacatecas	5	5	–

Source: Federal Electoral Institute (1996) *La Redistritación Electoral Mexicana. Memoria*. Volume II



III. Districting Strategic Processes

The basic principle of representative democracy is equity of the vote. Such rule forces to seek population balance amongst the districts because either overpopulation or under-population related to the districts involves under or over political representation affecting equality of the citizens in terms of value of their vote. That's why it is important to periodically review the balance of population within the single-member federal electoral districts.

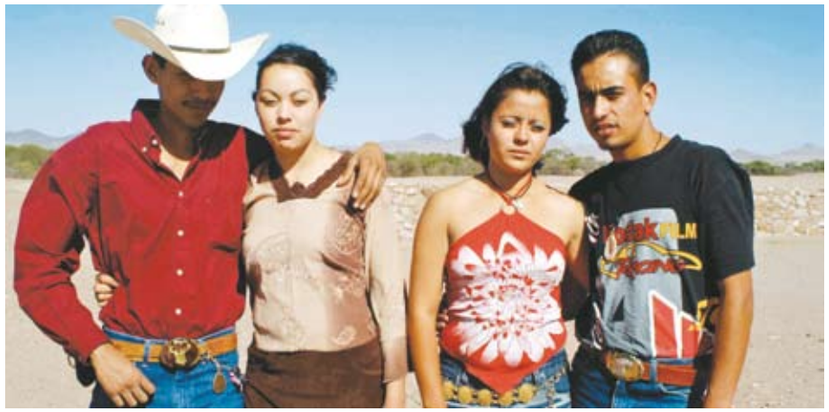
Therefore, it is necessary to carry out a characterization of the territory in which a number of variables and criteria intervene. It must be remembered that population centers change in time; they grow, diminish, emerge or disappear. Besides, it is also necessary to verify and identify their accessibility by means of a classification of their communication routes, infrastructure and transfer time.

3.1 ¿Why should we redraw the electoral boundaries? Representation and population balance within the electoral districts

The task of redistricting involves conceptualizing and re-dimensioning a given geographical space into geo-electoral zones that allow electoral balance and that properly reflect representation of popular elected posts, feature of modern democratic states. This task turns inevitable when realizing that population distribution is dynamic –because of either migration, births, deaths or economic and politic changes– and must be periodically re-calculated to avoid biases in the electoral processes that might interfere with equity in representation.

Districting is part of representation geography that has undertaken the problem of configuring the electoral districts, and its limits yield different results in terms of seats obtained, even though the underlying votes pattern remains the same. Taylor (2000) pints out that since there are many ways of dividing an area into a given number of electoral districts, the natural consequence is that many different results may occur, although the real voting is preserved and that this fact has allowed the occurrence of two kinds of electoral abuses: malapportionment, characterized by the delimitation of districts with a different number of inhabitants, and gerry-mandering or arbitrary division of the electoral districts, in both cases the objective is to favor a particular political group.

The aim of carrying out the federal electoral districting of 2004-2005 using an automated method and close surveillance of all parties is to avoid malapportionment and gerrymandering.



3.2 Works prior the districting

Between 1990 and 2000, the population in Mexico experienced an annual growth rate of 1.8 percent, the country's geographic diversity caused a differentiated population growth per state, municipality and locality. For instance, there was a growth rate of 4.1 percent in Baja California and of 0.4 percent in the Federal District. The above implied a population imbalance within 103 out of the 300 districts, 34 percent of them showed a growth or decrease of its population larger than 15%, limit marked as acceptable in the districting of 1996.

To materialize the districting works of 2004-2005, it was necessary to compile, adjust and generate the information needed to carry out the process.

An inventory of the information to compile and generate was made. This involved analyzing and systematizing documents, computer files, databases and maps at different scales. The data obtained from the XII National Census of 2000 was used along with the censual cartography per block of the National Institute of Statistics, Geography and Computing (INEGI, by its acronym in Spanish), with satellite images of all the national territory and the sectional and municipal cartography of the Federal Registry of Electors. On the other hand, the CDI, provided information regarding municipalities with 40 percent and more indigenous population. The information on communication routes was supplied by the Ministry of Communications and Transport and the geographical unevenness and political-administrative boundaries were responsibility of each one of the state committees of the IFE.

As for the geographic information regarding areas, perimeters, vicinities, centroid coordinates and polygons contained within the sections, it was generated by the DERFE.

3.3 Districting Work Plan

The Work Plan approved considered that the new districting would be used for the first time in the federal elections of 2006, and afterwards it was agreed that the same districting shall remain valid for the elections of 2009.

To comply with the agreement of the General Council of the Federal Electoral Institute, from January 30, 2002, which established the making up of the districting after the elections of 2003, the DERFE headed the development of studies and follow up of the activities related to the project, in order to define the methodology and criteria that at one stage determined the new districting of the country.

In this way, the definition of criteria and variables was identified as a priority, therefore, the National Supervision and Evaluation Committee (CONASE) decided to carry out a series of weekly working sessions starting on March 3, that same year.

On the other hand, the IFE's General Executive Board approved, in an extraor-dinary session held on April 13, the agreement establishing the procedure for the definition of the criteria to be used during the formulation of the project to divide the national territory into 300 single-member federal districts, instructing the Executive Directorship of the Federal Registry of Electors (DERFE), on the implementation of Work and Analysis Groups to carry out a full discussion on topics related to the districting.

To this end, the schedule was set out and delivered for comments to the political parties representatives, an agenda was made up to be discussed by the political parties' representatives before the National Vigilance Commission (CNV), along with the following materials: bibliography, criteria for the 1996 districting, an exercise about the districts distribution for 2001, population forecasts, data from the 2000 National Census, tables with inter-municipal dis-tances, equivalence tables of new municipalities and vicinity tables among municipalities.

In order to set precedent on the working groups results, a document was assembled and handed to the political parties for them to review and comment so that their views could be included.

This practice involved not only the direct participation of the President Councilor, the

Electoral Councilors, The Commission of Federal Registry of Electors, the CNV, the CONASE, the General Executive Board and Executive Directorships of the Institute, but also the participation of specialists in diverse fields, allowing technical solidity of the work done. In addition, prestigious institutions participated, such as: The National Autonomous University of Mexico, The Metropolitan Autonomous University, The Autonomous Technological Institute of Mexico, the College of Mexico, The College of the Northern Border, The University of Guadalajara, the INEGI, The Center for Research and Advanced Studies on Social Anthropology, the CONAPO and the CDI.

Once the basis for discussion and analysis were set, the working groups were integrated. Each group was responsible for recommending the optimal criteria as well as objective and impartial methodology to be applied in the delimitation of the 300 federal electoral districts.

It is also worth mentioning, the participation of political parties' representatives in the working groups, during their interventions they contributed with many proposals that enriched the work done. ◆

IV. Work and Follow up Groups

4.1 Working groups composition

As a starting point for the new districting, four central points were identified to determine the dynamics of the working groups: Cultural Identity, Population, Geographical Framework and Urban Districts.

I. Cultural Identity

Topics:

› Juridical framework.
› Methodology.
› Indigenous population in metropolitan areas.

Dates:

April 23 and 26, and May 3, 2004

Specialists / Academicians:

ARNULFO EMBRIZ OSORIO
National Commission for the Development of the Indigenous Population (CDI)

ENRIQUE SERRANO CARRETO
National Commission for the Development of the Indigenous Population (CDI)

FRANÇOIS LARTIGUE MENARD
Center for Research and Advanced Studies on Social Anthropology (CIESAS)

VÍCTOR MANUEL FRANCO PELLOTIER, M.S.†
Center for Research and Advanced Studies on Social Anthropology (CIESAS)

JUAN ENRIQUE GARCÍA LÓPEZ, M.S.
National Population Council (CONAPO)

MIGUEL ÁNGEL MARTÍNEZ HERRERA, M.S.
National Population Council (CONAPO)

HÉCTOR DANIEL VEGA MACÍAS, M.S.
National Population Council (CONAPO)

EUNICE ELIZABETH BAÑUELOS FLORES. M.S.
National Institute of Statistics, Geography and Informatics of Mexico (INEGI)

CELIA PALACIOS MORA, Ph.D.
National Autonomous University of Mexico, Geography Institute (IG-UNAM)

II. Population

Topics:

› Population forecasts usage.
› Methodology to assign the number of districts per federal entities.
› Acceptable demographic variance among districts.
› Population estimations in aggregates smaller than a municipality.
› Parameters of regional economic integration and social-economical and development indicators.
› Revisions of deviations from the population average.

Dates:

April 20 and 27 and May 4, 11, 18, 24 and 27, 2004

SPECIALISTS / ACADEMICIANS:

VIRGILIO PARTIDA BUSH, M.Sc.
National Population Council (CONAPO)
RODOLFO CORONA VÁZQUEZ, M.Sc.
College Of The Northern Border (COLEF)
RUBÉN HERNÁNDEZ CID, Ph.D.
Autonomous Technological Institute Of Mexico (ITAM)
MANUEL ORDORICA MELLADO, Ph.D.
College Of Mexico (COLMEX)
EUNICE ELIZABETH BAÑUELOS FLORES, M.Sc.
National Institute of Statistics, Geography and Informatics of Mexico (INEGI)
IGNACIO MÉNDEZ RAMÍREZ, Ph.D.
National Autonomous University Of Mexico, Applied Mathematics And Systems Institute (IIMAS-UNAM)
HORACIO PRIMO SOSA SÁNCHEZ, B.S.
National Population Council (CONAPO)
ARMANDO MAITRET HERNÁNDEZ, B.S.
Federal Electoral Tribunal of the Judicial Branch (TRIFE)
EDGAR CORZO SOSA, Ph.D.
National Autonomous University Of Mexico, Juridical Research Institute (UNAM)LORENZO CÓRDOVA VIANELLO, Ph.D.
National Autonomous University Of Mexico, Juridical Research Institute (UNAM)

JAIME CÁRDENAS GRACIA, Ph.D.
National Autonomous University Of Mexico, Juridical Research Institute (UNAM)
JORGE EDUARDO PASCUAL LÓPEZ, B.S.
Conf. Law Colleges, Bars And Associations A.c.
CARLOS A. MORALES PAULÍN, Ph.D.
National Autonomous University Of Mexico, Law School (UNAM)
ALFREDO DEL VALLE ESPINOZA
Chamber Of Deputies. Congress Of The Union (Proposed By The PRD).
RAMIRO BAUTISTA ROSAS
Metropolitan Autonomous University, (UAM) Azcapotzalco Campus

III. Geographical Framework:

Topics:

› Respecting state boundaries in district configuration.
› Analysis of transport times among municipalities and geographical unevenness related to communication routes.
› Municipality integrity and cases of territorial reordering after the census.
› Criteria for the definition of municipal administrative centers.
› Criteria for circumscriptions conformation.

Dates:

April 21 and 28, and May 7, 12 and 19, 2004

SPECIALISTS / ACADEMICIANS:

LUIS CHIAS BECERRIL, Ph.D.
National Autonomous University of Mexico, Geography Institute (IG-UNAM)
GLADSTONE OLIVA GUTIÉRREZ, Ph.D.(†)
University Of Guadalajara (UDG)
MARIO RUBÉN CHAVARRÍA ESPINOZA
National Institute of Statistics, Geography and Informatics of Mexico (INEGI)
LUIS MIGUEL MORALES MANILLA, M.Sc.
National Autonomous University of Mexico, Geography Institute (IG-UNAM)

IV. Urban Districts:

Topics:

› Criteria for cases of urban districts.
› Re-sectioning with districting purposes.
› Mixed districts (urban-rural).

Dates:

April 22, 29, and May 6, 13 and20, 2004

SPECIALISTS / ACADEMICIANS:

IGNACIO KUNZ BOLAÑOS, Ph.D.
National Autonomous University Of Mexico, Architecture Faculty (UNAM)
LUIS MIGUEL MORALES MANILLA, Ph.D.
National Autonomous University of Mexico, Geography Institute (IG-UNAM)
CELIA PALACIOS MORA, Ph.D.
National Autonomous University of Mexico, Geography Institute (IG-UNAM)
CARLOS ANZALDO GÓMEZ, Ph.D.
National Population Council (CONAPO)
SALVADOR MORENO PÉREZ, B.Sc.
National Institute of Statistics, Geography and Informatics of Mexico (INEGI)
CENOBIO MACÍAS SÁNCHEZ
National Institute of Statistics, Geography and Informatics of Mexico (INEGI)

4.2 Discussion and conclusions of the working groups

With the aim of reinforcing the districting process and making it transparent, an intense reflection and analysis was carried out in 20 working sessions with the participation of more than 30 specialists who discussed, along with the political parties' representatives, councilors, officers and technical staff of the Federal Electoral Institute about related topics.

Due to the complexity of the four central points to be discussed, there were some specific topics which required more than one session and the participation of a greater number of specialists to contribute with their views. There were diverse considerations, arguments and approaches which were useful for the conformation of criteria.

One of the topics which caused more debate in the Population Group, was the possibility of using population forecasts, a consensus was not reached among the participants and led to the integration of an extraordinary group where legal experts specialized in the topic appeared as exponents.

From the interpretation of article 53 in the Constitution, some participants pointed out that using population forecasts is legitimate, whereas other thought that the districting should be carried out with the data obtained directly from the National Census. Some of them considered that the forecasts for years 2004, 2006 and 2009 were reliable and would better reflect the population's situation for the corresponding elections. But other reasoned that using forecasts did not fully comply with the Constitutional mandate.

The Population Group also recommended the use of the "largest remainder method" to reach the most equitable index, and the method of centroids to obtain the population data in each electoral section from the data per block of the INEGI.

The Cultural Identity Group agreed on using the information generated by the CDI related to the identification of municipalities and towns with indigenous population.

They also agreed to follow the dispositions included in the Third Provisional Article of the Constitution, of the August 14, 2001 reform saying: "To establish the territorial boundaries of the single-member electoral districts, it shall be considered, whenever possible, the location of the indigenous towns and communities, to favor their political participation".

The Urban District Group, considered as **urban towns**, for districting purposes, those including more than 15,000 inhabitants according to the XII National Census of 2000; **urban municipalities,** those containing at least one urban town and that in total contain a population larger than 50% of the district population average established for that particular state, and, **urban districts**, the ones constituted of at least one urban municipality. It was agreed that the process would be carried out in two sages: the first one with the integration of the urban districts and the second, the non-urban, with whole municipalities or fractioned urban municipalities that due to population deviation are not feasible to be grouped during the first stage.

The Geographical Framework Group considered the use of the current geographic electoral framework per state, municipality and section. Likewise, suggested to respect the state and municipality boundaries; the territorial continuity and the temporary and geometric compactness of the districts. Three criteria were proposed: municipal integrity, population balance and communication routes. Regarding the district administrative centers, they suggested choosing those localities that after the districting process showed the largest amount of inhabitants, better communication routes and a number of quality public services.

The working sessions of the groups ended on May 25, 2005 and the comments of each one of them was systematized, to make up the final report handed to the CONASE and the CNV. The presentation before the Commission of the Federal Registry of Electors occurred in June, and on July 15, 2004 the agreement of the General Council of the Federal Electoral Institute (CG 104/2004) was signed, approving the criteria and operational considerations to be used for the projects of dividing the national territory into 300 single-member federal electoral districts, as well as the creation of the Technical Committee for the Following and Assessment of the Districting Works (CTSED). ◆

v. Districting Criteria: Agreement of the General Council of the IFE

On June 21, 2004, the CNV issued its report regarding the conclusions of the Working Groups and the papers: "Criteria Proposal for the Districting of 2004" and "Operational Considerations Regarding the Criteria for the Districting of 2004." The comments made by the CNV were given to the Members of the Local Executive Boards of the Institute and to the Members of the Federal Registry of Electors (RFE).

The conclusions of the Working Groups and comments made by the CNV, were delivered to the Institute's General Executive Board and presented during the session of June 28, a day after the RFE Commission held its meeting and received the inform from the DERFE. From this sessions agreement CG 104/2004 was reached:

The General Council in its ordinary session of July 15, 2004, issues the Agreement CG104/2004 by which it *approves the criteria and operational considerations to be used in the formulation of the projects to divide the national territory into 300 single-member federal electoral districts, as well as the creation of the Technical Committee for the Following and Assessment of the Districting Works.* (Published in the Federal Official Gazette on August 17, 2004).

5.1 Approved criteria for the Districting

Following, the 10 approved criteria are presented, along with the operational considerations. The criteria are classified according to the feasibility of being incorporated to the mathematical model or to be adjusted as external variables of it. The application hierarchy is included.

Criterion 1. The districts are integrated with territory of a single state. Moldable and with hierarchy 1.

Criterion 2. To determine the number of districts to be contained in each state, the resolutions included within Article 53 of the Constitution of the United Mexican States, shall be considered. Moldable and with hierarchy 1.

2.1. To determine the number of districts to be contained in each state, the results of the XII National Census of 2000, will be applied.

2.2. The method "Largest Remainder with a mean", shall be used because it is the mathematical model that guaranties a better population balance.

The mathematical model known as "Largest Remainder with a mean" consists of:

a) Calculating the national mean dividing the country's population into the number of districts to be distributed.

b) Dividing the population of each state into the national mean. Each state is assigned a number of districts equal to the whole resulting from the division.

c) Assigning, according to the corresponding legislation, two districts to those federal entities whose quotient results smaller than 2.

d) Assigning an additional district to those federal entities which obtained the largest fractional figures.

Criterion 3. The demographic balance will be applied to determine the districts from the premise that the difference in population for each district in relation to the state population mean will be as close as possible to cero. Partially moldable and with hierarchy 1.

3.1. To safeguard the municipality integrity, the population margin for each district in relation to the distribution quotient will be allowed to have a variation so that:

a) In cases where the absolute value of the difference between the state mean and the national mean is smaller than 5%, the size of each district will be equal to the state mean allowing it to differ from that value within the limits of 15% from the value of the national mean.

b) In cases where the absolute value between the state mean and the national mean differ in more than 5% and less than 10%, only a deviation of 10% from the national mean value will be allowed.

3.2. All variations exceeding the limits above mentioned, must be fully explained.

3.3. In cases where the districts undergo demographic expansion, a negative deviation will be sought; whereas if the demographic movement is decreasing, then a positive deviation will be sought.

Criterion 4. The conformation of electoral districts with a majority of indigenous population will be sought. In any case the territorial integrity of the indigenous communities will be preserved.

Partially moldable and with hierarchy 2.

4.1. The information provided by the National Commission for the Development of the Indigenous Communities, regarding localities and municipalities, will be used.

Criterion 5. The districts will have geographical continuity considering the political-administrative boundaries and geographical unevenness. Moldable and with hierarchy 3.

Criterion 6. In the drawing of the districts, compactness will be sought, so that the perimeter of the districts have a geometrical shape as close as possible to a regular polygon. No district will totally surround another one. Moldable and with hierarchy 3.

Criterion 7. In the integration of the districts, the current municipal and sectional distribution will be used. The smallest aggregation unit will be the electoral section. Moldable and with hierarchy 4.

Criterion 8. The districts will be preferably constituted of complete municipalities. Partially moldable and with hierarchy 5.

8.1. The municipalities containing more population than the corresponding to 0.85 of the state mean or less than 1.15, will preferably not be fractioned and conform a district.

8.2. The urban municipalities that don't reach the 0.85 previously mentioned and having conurbated urban localities, will be preferably grouped to conform districts with other municipalities with urban localities with whom they share geographic continuity, an adequate accessibility depending on the geographical evenness and transport time between municipalities and also, that are more integrated as a community.

a. For districting purposes, a urban locality is composed by more than 15,000 inhabitants according to the National Census of 2000. A urban municipality contains at least one urban locality and the municipality in its whole contains a population larger than 50% of the average district population established for the state where it is located.

b. To evaluate the integration as a community, the "mega-regions" developed by Ángel Bassols Batalla, will be considered.

8.3. In cases of municipalities with a total population larger that the state mean, the integration of complete districts in the inside will be promoted, and the exceeding territorial fraction will be added to adjoining municipalities, urban if possible, to conform another district.

8.4. When the need arises to integrate districts from municipalities fractions, the least number of municipalities will de involved, whenever possible. Only exceptionally, and with the proper technical explanation, a district with fractions of up to three municipalities, shall be integrated.

Criterion 9. To establish the district administrative center, the following parameters will be considered: more population, communication routes and public services. In case of two or more localities with similar features, and one of them is currently the district's administrative center, it will remain the same. Partially moldable and with hierarchy 6.

Criterion 10. In the conformation of the districts, the optimization of the transport time within the boundaries of the district will be promoted considering the size, extension, and geographical distribution of its localities. Partially moldable and with hierarchy 7.

The criteria mentioned will be considered as follows: first level hierarchy, the criteria numbered as 1,2 and 3; second level hierarchy, the one numbered as number 4; third level hierarchy, criteria 5 and 6; fourth level hierarchy, number 7; fifth level hierarchy, number 8; sixth level hierarchy, number 9 and; seventh level hierarchy, number 10.

Some of the previous criteria as those regulating the target population, the integrity of the indigenous population communities, the respect to the political administrative boundaries and the use of the largest remainder for district assigning, have the purpose of achieving an adequate representation; others, such as transport time and communication routes, tend to make the electoral process more efficient. ◆

VI. Technical Works for the Districting

6.1 District calculation by state

From paragraph 2.1 corresponding to criterion 2 "To determine the number of districts to be contained in each state, the results of the XII National Census of 2000, will be applied", results officially published by the INEGI (table 2).

Table 2

Final Results of the XII National Census of 2000.

Code	Entity	Population 2000
01	Aguascalientes	944,285
02	Baja California	2,487,367
03	South Baja California	424,041
04	Campeche	690,689
05	Coahuila	2,298,070
06	Colima	542,627
07	Chiapas	3,920,892
08	Chihuahua	3,052,907
09	Federal District	8,605,239
10	Durango	1,448,661
11	Guanajuato	4,663,032
12	Guerrero	3,079,649
13	Hidalgo	2,235,591
14	Jalisco	6,322,002
15	Mexico	13,096,686
16	Michoacán	3,985,667
17	Morelos	1,555,296
18	Nayarit	920,185
19	Nuevo León	3,834,141
20	Oaxaca	3,438,765
21	Puebla	5,076,686
22	Querétaro	1,404,306
23	Quintana Roo	874,963
24	San Luis Potosí	2,299,360
25	Sinaloa	2,536,844
26	Sonora	2,216,969
27	Tabasco	1,891,829
28	Tamaulipas	2,753,222
29	Tlaxcala	962,646
30	Veracruz	6,908,975
31	Yucatán	1,658,210
32	Zacatecas	1,353,610
National Total		**97,483,412**

Source: National Institute of Statistics, Geography and Informatics of Mexico. XII National Census 2000.

From paragraph 2.2 corresponding to criterion 2, when mentioning the number of districts per state, it reads: "*...The method **"Largest Remainder** with a mean", shall be used because it is the mathematical model that guaranties a better population balance." Applied as follows:*

a) The national mean was calculated by dividing the national population into the number of districts in which it was to be distributed.

NATIONAL MEAN = COUNTRY'S POPULATION/ NUMBER OF DISTRICTS TO DISTRIBUTE
NATIONAL MEAN = 97´483,412 inh / 300 dcts = 324,944.706667 inh/dct = 324,945 inh/dct

NATIONAL MEAN PER DISTRICT = 324,945

b) The population of each state was divided into the national mean. Each state was assigned a number of districts equal to the whole part obtained from the division.

c) In the case of South Baja California and Colima, the quotients were smaller than 2 (1.30 and 1.67, respectively), therefore, an additional district was directly assigned, to comply to the dispositions contained in Article 53 of the Constitution.

d) An additional district was assigned to those federal entities with the highest fractional figures.

Table 3 shows the final number of districts per state, considering the whole districts, the direct assignation according to article 53 in the Constitution, the assignation per largest remainder and the state mean.

TABLE 3

DISTRIBUTION OF NUMBER OF DISTRICTS FOR THE 32 FEDERAL ENTITIES.

State			District Assignation				
Cve	Name	Population 2000	Whole Districts	Direct Assignation (Article 53 Constitution)	Assignation Per Largest Remainder	Total Districts Per State (Final Distribution)	State Mean
1	Aguascalientes	944,285	2	0	1	3	314,761.67
2	Baja California	2,487,367	7	0	1	8	310,920.88
3	South Baja California	424,041	1	1	0	2	212,020.50
4	Campeche	690,689	2	0	0	2	345,344.50
5	Coahuila De Zaragoza	2,298,070	7	0	0	7	328,295.71
6	Colima	542,627	1	1	0	2	271,313.50
7	Chiapas	3,920,892	12	0	0	12	326,741.00
8	Chihuahua	3,052,907	9	0	0	9	339,211.89
9	Federal District	8,605,239	26	0	1	27	318,712.56
10	Durango	1,448,661	4	0	0	4	362,165.25
11	Guanajuato	4,663,032	14	0	0	14	333,073.71
12	Guerrero	3,079,649	9	0	0	9	342,183.22
13	Hidalgo	2,235,591	6	0	1	7	319,370.14
14	Jalisco	6,322,002	19	0	0	19	332,736.95
15	Mexico	13,096,686	40	0	0	40	327,417.15
16	Michoacán De Ocampo	3,985,667	12	0	0	12	332,138.92
17	Morelos	1,555,296	4	0	1	5	311,059.20
18	Nayarit	920,185	2	0	1	3	306,728.33
19	Nuevo León	3,834,141	11	0	1	12	319,511.75
20	Oaxaca	3,438,765	10	0	1	11	312,615.00
21	Puebla	5,076,686	15	0	1	16	317,292.88
22	Querétaro De Arteaga	1,404,306	4	0	0	4	351,076.50
23	Quintana Roo	874,963	2	0	1	3	291,054.33
24	San Luis Potosí	2,299,360	7	0	0	7	328,480.00
25	Sinaloa	2,536,844	7	0	1	8	317,105.50
26	Sonora	2,216,969	6	0	1	7	316,709.86
27	Tabasco	1,891,829	5	0	1	6	315,304.83
28	Tamaulipas	2,753,222	8	0	0	8	344,152.75
29	Tlaxcala	962,646	2	0	1	3	320,882.00
30	Veracruz De La Llave	6,908,975	21	0	0	21	328,998.81
31	Yucatán	1,658,210	5	0	0	5	331,642.00
32	Zacatecas	1,353,610	4	0	0	4	338,402.50
	National Total	**97,483,412**	**284**	**2**	**14**	**300**	

6.2 Integral instrumentation of criteria 4, 5 and 8: municipalities with 40 percent or more indigenous population, geographical aspects and urban municipalities

To instrument the criteria, the feasibility of being incorporated to the mathematical model of each one of them was considered. Criteria 4 and 8 regarding the preservation of the territorial integrity of the indigenous communities and the preference of integrating districts with whole municipalities, require a specific treatment due to their operative complexity, before incorporating them to the mathematical model. The above involved an integral analysis resulting in the conformation of a number of municipalities' groupings of both, urban areas and indigenous regions (methodological criterion determined by the CDI for population studies purposes. Such justification was analyzed prior the districting works in collaboration with the National Population Council). Grouping was a territorial portion integrated by a changing amount of urban municipalities or 40 percent and more indigenous population, that together may constitute one or more whole districts according to the population accumulated.

So, first, all urban and indigenous municipalities were identified and criteria 4 and 8 were applied. Afterwards, an analysis of criteria 3.2 (population balance) and 5 (geographical continuity) was made. Assuring in this way, the proper integration of the municipalities that were to participate in the mathematical model in a grouped fashion, considered also the geographical continuity and population of the rest of the municipalities within the entity. (table 4).

Under an integral analysis, the criteria were applied to the 106 urban districts distributed in 30 federal entities, as well as in the 650 municipalities pointed by the CDI with 40 percent and more indigenous population, distributed in 19 states.

Besides, the geographical continuity of the urban municipalities was analyzed and the corresponding geographical units (territorial portion composed by more than one urban municipality or by 40 percent and more indigenous population that do not integrate a whole district) were defined.

Table 4

Number of municipalities with 40 percent and more indigenous population and number of urban municipalities by state

Entity	Indigenous Municipalities	Urban Municipalities
Aguascalientes	0	1
Baja California	0	3
South Baja California	0	1
Campeche	4	1
Coahuila	0	3
Colima	0	0
Chiapas	39	3
Chihuahua	5	2
Federal District	0	14
Durango	1	2
Guanajuato	0	4
Guerrero	22	2
Hidalgo	23	1
Jalisco	2	5
Mexico	3	19
Michoacán	7	3
Morelos	0	2
Nayarit	1	1
Nuevo León	0	6
Oaxaca	309	1
Puebla	64	2
Querétaro	1	2
Quintana Roo	5	2
San Luis Potosí	14	2
Sinaloa	0	4
Sonora	1	3
Tabasco	0	4
Tamaulipas	0	6
Tlaxcala	2	0
Veracruz	49	5
Yucatán	98	1
Zacatecas	0	1
Total	**650**	**106**

6.2.1 Island Municipalities (territorial discontinuity)

To comply with criterion 5 (geographical continuity), the municipalities where the political-administrative division have no territorial continuity "island municipalities" were analyzed, the rural municipalities having inserted territories among themselves were grouped and integrated to the system in that way. In some urban municipalities the territorial discontinuity was respected giving priority to criterion 3.1 regarding the population balance (table 5).

Table 5

"Island municipalities" that were considered as independent for the determination of the urban grouping.

Code	Entity	Municipality	Mun. Code.	Municipality Or Fraction	Original Municipality
5	Coahuila	Torreón	35	North Torreón	Torreón
			900	South Torreón	Torreón
15	Mexico	Otzolotepec	68	East Otzolotepec	Otzolotepec
			902	West Otzolotepec	Otzolotepec
		Tlalnepantla De Baz	105	West Tlalnepantla De Baz	Tlalnepantla De Baz
			900	East Tlalnepantla De Baz	Tlalnepantla De Baz
		Tultitlán	110	South Tultitlán	Tultitlán
			901	North Tultitlán	Tultitlán
17	Morelos	Cuernavaca	7	North Cuernavaca	Cuernavaca
			900	South Cuernavaca	Temixco
21	Puebla	Cuautlancingo	42	West Cuautlancingo	Cuautlancingo
			901	East Cuautlancingo	Puebla Puebla
			902	Central Cuautlancingo	Puebla
			903	South Cuautlancingo	Puebla
		Puebla	115	West Puebla	Puebla
			900	East Puebla	Amozoc

Note:
The Otzolotepec municipality is rural, but it is inserted in the Northern portion of the Toluca municipality considered as urban and the Cuautlancingo municipality is rural, but is inserted en the Northwestern Puebla municipality, considered urban.

6.2.2 Urban municipalities grouping

Application of Criterion 8.1

The municipalities containing more population than the corresponding to 0.85 of the state mean or less than 1.15, will preferably not be fractioned and conform a district. Municipalities that constituted by themselves a district were identified.

Application of Criterion 8.2

The urban municipalities that don't reach the 0.85 previously mentioned and having conurbated urban localities, will be preferably grouped to conform districts with other municipalities with urban localities with whom they share geographic continuity, an adequate accessibility depending on the geographical evenness and transport time between municipalities and also, more integrated as a community.

Application of Criterion 8.3

In cases of municipalities with a total population larger that the state mean, the integration of complete districts in the inside will be promoted, and the exceeding territorial fraction will be added to adjoining municipalities, urban if possible, to conform another district. To comply with this criterion, there were two variants:

a) Criterion 8.3 without district surplus

In order to preserve the municipality integrity, the municipalities that due to their population and state mean could include complete districts, were identified, with no need of adding any exceeding territorial fraction to an adjoining municipality.

b) Criterion 8.3 with district surplus

Municipalities where the district proportion produced whole numbers with a surplus, were identified: In these cases, the surplus was grouped with the adjoining municipalities.

Once the municipalities that could include whole districts were identified, the next step was to identify adjoining urban municipalities and with conurbated localities that did not reach the 0.85 of the state mean, to develop the grouping proposal.

6.2.3 Identification and grouping of municipalities with indigenous population

As part of the integral instrumentation of criteria 4, 5 and 8, municipalities with 40 percent and more indigenous population were identified and whenever the case, grouped.

Criterion 4 of the General Council Agreement states that *The conformation of electoral districts with a majority of indigenous population will be sought. In any case the territorial integrity of the indigenous communities will be preserved and that the information provided by the National Commission for the Development of the Indigenous Communities (CDI), regarding localities and municipalities, will be used.*

With the information provided by the CDI, the geographical distribution of the municipalities with 40 percent and more indigenous population was represented, and proposals for the conformation of the geographic units were integrated (grouping of adjoining municipalities with 40 percent and more), respecting the territorial integrity of the indigenous communities, and were included in this fashion to the mathematical model.

The Criteria for the grouping of municipalities with 40 percent or more indige-nous population are the following:

1. Municipalities with 40 percent and more indigenous population, with a total population larger than 0.85 of the state mean and smaller than 1.15, will preferably not be fractioned and will constitute a district.
2. When several municipalities with 40 percent and more indigenous population constitute one or more whole districts, they will be integrated as a grouping and the system will design the internal district configuration.
3. When the indigenous municipalities grouping exceeds the proportion for whole districts, the district or districts will be constituted with the municipalities needed and the remainder will be constituted in geographic units that will act independently within the mathematical model.
4. Municipalities with 40 percent and more indigenous population with no possibility of being grouped due to lack of contiguity, will act independently within the model.

6.2.4 Geographical environment analysis and population distribution

After the stages above described, an integral analysis of the geographical environment was made, considering two main aspects:

a) **The geographical environment (Criterion 5)**

The geographical environment of the ungrouped municipalities was re-viewed, being careful not to have confined municipalities (those that after the grouping of urban municipalities or with 40 percent and more indigenous population, were left apart from municipalities of the entity with no possibility of being combined to integrate a continuous district).

b) **Population balance (Criterion 3.1)**

Once the groupings were defined as a result of applying criteria 4 and 8 or by some geographical isolation (Criterion 5), an integral analysis of the population of the ungrouped municipalities was carried out, and when the average district population exceeded the limits allowed, the proposals were modified.

6.2.5 Integral proposal

After implementing the integral analysis of the criteria, a final grouping proposal was obtained, that was represented cartographically and accompanied of technical reasoning as well as the analysis carried out in each stage. The political parties had the opportunity of reviewing this works and make relevant comments that were properly analyzed and answered, whenever pertinent, by the CTSED. After this process, the final grouping proposals were integrated into the mathematical model.

6.3 Analysis and validation of time table and inter-municipal distances

To make up the time table and inter-municipal distances, considerations were made on distance, means of transportation and average transport speed for each state. The Local Surveillance Commissions were in charge of the validation of the information. The Communication and Transport Ministry, as well as the Autonomous University of the State of Mexico contributed in the calculation of the transport times in the state of Oaxaca, which is particularly complex because it has more than 500 municipal administrative centers. For such a particular case, the procedure was as follows:

1. Topological refinement of the road network (updated to year 2003).
2. An average speed was determined for each kind of road (highway, paved, non-paved, path and trail).
3. According to the section of the road and given speed, optimal routes were calculated between administrative centers.
4. Transport time between administrative centers within Oaxaca was calculated.

6.4 Urban areas generation for 60 municipalities (system input)

At the time of integrating to the districting system the urban municipalities that were to be divided to conform more than one district in the inside, or those municipalities than added to other or others were to conform more than one district, it was detected that if electoral sections were directly used, a large number of cartographic units were involved. Therefore, it was necessary to group some of the sections considering the main routes inside the cities.

6.5 Calculation of population per electoral section and municipal population adjustment.

To district municipalities whose population exceeded 1.15 the state mean and those that due to its geographical situation had to be divided to be combined with other municipalities, a special procedure to associate the population data of the blocks and localities to the electoral sections, was applied.

It is worth mentioning that it was necessary to calculate the number of inhabitants in blocks with less than five inhabitants and in municipalities created after 2000, in the "island municipalities", in municipalities with discrepancies regarding their political-administrative boundaries and non adjoining territory sections.

6.6 Application of the criteria

The criteria for the 2004-2005 districting were included in the system according to the following considerations:

1. Input: information the system cannot modify.
2. Feasibility restrictions: are those which determine the kind of solutions that the system can or cannot generate.
3. Definition elements of the geographical units: rules the system obeys to create territorial units from municipalities and sections.
4. Components of the target function or cost function: those features that expressed mathematically, define the cost function of every possible districting. The numeric value of this function is lower when the proposal's configuration is better. The system will seek to minimize the cost function to find the best possible districting, according to the criteria considered.

6.7 Using the simulated annealing method

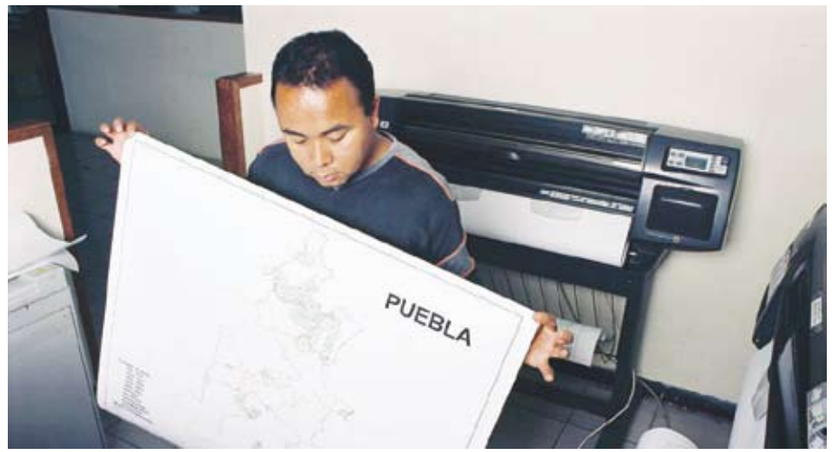
Many practical *combinatorial optimization* problems cannot be optimally resolved because the required computing times reach prohibitory levels. Therefore, the use of *approximation or heuristic algorithms* becomes compulsory, even if an optimal solution may not be generally guaranteed, but with the advantage of shortening the application times. In this way, the quality of the final solution is sacrificed in exchange of a shorter computing time. However, it is necessary to use algorithms that guarantee the smallest sacrifice.

One of these methods, the *simulated annealing*, consists of applying an optimization algorithm motivated by an analogy with the annealing or tempering of solids or metals. If a solid is heated more than its melting point and afterwards cooled, the structural properties of the solid obtained depend on the cooling. If the liquid is cooled slowly, large stable crystals will form. However, if the liquid is cooled fast, the crystals will show imperfections. The idea is to use the simulated annealing method to find feasible solutions and come closer to the optimal solution.

The application of a successive optimization algorithm assumes the definition of the configurations, a cost function and a *generation mechanism*, that is, a recipe to generate transition from one configuration to another by means of a small perturbation.

The procedure may be defined as follows: the process is launched with a given configuration, an interaction succession is generated, each one consists of a possible transition from the current configuration to another configuration elected from its vicinity. If the chosen configuration has a smaller cost, the current configuration is substituted by the neighbor; otherwise, the neighbor is rejected and another one is sought, and the cost will once again be compared to the current's. The procedure is repeated until a configuration whose cost is no worse than any of its neighbor's.

The successive optimization has the advantage of being applicable broadly speaking to a number of diverse problems: the configurations, cost function and generation mechanisms which tend to be easy to define. Besides, a sole running of the algorithm, for a sole initial configuration, for an average problem, may be executed within a reasonable time.



6.8 Configuration space (feasible scenarios or solutions).

The process of designing geo-electoral areas that contain a given number of inhabitants, is complex: from a series of defined criteria, a mathematical model which allows the construction of districting scenarios is used, complying with the given criteria and seeking for the one that produces the most satisfying scenario in terms of electoral equity. In mathematical terms, as mentioned, it is a problem, and for its resolution, a suitable algorithm and computing system must be developed.

Basically, it is about obtaining a mechanism to build acceptable scenarios or solutions (districting proposals) to comply with all the given criteria. On the other hand, it is necessary to design a mathematical function (*objective function or cost function*) that includes diverse satisfaction elements (criteria) and allows the quantitative comparison of two acceptable scenarios to decide which one turns out to be better, more convenient or more satisfactory.

6.9 Objective function or cost function

Usefulness of the objective function

- It's a way of measuring how good a configuration is.
- Allocates a value to each configuration, the value becomes smaller as the configuration improves.
- The algorithm will find the configuration with the lowest cost, therefore, the success of its application depends on the correct definition of the function.
- The cost function is a balanced addition of partial functions representing the diverse criteria.

Description of the cost function

To each scenario (S) a cost (C(S)) is assigned in the space of solutions, that will be decrease as the scenario gets better, following the districting criteria. C is named cost function or objective function and the purpose of the algorithm is to find the scenario that minimizes it more. In short, it's about calculating the value of the objective function for each feasible solution. Such function will be conformed of a balanced addition of other functions, each one of them will depend initially of the criteria established for the districting:

Cost function = population cost + geometric compactness cost + municipal integrity cost + temporary compactness cost

First component: *C_1 (S) cost per population deviation associated to scenario S*

The first component of the objective function $C_1(S)$ represents the average district deviations in relation to the population state mean, so that, when lowering the cost, the population deviations are lowered, always combined with the other variables, that is, considering the other criteria.

Second component: *C_2 (S) cost per geometric compactness associated to scenario S*

The second component of the objective $C_2(S)$ refers to the geometric or geographical compactness of the districts. Since the nature of the entities and attachment units (municipalities, sections and geographic units) is geometrically irregular, the use of classical geometric compactness measures may not be convenient. Therefore, a generalized measure of district compactness was created. The system imposes a cost to the lower district compactness.

The minimum unit used to evaluate a scenario's compactness is the section, because it is considered an acceptable geometric approximation in terms of producing satisfactory results without an excessive effort of computing processing.

Third component: *C_3 (S) cost per municipal integrity associated to scenario S*

The third component of the cost function $C_3(S)$, refers to the municipal integrity trying to configure whole districts within the municipalities in case of the municipalities in which the population exceeds the accepted limits to form a district and must be added to adjoining municipalities, being its fraction the one added to others to configure another district.

Fourth component: *C_4 (S) cost per temporary compactness associated to scenario S*

The temporary component $C_4(S)$ of the cost function considers the transport time, favoring the conformation of districts communicated to its interior.

6.10 Districting computing system

The RFE specialists developed a computing system to comply with the technical criteria approved by the General Council. This system, was created on purpose and is user friendly to generate district scenarios, allowing to work the urban independently from the rural and supplied with the following data:

- Digital electoral cartography of all the country.
  - Federal entities
  - Municipalities
  - Urban zones
  - Electoral sections
  - National road map
- Data on the population census of 2000
- Percentage of municipal indigenous population
- Population growth rates
- *Quickhull* (Convex Polygon which contains the district, approximated by the enveloped rectangles of its sections).
- Inter-municipal transport time.

The open nature of the system allowed its revision and correction in order to achieve the suitable application of the mathematical model demanded by the criteria emitted by the Agreement. The features of a "blind" system to electoral tendencies and open to comments from the political parties, guaranteed the transparency and neutrality. ◆

VII. Head District Administrative Centers

Agreement CG104/2004 of the General Council establishes that for the placement of the District Administrative Centers, the following parameters must be considered: more population, communication routes and public services, and in case of two or more similar localities, being one of them the current administrative center, this last one shall prevail. (Criterion 9).

The overall procedure to determine the placement of the administrative centers is as follows:

1. Analysis of the population in the municipalities and administrative centers that conform the districts.
2. Identification of conurbated areas within the districts.
3. Analysis of the access among all administrative centers integrating a district.
4. Analysis of number of public services within the municipalities and the municipal administrative centers.
5. Identification of municipal administrative centers that were district administrative centers in the previous districting.
6. Comparison of municipal population, municipal administrative centers population and number of services in both.
7. Choosing of municipal administrative centers with more population and more services.
8. Choosing of municipal administrative centers better communicated compared to others.
9. Election of the municipal administrative centers with more population, more services and more accessibility. ◆

VIII. Technical Committee for the Following and Assessment of the Districting Works (CTSED)

On August 3, 2004 the Technical Committee for the Following and Assessment of the Districting Works, was created (CTSED), as a qualified body responsible for the counseling, follow up and assessment of the districting works to guarantee that the citizen's vote had the same value in each one of the electoral districts. The Committee was conformed by renown academicians and specialists in areas directly related to the scientific and technical complexity of the process: Carlos Barros Horcasitas, Rodolfo Corona Vázquez, Arnulfo Embriz Osorio, Miguel Ángel Gutiérrez Andrade, Ignacio Méndez Ramírez, Manuel Ordorica Mellado. The Executive Secretariat of the Institute appointed Alberto Alonso y Coria as the technical secretary who was only entitled to give opinions and served as the link between the Committee and the Executive Secretariat.

The Main functions of the Committee were to:

1. Counsel, follow and assess the development of the activities related to the districting process;
2. Express technical opinions and evaluations regarding particular given cases;
3. Hold meetings and have permanent communication with the members of the General Council to keep an eye on the development of their tasks, and,
4. Produce a final inform, to the General Council, by means of the Executive Secretariat of the Federal Electoral Institute, regarding the districting process.

At all times, the Committee followed the guidelines contained in the Constitution of the United Mexican States and in the Federal Electoral Institutions and Procedures Code, regarding the principles of certainty, legality, autonomy, impartiality and objectivity, without interfering with the bodies of the Institute.

To carry out their duties properly, the Committee was supported by the Executive Directorship of the Federal Registry of Electors, which provided all resources and elements needed.

The Committee met 36 times, accumulating an approximate total of 250 hours devoted to the evaluation and following of the districting works, among which the following stand out: analysis of the differences between the geographical and statistical databases of the National Institute of Statistics, Geography and Informatics of Mexico (INEGI) and the IFE; objective function to rule the computing system; incorporation of municipal growth rates to the model; making up and approval of documents, among others.

The Committee also designed a method for the grouping of the urban districts.

It also asked for the counseling of the executive members and the Federal Registry of Electors from the local executive boards of the IFE, so that, along with the corresponding Local Surveillance Commission, validated the distances and transport time and issued specific justified proposals. These works were also handed to the political parties' representatives. Likewise, it asked for the intervention of the Consultative Support Directorship in Registering Matters to issue a legal opinion on the criteria established in the technical proposals to order to make adjustments.

Once the National Commission for the Development of the Indigenous Population (CDI) handed the document "Results of indigenous population and district proportionality applied to the districting system", it was agreed to integrate to the model the municipalities with indigenous population; the purpose was not to divide these communities.

The adjustments made to the model included adaptations to the criteria established such as the processing time, which was very long at first.

In a later stage, the members of the Committee concentrated in the analysis of the proportionalities of the cost function and the comments made by the political parties to the mathematical model. In this phase, it was necessary to evaluate the cost function by the generation of hundreds of scenarios, within the 32 federal entities, to find the one that would produce the best result. The political parties had extensive participation in this part of the process and from their comments some adequacies were made to the model.

In the Committee's meeting held on November 12, 2004, the methodologies for the calculation of the population per electoral section and instrumentation of criteria 4, 5 and 8, were approved. It was also agreed that, in a CNV session, the final version of the mathematical model would be handed to the parties' representations and two examples would be selected randomly for transparency purposes, to originate two different scenarios. The guidelines to be used by the model would be 4,3,2,1 corresponding to population, geometrical compactness, municipal integrity and temporality, respectively.

From November 22, to the 25th, the working groups held meetings with the attendance of parties' representatives, where the first scenario was handed and analyzed. The parties expressed their consent to the proper operation of the system and praised its flexibility in use.

Afterwards, the Committee focused on the analysis of the methodology to designate district administrative centers, as well as on the revision of the comments made by the political parties to the first and second districting scenarios, establishing a permanent session of 4 days to assess the comments of all political parties. For the second scenario, the Committee received 61 comments and 24 complementary ones, from political parties, also.

At the end of this process, the Committee issued a document containing systematic comments regarding those made by the parties' representatives.

The Committee based its evaluation on the complying with the criteria approved by the General Council from a global point of view, per state.

8.1 Conclusions

The Final Report on the Districting Process of 2004-2005 produced by the Technical Committee for the Following and Assessment of the Districting Works and handed to the General Council of the Federal Electoral Institute, included the following conclusions:

I. Within the technical parameters of its competence, this Committee concludes that the new division of the national territory into 300 hundred single-member electoral districts proposed by the Executive Directorship of the Federal Electoral Institute bestowed with its legal attributions, follows with precision and transparency the criteria established by the General Council of the Federal Electoral Institute.

II. The Committee considers that the use of the mathematical model, efficiently and successfully implemented by the members of the DERFE, allowed an objective and transparent application of the criteria approved by the General Council.

III. The computing system developed by the DERFE allowed the validation of the districting scenarios in numbers and graphics in a fast and efficient way, as well as the comparison of the scenarios proposed by the political parties. This enabled the efficient discouraging reduction of the analysis time used by the Committee to express its opinions.

IV. The population calculations made by the DERFE for the application of the model, may be considered a novel contribution of high technical precision that gave certainty to the districting works.

V. In the development of these works, the committee points out, the following of the constitutional orders that guarantee the legal and political recognition of the indigenous people and communities of our country. This allowed the establishment, for the first time in the geographical electoral framework of the country, the configuration of electoral districts that preserve the territorial integrity of the indigenous population.

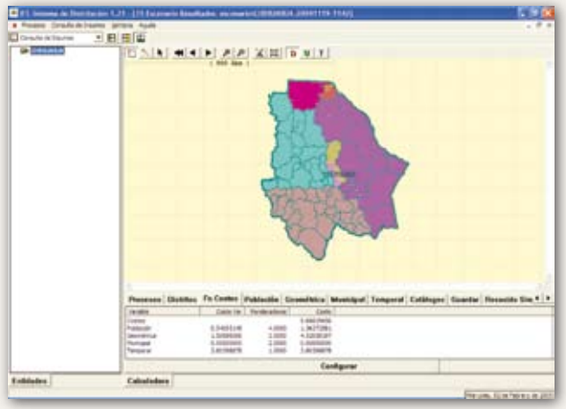
VI. The final districting proposal, is exclusively conformed by districts within the population ranges established by the Agreement of the General Council, allowing also, the strict application of the whole of the criteria established by the General Council.

VII. The Technical Committee recognizes the professional and supportive work that the Executive Directorship provided at all times and the working team from the Federal Registry of Electors.

VIII. The Technical Committee puts on record that during the development of its tasks, they had full technical and operative autonomy directed to the upright accomplishment of their goals and that their qualified decisions were invariably taken in full liberty. ◆

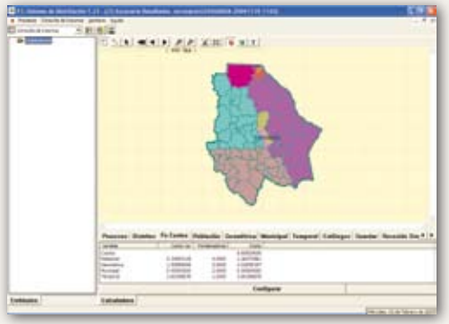
IX. Scenarios for the Districting 2004

9.1 Results of the first scenario



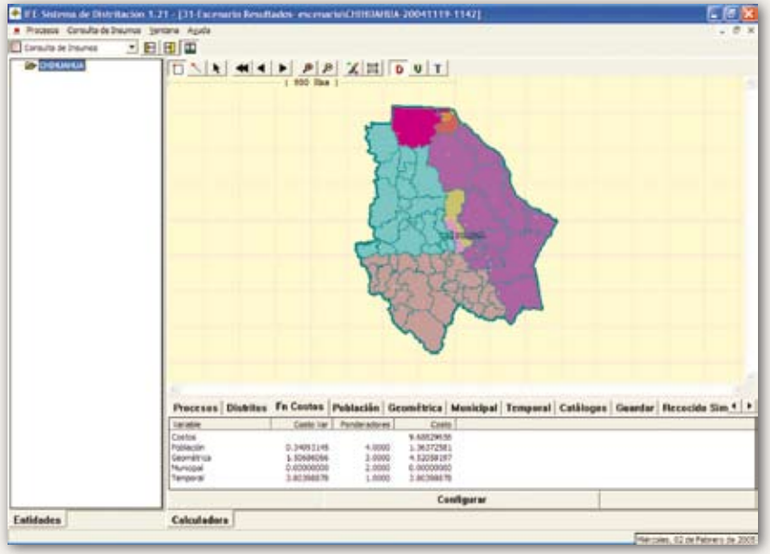
Example of the state of Chihuahua

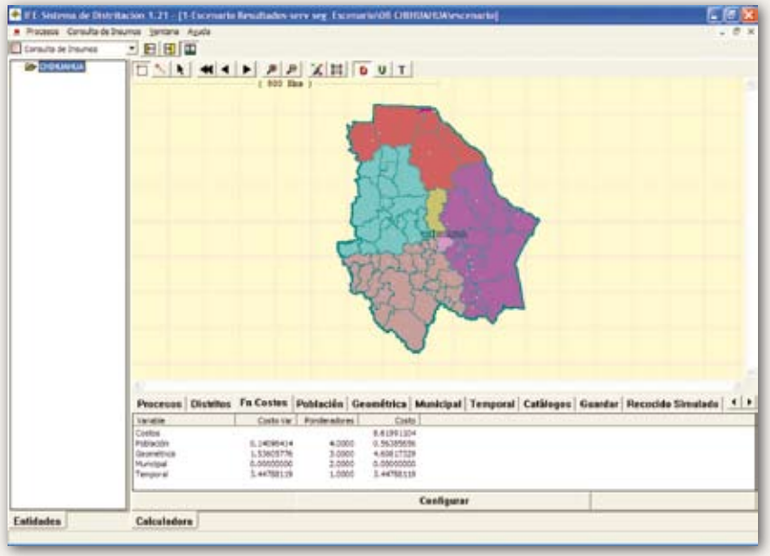
9.2 Results of the second scenario



Example of the state of Chihuahua

9.3 Final result





Example of the state of Chihuahua

x. Approval of the New Federal Electoral Geography

On February 11, 2005, after 25 months of hard work, the General Council of the IFE, unanimously approved, with the political parties' consent, the new districting to be the territorial basis for the elections of years 2006 and 2009.

10.1 Districting results

Districting results are included in table 6 before and after the districting process, as well as the number of districts gained or lost by state.

10.2 Districts with 40 percent and more indigenous population

According to the methodology proposed by the National Commission for the Development of the Indigenous Population (CDI) and the National Population Council (CONAPO), to classify as indigenous municipalities those which added up 40 percent or more, the districts including 40 percent or more indigenous population are shown in table 7.

Table 6
Number of districts before and after districting process 2004-2005, by state

Code	Entity	Districts before 2005	Current districts	Change in the number of districts
1	Aguascalientes	3	3	
2	Baja California	6	8	+ 2
3	South Baja California	2	2	
4	Campeche	2	2	
5	Coahuila	7	7	
6	Colima	2	2	
7	Chiapas	12	12	
8	Chihuahua	9	9	
9	Federal District	30	27	- 3
10	Durango	5	4	- 1
11	Guanajuato	15	14	- 1
12	Guerrero	10	9	- 1
13	Hidalgo	7	7	
14	Jalisco	19	19	
15	Mexico	36	40	+ 4
16	Michoacán	13	12	- 1
17	Morelos	4	5	+ 1
18	Nayarit	3	3	
19	Nuevo León	11	12	+ 1
20	Oaxaca	11	11	
21	Puebla	15	16	+ 1
22	Querétaro	4	4	
23	Quintana Roo	2	3	+ 1
24	San Luis Potosí	7	7	
25	Sinaloa	8	8	
26	Sonora	7	7	
27	Tabasco	6	6	
28	Tamaulipas	8	8	
29	Tlaxcala	3	3	
30	Veracruz	23	21	- 2
31	Yucatán	5	5	
32	Zacatecas	5	4	- 1
	Total	**300**	**300**	

Table 7
Districts with 40 percent and more indigenous population, by state

			Population		
State	**District**	**Administrative Center**	**Total**	**Indigenous**	**%**
Campeche	01	Campeche	328,299	133,080	40.54
Chiapas	01	Palenque	365,666	263,032	71.93
	02	Bochil	296,919	222,934	75.08
	03	Ocosingo	334,675	216,753	64.77
	05	San Cristobal De Las Casas	314,128	227,469	72.41
Guerrero	05	Tlapa De Comonfort	334,834	279,684	83.53
Hidalgo	01	Huejutla De Reyes Hidalgo	344,209	268,680	78.06
	02	Ixmiquilpan	325,737	149,285	45.83
México	09	Ixtlahuaca De Rayon	419,341	208,212	49.65
Oaxaca	01	San Juan Bautista Tuxtepec	307,864	124,930	40.58
	02	Teotitlan De Flores Magon	294,604	262,442	89.08
	04	Tlacolula De Matamoros	321,044	246,652	76.83
	05	Santo Domingo Tehuantepec	282,929	116,933	41.33
	06	Heroica Ciudad De Talxiaco	325,168	203,339	62.53
	07	Juchitan De Zaragoza	329,088	210,219	63.88
	10	Miahuatlan De Porfirio Diaz	303,801	129,116	42.50
	11	Santiago Pinotepa Nacional	335,878	145,323	43.27
Puebla	01	Huauchinango De Degollado	354,471	148,163	41.80
	04	Zacapoaxtla	348,885	280,076	80.28
	16	Ajalpan	284,521	163,784	57.56
Quintana Roo	01	Playa Del Carmen	155,567	72,773	46.78
San Luis Potosí	07	Tamazunchale	372,306	276,714	74.32
Veracruz	02	Tantoyuca	365,776	267,176	73.04
	06	Papantla De Olarte	325,892	170,516	52.32
	18	Zongolica	338,583	176,616	52.16
Yucatán	01	Valladolid	313,935	281,246	89.59
	02	Progreso	303,554	186,411	61.41
	05	Ticul	335,666	282,742	84.23

Districting in Numbers

Main Outcomes

- **The Mexican Republic is divided into 300 single-member federal electoral districts.**
- Each state must have two districts at least.
- **In May,1978 the districting prior to 1996 was carried out.**
- In July 1996, the IFE carried out the second districting of the country.
- **The districting configuration of 1996 was used in three elections (1997, 2000 and 2003).**
- The maximum number of districts per state depends on its population.
- **According to the National Census of 2000:**
  - There are 97 million 483 thousand 412 inhabitants.
  - **The ideal number of inhabitants per district is 324 thousand 945.**
  - 34 percent of the districts within the country had a population variant above 15 percent.
  - **13 entities have a district number different to the former.**
  - Out of the 19 which don't have a different number of districts, 12 of them include 34 districts out of range.
  - **The 7 remaining entities maintain districts within the population range, and 6 are capable of improvement.**
- Campeche is the only entity which maintained its former district configuration with a deviation of 0.5%. Even more, it's configuration is the same as the one used before the districting of 1996.
- **In febraury, 2005, the General Council of the IFE, unanimously approved, with political parties consent, the new districting to be the territorial basis for the Federal Elections of years 2006 and 2009.**
- The new districting shall be used in two elections (2006 and 2009).
- **The new districting does not include districts with population out of range.**
- For the election of the 200 deputies of proportional representation, the country is divided into 5 multi-member circumscriptions, in each one of them, 40 deputies are elected.

› During the districting, there were 212 comments and proposals from the national political parties, that were known and discussed by the Technical Committee for the Following and Assessment of the Districting Works and the same parties' representatives. The parties' opinions were classified as follows: 126 proposals of 6 parties regarding the first districting scenario, 61 proposals of 6 parties regarding the second and 25 complementary proposals of 6 political organizations regarding that same scenario.

› Of the districting, 28 electoral districts that preserve the territorial integration of indigenous communities in a 40% or more within the country, resulted, favoring their political participation in regards to the constitutional mandate.

› The entity with more districts is the State of Mexico with 40.

› The entities with less districts are South Baja California, Campeche and Colima with 2 districts each.

› The district with the greatest population is in Durango, belonging to the administrative center of Gómez Palacio.

› The district with fewer population in the country is in South Baja California, belonging to the administrative center of Santa Rosalía, Mulege.

› The entity which losses a higher number of districts if the Federal District with 3.

› The entity which increases with more districts is the State of Mexico with 4.

› The district with the largest geographical zone of the country is district 09 in Chihuahua, belonging to the administrative center of Hidalgo del Parral.

› The district with the smallest geographical zone of the country is district 31 in State of Mexico, located in Ciudad Nezahualcóyot.




Working Sessions for the Districting Process, 2004-2005

National Vigilance Commission

8 Ordinary and 6 Extraordinary
(14 Sessions)

CONASE

15 Ordinary and 11 Extraordinary
(26 Sessions)

Working and Analysis Groups to Discuss the Districting Criteria

20 meetings (7 of Population; 5 of Geographic Framework;
5 of Urban Districts; and 3 of Cultural Identity)

Technical Committee for the Following and Assessment of the Districting Works

25 Working Sessions

Working Groups Registered Before CNV And/or CONASE

13 Meetings

Working Groups Registered Before CNV and the Local Surveillance Commissions

36 Meetings (4 Plenary and one with each Local Surveillance Commission)

TOTAL MEETINGS AND HOURS DEVOTED:

134 meetings, 324:05 hours

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Multi-member Electoral Circumscriptions:

A Way To Democracy

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Foreword

The Lower Chamber of the Congress of the Union is made up of a mixed system of representation: relative majority and proportional representation.

This annex explains the technical procedures for the territorial delimitation and later approval of the multi-member federal electoral circumscriptions, to be applied for the first time in the election of proportional representation deputies in the elections of 2006.

First, the preceding is exposed, then, the circumscriptions delimitation is presented according to the comments and recommendations of the Electoral Roll Technical Committee, and finally, comments are made on the Agreement of the General Council of the IFE which approves the new territorial configuration in this matter.

I. Preceding

The configuration of multi-member electoral circumscriptions began in our country back in 1977, when the Constitutional reform of articles 52 and 54 stated the following:

"The Lower Chamber will be integrated of 300 deputies elected by the principle of relative majority, by means of a single-member electoral districts system, and 100 deputies that shall be elected by the principle of proportional representation, by means of Regional Lists System, elected in multi-member circumscriptions."

"For the election of the 100 deputies following the principle of proportional representation and the Regional Lists System, five multi-member electoral circumscriptions will be constituted throughout the country. The Law will determine the way to establish the territorial boundaries of such circumscriptions."

In 1986, a Constitutional reform is approved to change the number of deputies to be elected by proportional representation, from 100 to 200.

The territorial boundaries of the circumscriptions have changed at different times from 1977 to date; the last modification was made in 1996, such configuration was used in the election of deputies by the principle of proportional representation in the elections of 1997, 2000 and 2003.

The data obtained throughout the National Census of 2000 showed, that population dynamics and interstate migration, generated an imbalance in the number of inhabitants that made up each one of the multi-member electoral circumscriptions, therefore, a territorial restructuring was needed.

So, in the seventh point of agreement CG28/2005, published in the Federal Official Gazette (DOF by its acronym in Spanish), on August 3, 2005, the General Council of the Federal Electoral Institute commanded the General Executive Board to present by means of the Executive Directorship of the Federal Registry of Electors and during September 2005, the projects to determine the territorial boundaries of each one of the 5 multi-member electoral circumscriptions and the state capital to be the administrative center of each one of them.

To comply with this mandate, the DERFE led to design a methodology and a computing system that by applying a cost function, could generate a territorial configuration proposal for the 5 multi-member circumscriptions, guaranteeing the total transparency of the process. The results of the application of the system were reflected in the document "Proposal of Multi-member Electoral Circumscriptions" (Annex I) handed to the representatives of the political parties before the National Vigilance Commission, (CNV).

II. Technical Committee Of The Electoral Roll

On the other hand, on September 7, 2005, the Federal Official Gazette published the Agreement of the General Council of the Federal Electoral Institute, which decrees the creation of the Technical Committee of the Electoral Roll, as a technical-scientific consultation agency of the Federal Registry of Electors Commission, to study the electoral instruments to be used in the federal elections of July 2, 2006.

The Technical committee of the Electoral Roll included: Ana María Chávez Galindo, Rodolfo Corona Vázquez, Manuel Ordorica Mellado, Silvia Ruiz Velasco Acosta and Carlos Welti Chanes. One of the duties of this Committee was to advice the Federal Electoral Roll Commission in the definition of the territorial boundaries of the 5 multi-member circumscriptions and their administrative centers, in this way, the Committee learnt the proposal produced by the DERFE by means of the aforementioned document (the territorial configuration may be consulted in figure 2).

III. The New Proposal and the Possibility to use Social-economic and Cultural Variables

Chart 1 contains the comparative data of the Circumscriptions for 1996-2005 and those resulting from the application of the mathematical model, it is worth pointing out the better population balance of the new proposal, as well as the improvement in the cost function and population deviations (figures 1 and 2).

Also, on September 7, 2005, the parties' representatives accredited before the National Vigilance Commission, handed their comments to the aforementioned document. Afterwards, the Technical Committee of the Electoral Roll analyzed their statements and asked the DERFE to carry out several exercises and consider some criteria of social-economical regionalization.

One of these exercises considered the economic concept of "mesoregiones", proposed and developed by Ángel Bassols, Ph.D., which is based on geographical, social and economic variables; with the antecedent of districting Criterion 8.2b from Agreement CG/104/2004. The Committee also advised to consider Criterion 4 from the same agreement, regarding the integrity of the indigenous communities.

Chart 1. Comparative between Circumscriptions for 1996-2005 and those resulting from the application of the mathematical model

CIRCUMSCRIPTIONS FOR 1996-2005

Entity Code	Federal Entities	District Population	Districts
02	Baja California	2,487,367	8
03	Baja California Sur	424,041	2
06	Colima	542,627	2
11	Guanajuato	4,663,032	14
14	Jalisco •	6,322,002	19
18	Nayarit	920,185	3
25	Sinaloa	2,536,844	8
26	Sonora	2,216,969	7
	Total 8	**20,113,067**	**63**

Entity Code	Federal Entities	District Population	Districts
01	Aguascalientes	944,285	3
05	Coahuila	2,298,070	7
08	Chihuahua	3,052,907	9
10	Durango	1,448,661	4
19	Nuevo León •	3,834,141	12
22	Querétaro	1,404,306	4
24	San Luis Potosí	2,299,360	7
28	Tamaulipas	2,753,222	8
32	Zacatecas	1,353,610	4
	Total 9	**19,388,562**	**58**

Entity Code	Federal Entities	District Population	Districts
04	Campeche	690,689	2
07	Chiapas	3,920,892	12
20	Oaxaca	3,438,765	11
23	Quintana Roo	874,963	3
27	Tabasco	1,891,829	6
30	Veracruz •	6,908,975	21
31	Yucatán	1,658,210	5
	Total 7	**19,384,323**	**60**

Entity Code	Federal Entities	District Population	Districts
09	Federal District •	8,605,239	27
13	Hidalgo	2,235,591	7
17	Morelos	1,555,296	5
21	Puebla	5,076,686	16
29	Tlaxcala	962,646	3
	Total 5	**18,435,458**	**58**

Entity Code	Federal Entities	District Population	Districts
12	Guerrero	3,079,649	9
15	México •	13,096,686	40
16	Michoacán	3,985,667	12
	Total 3	**21,162,002**	**61**

MATHEMATICAL MODEL PROPOSAL

Entity Code	Federal Entities	District Population	Districts
02	Baja California	2,487,367	8
03	Baja California Sur	424,041	2
08	Chihuahua	3,052,907	9
10	Durango	1,448,661	4
14	Jalisco •	6,322,002	19
18	Nayarit	920,185	3
25	Sinaloa	2,536,844	8
26	Sonora	2,216,969	7
	Total 8	**19,408,976**	**60**

Entity Code	Federal Entities	District Population	Districts
01	Aguascalientes	944,285	3
05	Coahuila	2,298,070	7
11	Guanajuato	4,663,032	15
19	Nuevo León •	3,834,141	11
22	Querétaro	1,404,306	4
24	San Luis Potosí	2,299,360	7
28	Tamaulipas	2,753,222	8
32	Zacatecas	1,353,610	5
	Total 8	**19,550,026**	**59**

Entity Code	Federal Entities	District Population	Districts
04	Campeche	690,689	2
07	Chiapas	3,920,892	12
20	Oaxaca	3,438,765	11
23	Quintana Roo	874,963	3
27	Tabasco	1,891,829	6
30	Veracruz •	6,908,975	21
31	Yucatán	1,658,210	5
	Total 7	**19,384,323**	**60**

Entity Code	Federal Entities	District Population	Districts
09	Federal District •	8,605,239	27
12	Guerrero	3,079,649	9
17	Morelos	1,555,296	5
21	Puebla	5,076,686	16
29	Tlaxcala	962,646	3
	Total 5	**19,279,516**	**60**

Entity Code	Federal Entities	District Population	Districts
06	Colima	542,627	2
13	Hidalgo	2,235,591	7
15	México •	13,096,686	40
16	Michoacán	3,985,667	12
	Total 4	**19,860,571**	**61**

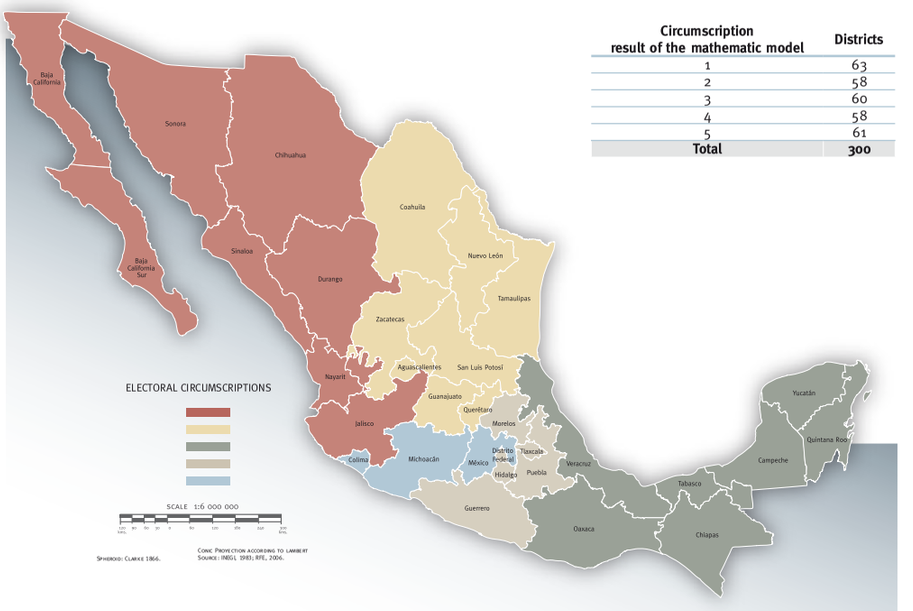
• Circumscription Head Entity
Federal entities that changed circumscription, regarding 1996-2005 conformation.

Circumscription 1996 - 1005	Distrcts
1	63
2	58
3	60
4	58
5	61
Total	**300**

Federal Entities	Population		Deviation
Aguascalientes	944,285		0
Baja California	2,487,367		0
South Baja California	424,041		0
Campeche	690,689		0
Coahuila De Zaragoza	2,298,070		0
Colima	542,627		0
Chiapas	3,920,892		0
Chihuahua	3,052,907		0
Federal District	8,605,239		0
Durango	1,448,661		0
Guanajuato	4,663,032		0
Guerrero	3,079,649	1	3,079,649
Hidalgo	2,235,591		0
Jalisco	6,322,002		0
Mexico	13,096,686	1	13,096,686
Michoacán De Ocampo	3,985,667	1	3,985,667
Morelos	1,555,296		0
Nayarit	920,185		0
Nuevo León	3,834,141		0
Oaxaca	3,438,765		0
Puebla	5,076,666		0
Querétaro De Arteaga	1,404,306	1	1,404,306
Quintana Roo	874,963		0
San Luis Potosí	2,299,360		0
Sinaloa	2,536,844		0
Sonora	2,216,969		0
Tabasco	1,891,829		0
Tamaulipas	2,753,222		0
Tlaxcala	962,646		0
Veracruz De La Llave	6,908,975		0
Yucatán	1,658,210		0
Zacatecas	1,353,610		0
Totals	**97,483,412**	**4**	**21,566,308**

D	Population	Statal Mean	Statal Difference
01	19,388,562	-0.5546	-108,120
02	20,113,067	3.1615	616,385
03	19,384,323	-0.5763	-112,359
04	20,162,002	3.4125	665,320
05	18,435,458	-5.4431	-1,061,224

FIGURE 1 • Population deviations of the multi-member circumscriptions for 1996-2005



Circumscription result of the mathematic model	Districts
1	63
2	58
3	60
4	58
5	61
Total	**300**

Federal Entities	Population		Deviation
Aguascalientes	944,285	1	944,285
Baja California	2,487,367		0
South Baja California	424,041		0
Campeche	690,689		0
Coahuila De Zaragoza	2,298,070	1	2,298,070
Colima	542,627	1	542,627
Chiapas	3,920,892		0
Chihuahua	3,052,907		0
Federal District	8,605,239		0
Durango	1,448,661		0
Guanajuato	4,663,032	1	4,663,032
Guerrero	3,079,649	1	3,079,649
Hidalgo	2,235,591	1	2,235,591
Jalisco	6,322,002		0
Mexico	13,096,686	1	13,096,686
Michoacán De Ocampo	3,985,667	1	3,985,667
Morelos	1,555,296		0
Nayarit	920,185		0
Nuevo León	3,834,141		0
Oaxaca	3,438,765		0
Puebla	5,076,666		0
Querétaro De Arteaga	1,404,306	1	1,404,306
Quintana Roo	874,963		0
San Luis Potosí	2,299,360		0
Sinaloa	2,536,844		0
Sonora	2,216,969		0
Tabasco	1,891,829		0
Tamaulipas	2,753,222		0
Tlaxcala	962,646		0
Veracruz De La Llave	6,908,975		0
Yucatán	1,658,210		0
Zacatecas	1,353,610		0
Totals	**97,483,412**	**9**	**32,249,913**

D	Population	Statal Mean	Statal Difference
01	19,408,976	-0.4499	-87,706
02	19,550,026	0.2736	53,344
03	19,860,571	1.8664	363,889
04	19,279,516	-1.1139	-217,166
05	19,384,323	-0.5763	-112,359

FIGURE 2 • Population deviations of the multi-member circumscriptions resulting from the application of the mathematical model

Multi-Member Circumscriptions, 2005

ELECTORAL GEOGRAPHIC FRAMEWORK

Circumscription	Federal Entities	Districts	Municipalities	Electoral Sections
01	02 Baja California	8	5	1,370
	03 Baja California Sur	2	5	352
	08 Chihuahua	9	67	2,842
	10 Durango	4	39	1,391
	14 Jalisco	19	124	3,326
	18 Nayarit	3	20	878
	25 Sinaloa	8	18	3,789
	26 Sonora	7	72	1,331
	Subtotal	**60**	**350**	**15,279**
02	01 Aguascalientes	3	11	486
	05 Coahuila	7	38	1,520
	11 Guanajuato	15	46	3,005
	19 Nuevo León	11	51	2,135
	22 Querétaro	4	18	696
	24 San Luis Potosí	7	58	1,795
	28 Tamaulipas	8	43	1,739
	32 Zacatecas	5	57	1,882
	Subtotal	**59**	**322**	**13,260**
03	04 Campeche	2	10	490
	07 Chiapas	12	111	1,929
	20 Oaxaca	11	570	2,453
	23 Quintana Roo	3	8	450
	27 Tabasco	6	17	1,133
	30 Veracruz	21	212	4,722
	31 Yucatán	5	106	1,059
	Subtotal	**60**	**1,032**	**12,236**
04	09 Distrito Federal	27	16	5,535
	12 Guerrero	9	77	2,786
	17 Morelos	5	33	907
	21 Puebla	16	217	2,550
	29 Tlaxcala	3	60	608
	Subtotal	**60**	**403**	**12,386**
05	06 Colima	2	10	336
	13 Hidalgo	7	84	1,707
	15 México	40	125	5,930
	16 Michoacán	12	113	2,677
	Subtotal	**61**	**332**	**10,650**
TOTAL		**300**	**2,441**	**63,811**

Cartographic cut: september 30, 2005.

Multi-member electoral circumscriptions 1996.

ELECTORAL GEOGRÁPHIC FRAMEWORK

Circumscription	Federal Entities	Districts	Municipalities	Electoral Sections
01	02 Baja California	6	5	1,370
	03 Baja California Sur	2	5	352
	06 Colima	2	10	336
	11 Guanajuato	15	46	3,000
	14 Jalisco	19	124	3,311
	18 Nayarit	3	20	878
	25 Sinaloa	8	18	3,789
	26 Sonora	7	72	1,331
	Subtotal	**62**	**300**	**14,372**
02	01 Aguascalientes	3	11	486
	05 Coahuila	7	38	1,520
	08 Chihuahua	9	67	2,710
	10 Durango	5	39	1,391
	19 Nuevo León	11	51	2,123
	22 Querétaro	4	18	687
	24 San Luis Potosí	7	58	1,795
	28 Tamaulipas	8	43	1,739
	32 Zacatecas	5	56	1,882
	Subtotal	**59**	**381**	**14,333**
03	04 Campeche	2	10	490
	07 Chiapas	12	111	1,929
	20 Oaxaca	11	570	2,451
	23 Quintana Roo	2	8	450
	27 Tabasco	6	17	1,133
	30 Veracruz	23	210	4,719
	31 Yucatán	5	108	1,059
	Subtotal	**61**	**1,032**	**12,231**
04	09 Federal	30	16	5,535
	13 Hidalgo	7	84	1,707
	17 Morelos	4	33	908
	21 Puebla	15	217	2,548
	29 Tlaxcala	3	80	608
	Subtotal	**59**	**410**	**11,304**
05	12 Guerrero	10	76	2,782
	15 México	36	122	5,921
	16 Michoacán	13	113	2,676
	Subtotal	**59**	**311**	**11,379**
TOTAL		**300**	**2,434**	**63,619**

Source: RFE, DCE, 1997.

Chart 2. Comparative geographic framework between Circumscriptions for 1996-2005 and those resulting from the application of the mathematical model

IV. Conclusions of the Technical Committee of the Electoral Roll

Regarding the territorial configuration of the multi-member federal electoral circumscriptions, the Technical Committee of the Electoral Roll submitted the following conclusions:

1. About the concept and definition of electoral circumscription.

Regarding the definition of circumscription, it is important to bear in mind that it must not necessarily be related to the social-economical concept or region, since the multi-member circumscription limits to the proportional representation and must be based in the homogeneous regionalization of the population, grouping federal entities to obtain a similar number of seats per region to conform the Lower Chamber.

2. About the criteria for the delimitation of the circumscriptions.

The main criterion for the territorial division of the multi-member electoral circumscriptions is population balance because it determines the balance between the number of inhabitants and the number of representatives in the Congress.

The most appropriate criteria considered by the DERFE in the production of the circumscriptions' proposal are: population balance, number of districts balance, geographical continuity and respect to the state boundaries.

3. About the mathematical model proposal.

The proposal produced by the mathematical model was based on: the use of the federal entities as minimal association units, the connection of the geographic zones in the circumscriptions scenarios and population balance as the ruling criterion.

In this way, the cost function obtained the ideal population configuration value for the 5 circumscriptions by means of the optimization with combinatorial analysis.

Using this technique, and supported by a computing system (the source programs, the data input, and the executable programs were released to parties' representatives), offered elements of certainty, legality, impartiality, objectivity and transparency in the making up of the proposal for the territorial configuration of the 5 multi-member electoral circumscriptions.

4. About the circumscriptions' administrative centers.

According to the scenario proposed by the DERFE, it was noticed that the nominated and current administrative centers, meet the requirements for the thorough fulfillment of their duties.

5. About additional considerations.

When comparing different scenarios, it was made clear that the nominated circumscriptions have the additional advantage of respecting the territorial integrity of most of the indigenous communities.

The committee considered the possibility of using the "mesoregiones" concept. However, it was concluded that such methodology was not applicable due to the loss of population balance within the circumscriptions.

V. Committee Views

According to what has been stated, the Technical Committee of the Electoral Roll recommended as the best territorial configuration proposal for the 5 multi-member electoral circumscriptions, the so called "MATHEMATICAL MODEL PROPOSAL" and to keep the location of the current Circumscription Administrative Centers.

VI. Approval of the New Territorial Boundaries of the Multi-member Federal Electoral Circumscriptions

On September 30, 2005, the General Council of the Federal Electoral Institute approved the agreement on the territorial configuration of the 5 Multi-member Federal Electoral Circumscriptions to be used for the designation of proportional representation deputies in the federal elections of 2006.

Executive Directorship Of The Federal Registry Of Electors

(At the moment of the Districting Process, 2004-2005)

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Electoral Roll Update Unit
Melania Núñez Medina. In charge

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Editorial Coordination:
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Graphic Design
Mónica Méndez Padilla Jiménez

Fotography
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Printed in Talleres Gráficos de México, Canal del Norte No. 80,
Col. Felipe Pescador, Cuauhtémoc, 06280 México City.
May 2009. 1,000 copies.

Mexican Electoral Districting

This document constitutes the memoir of the districting process carried out by the IFE during years 2004-2005. The reading accounts for the magnitude of the task carried out and is the cornerstone for other similar exercises to be performed periodically to guarantee that Mexican citizens concur to the ballots to vote for their rulers with the certainty of being part of a complex yet transparent political process, which enables us to fully execute our democratic rights and responsibilities.

This memoir also describes the importance of the electoral districting in order to reduce the possible demographic imbalances which may cause inequality or distrust in terms of electoral representation. This project involved the participation of many people, including academics, directive and technical personell who worked intensely every day to finish the assigned task with the major commitment to the citizenship.

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