

**INTERNATIONAL BOUNDARY AND WATER COMMISSION  
UNITED STATES AND MEXICO**

MINUTE NO. 262

Ciudad Juarez, Chih.  
December 26, 1979

**INTERNATIONAL BOUNDARY AND WATER COMMISSION  
UNITED STATES AND MEXICO**

**RECOMMENDATIONS FOR WORKS TO PRESERVE FOR  
THE RIO GRANDE ITS CHARACTER AS THE INTERNATIONAL BOUNDARY  
IN THE REACH FROM CAJONCITOS, CHIHUAHUA TO HACIENDITA, TEXAS**

The Commission met in the offices of the Mexican Section in Ciudad Juarez, Chihuahua at 10:00 a.m. on December 26, 1979, to consider recommendations for works which should be executed to preserve for the Rio Grande its character as the international boundary in the 199-mile (320 kilometer) reach from Cajoncitos, Chihuahua to Haciendita, Texas pursuant to "The Treaty Between the United States and Mexico to Resolve Pending Boundary Differences and Maintain the Rio Grande and Colorado River as the International Boundary" signed November 23, 1970, hereinafter referred to as "The 1970 Treaty".

The Commission reviewed the problem that has developed in the Cajoncitos-Haciendita reach of the Rio Grande incident to the reduction in its flows in recent decades to the extent that the river is not capable of naturally maintaining its channel. The Commissioners noted that in many places the channel has become so filled with sediment and become so overgrown with vegetation that the channel, and hence the boundary, is difficult to find. The Commissioners noted that several changes in the course of the river occurred in 1978 because of the high water of that year and because of the lack of a well-defined channel, and that the Commission will have to take up these cases under the terms of the 1970 Treaty. The Commission agreed that this reach of the Rio Grande presents a serious boundary problem and that unless measures are soon taken to restore and preserve the channel, its character as the boundary will be completely lost in large sections of the reach, and that in other sections of the reach the river may be expected to change its course to cause separation of tracts of lands from one side of the river to the other. The Commission noted that this is the only reach in the 1250 miles (2013 kilometers) of the boundary marked by the Rio Grande that the described problem exists, because in other reaches the river has sufficient flow to naturally maintain its channel.

The Commission reviewed the 1970 Treaty and observed that one of its principal purposes is to provide for restoration of the character of the Rio Grande as the international boundary in the reaches where that character has been lost, to preserve that character, and to minimize changes in the channel. The Commissioners noted that Article IV C (1) stipulates that "The Commission shall recommend to the two Governments, the execution of works it may consider advisable and practical for improvement and stabilization of the channels of the Rio Grande and of the Colorado River in their limitrophe sections..."

The Commission reviewed the "Joint Report of the Principal Engineers on Plans and Procedures to Preserve the Channel of the Rio Grande as the International Boundary in the Reach from the end of the Rectification Project near Cajoncitos to Haciendita", dated April 11, 1979, and submitted by Principal Engineers Delbert D. McNealy and Jenaro Paz Reyes. The text is attached to this Minute and forms a part hereof.

The Commission agreed that improvement and maintenance of the channel of the Rio Grande and adjoining overbank areas in the Cajoncitos-Haciendita reach, in accordance with the engineering plans proposed by the Principal Engineers in their Joint Report, would be the most practical means of restoring and preserving for the Rio Grande its character as the international boundary. The Commissioners further agreed that division of the restoration work and of the maintenance work as proposed by the Principal Engineers would effect an equal division of the costs between the two Governments, with the understanding that such divisions should be subject to exchanges of items of construction work and of items of maintenance work to facilitate their performance, as may be agreed upon by the Commission.

The Commission also agreed that the proposal by the Principal Engineers to provide and maintain a cleared berm on each bank of the river channel for a width of 100 feet (30.5 meters) from the international boundary except for a 25-foot (7.6 meter) strip of natural vegetation along each bank, would satisfy the requirement of Article IV B (1) of the 1970 Treaty; namely that each Government shall prohibit the construction of works which, in the judgment of the Commission, may cause deflection or obstruction of the

normal flow of the river or of its flood flows. The Commissioners also agreed that such cleared width will be consistent with that provided for in Minute No. 247 for the lowermost section of the reach from Paradero to Haciendita.

The Commission then referred to Article IV C (2) of the 1970 Treaty which provides that as soon as may be practical, after the two Governments approve the Commission's recommendation, each of the contracting States shall execute, at its expense, its share of the construction, operation and maintenance for the improvement and stabilization of the channels. The Commissioners confirmed the urgency of execution of the plan for preservation of the channel in the Cajoncitos-Haciendita reach and agreed that it should be completed within three years subject to and after approval of the recommendations by the two Governments. They further agreed that because of the long length of the channel to be improved by each Government through its Section of the Commission, and because each Government can perform its share of the channel work and of the adjoining overbank clearing and other work on its side of the river without in any way interfering with or depending upon the work of the other, the execution of the works by the two Governments does not have to be undertaken and performed simultaneously. Each Government through its Section may proceed independently to perform its share of the work in accordance with its schedule under the supervision of the Commission.

The Commission then adopted the following Recommendations subject to the approval of the two Governments:

1. That the two Governments, through their respective Sections of the Commission and under its supervision, construct the works for the preservation of the channel of the Rio Grande as the international boundary in the Cajoncitos-Haciendita reach, in accordance with the plan and procedures described in the Joint Report of the Principal Engineers on Plans and Procedures to Preserve the Channel of the Rio Grande as the International Boundary in the Reach from the End of the Rectification Project near Cajoncitos to

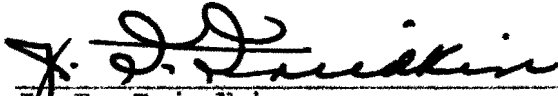

Haciendita, dated April 11, 1979, the text of which is attached to this Minute and forms a part hereof, and subsequently maintain the works as described in the same report; and that the costs of the works of construction and of maintenance be equally divided, with each Government performing through its Section of the Commission one-half of the works of construction and of maintenance as described in the Joint Report of the Principal Engineers.



2. That to conform with the stipulations of Article IV B (1) of the 1970 Treaty each Government prohibit the construction of levees or other works in its territory for a distance of 100 feet (30.5 meters) from the international boundary including a 25-foot (7.6 meter) strip of vegetation along each bank of the river as provided for in the Joint Report of the Principal Engineers.

3. That the two Governments, through their respective Sections, undertake and complete construction of the works recommended within three years after approval of this Minute with the understanding that each Government through its Section may proceed independently to perform its share of the work, in accordance with its schedule under the supervision of the Commission.

4. That this Minute requires the specific approval of the two Governments.

The meeting adjourned.

 _____ J. F. Friedkin Commissioner for the United States	 _____ Joaquin Bustamante R. Commissioner for Mexico
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 _____ Manuel R. Barra Secretary for the United States Section	 _____ Lorenzo S. Padilla Secretary for the Mexican Section
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INTERNATIONAL BOUNDARY AND WATER COMMISSION  
UNITED STATES AND MEXICO

Ciudad Juarez, Chihuahua  
April 11, 1979

JOINT REPORT OF THE PRINCIPAL ENGINEERS  
ON PLANS AND PROCEDURES TO PRESERVE THE CHANNEL  
OF THE RIO GRANDE AS THE INTERNATIONAL BOUNDARY  
IN THE REACH FROM THE END OF THE RECTIFICATION PROJECT  
NEAR CAJONCITOS TO HACIENDITA

To the Honorable Commissioners  
International Boundary and Water Commission  
United States and Mexico  
El Paso, Texas, and Ciudad Juarez, Chihuahua

Sirs:

Pursuant to your instructions, we respectfully submit for your consideration this joint report recommending plans and procedures to preserve the channel of the Rio Grande as the international boundary, from the end of the Rectification Project near Cajoncitos downstream to Haciendita, in accordance with Article IV of the "Treaty to Resolve Pending Boundary Differences and Maintain the Rio Grande and Colorado River as the International Boundary," signed November 23, 1970, hereinafter referred to as the 1970 Boundary Treaty.

Article IV stipulates that "... to reduce to a minimum the shifting of the channels of the Rio Grande and the Colorado River in their limitrophe sections, and the problems that would be caused by the separation of tracts of land, ... the Commission shall recommend to the two governments the execution of works it may consider advisable and practical for improvement and stabilization of the channels of the Rio Grande ... in its limitrophe sections, including among

others ... clearing, channel excavation, bank protection, and rectifications." The Article also provides that "The Commission shall include in its recommendations an estimate of the costs of construction, operation and maintenance of the works and a proposal for the division of work and costs between the Contracting States."

Further, Article 4B(1) of the 1970 Boundary Treaty provides:

"Both in the main channel of the river and on adjacent lands to a distance on either side of the international boundary recommended by the Commission and approved by the two governments, each Contracting State shall prohibit the construction of works in its territory which, in the judgment of the Commission, may cause deflection or obstruction of the normal flow of the river or of its flood flows."

#### The Reach to be Preserved

The reach of the Rio Grande to be preserved begins near the village of Cajoncitos, Chihuahua, at the downstream end of the Rio Grande Rectification Project, about 85 miles (137 km) downstream from El Paso, Texas, and Juarez, Chihuahua, and extends some 198.8 river miles (320.1 km) to the Village of Haciendita, Texas, about five miles (eight km) upstream from Presidio, Texas, and Ojinaga, Chihuahua. The river in this reach traverses a series of canyons having an aggregate distance of about 29.3 miles (47.2 km) where rock walls closely restrict the river channel against any significant lateral movement. The remaining 169.5 miles (272.9 km) traverse a series of narrow alluvial valleys whose widths vary from about one-half to 1.5 miles (0.8 to 2.4 km). Within these valleys the river follows a shifting, meandering course. The location of the reach is shown on the map, Exhibit No. 1.

The Problem

The channel of the Rio Grande in this reach has seriously deteriorated since the late 1940's due to its becoming filled with sediment and overgrown with salt cedar. The deterioration has occurred to the extent that the channel is barely discernible in some segments. Unless the channel is restored and preserved, it is believed that many of its segments in the valley sections will be completely obliterated within the next five to ten years.

The deterioration of the channel since the late 1940's has been incident to a marked reduction in the flows of the Rio Grande entering the reach at Fort Quitman. As a consequence, the river has not been able naturally to maintain its channel clean of sediments and vegetation. The problem is seriously aggravated by the flash flood runoff into the reach from more than 100 arroyos which head in the surrounding mountains on the United States and Mexican sides. The flood inflows bring large quantities of heavy sediments into the river channel, which in large part remain and which have steadily reduced the gradient of the river in the valley reaches and have progressively decreased its cross-sections. There are places where the channel is now only three feet or less in width and one foot or less in depth. Moreover, the rapid encroachment of salt cedar into the channel further aggravates the problem. For these reasons, a number of channel changes are currently in progress.

The problem is, therefore, that without early action to restore to the Rio Grande a well-defined channel, and preserve it to mark the boundary, the character of the river as the international boundary will soon be lost in many sections of the reach. Serious international questions could arise as to the location of the boundary. The 1970 Boundary Treaty was designed to guard against just such questions.

#### Surveys, Studies, and Investigations

The base survey maps used for the study and investigation were the "1972 International Boundary Survey" aerial photographic maps as approved by Minute No. 253, dated September 23, 1976. Field surveys made of the channel in this reach in 1977 included 337 cross-sections and surveys of the location and type and number of irrigation structures now existing in the channel that will require either removal or replacement. Studies were made to determine the minimum cross-section required to provide a reasonably well-defined channel to mark the Rio Grande as the international boundary. The amount of excavation from the channel required to provide the well-defined cross-section throughout the reach was estimated from the channel cross-section data. Studies were made to determine the distance of clearing required on each side of the channel to carry most of its overflows to guard against their causing channel changes. Each of the items of work needed was defined, and the total quantities of work required to preserve the channel in the 198.8-mile (320.1-km) reach were estimated.



Engineering Plans and Estimates

The basic engineering plan is to preserve the channel in the reach along the existing alignment by simply enlarging and maintaining the channel cross-sections where and as needed to provide a well-defined cross-section to clearly demark the boundary, and to provide a cleared floodway on each side of the channel to facilitate the flow of floodwaters along the course of the river.

We find that the minimum channel cross-section required to provide a well-defined channel to mark the international boundary should have a depth of about six feet (1.8 m), a bottom width of 16.4 feet (5.0 m), and side slopes varying from  $1\frac{1}{2}$  to 1 to 2 to 1 that will result in a top width of about 38 feet (11.6 m), reference Exhibit No. 2. The plan is to excavate the channel in the deteriorated sections to provide the described minimum cross-section, with as uniform bottom grade as is practical in each section.

We find that to comply with the provisions of 4B(1) of the 1970 Boundary Treaty, each contracting state should prohibit the construction of works in its territory within 100 feet (30.5 m) of the center line of the river channel, which in the judgment of the Commission, may cause deflection or obstruction of the normal flow of the river or of its floodflows.

We find that no work is required in the 29.3 miles (47.2 km) of canyon sections because the river is so narrowly confined by the canyon walls that the boundary is clearly demarked and not likely to change. In the remaining 169.5 miles (272.9 km) of the reach, the

channel is badly deteriorated in a number of sections, estimated to aggregate about 90.14 miles (145.10 km). These sections are noted on the maps, Exhibits Nos. 3a, 3b, and 3c.

The materials excavated from the channel are to be disposed of outside a zone extending a distance of 100 feet (30.5 m) from each side of the center line of the channel as shown on Exhibit No. 4. Based upon the 337 cross-sections taken in 1977 and the new channel cross-section shown in Exhibit No. 2, we estimate that a total of 1,097,000 cubic yards (838,600 cm) of excavation will be required from the existing channel. Quantities by reaches are shown in Exhibit No. 5.

To facilitate the flow of floodwaters along the alignment of the river channel, a cleared zone of 56 feet (17.1 m) should be provided in the overbank area parallel to the course of the channel. Between the cleared zone and the top of the bank of the normal channel, a fringe of existing vegetation should be left remaining in a 25-foot (7.6 m) wide zone situated immediately adjacent to the top of the channel bank, to aid in resisting erosion of the banks and attendant channel changes, and to preserve the natural environment along the riverbanks. This fringe zone of vegetation should have diagonally cleared strips 23 feet (7 m) wide spaced about every 230 feet (70 m) along the channel into the cleared floodway, as shown on Exhibit No. 6, to allow floodwaters to pass from the channel into the cleared floodway. The area to be cleared in each country, including the 56-foot (17.1 m) overbank floodway and the diagonal strips connecting to the river channel, covers 1177.5 acres (467.5 hectares).

The surveys show that there are 13 diversion dams in the existing river channel in the reach from Capote Creek to Haciendita. During the construction work, it will be necessary to restore seven now in use and to remove six that have been abandoned. Their locations are noted on Exhibit No. 3.

Division of Construction Work

The construction work should be divided equally between the two governments. To divide equally the initial work of restoring the channel of the river to the minimum section, the total length of the reach should be divided between the two governments in such a way that the total volume of work to be performed by one government in one part of the total length is equal to that performed by the other government in the other part. The channel work would include the channel area to be cleared, its excavation, and the work required for the replacement and/or removal of diversion dams. To divide equally the initial clearing and related works on each side of the channel, each government should perform all such work lying in its territory, including relocation of the fences, ditches, structures, or other work that may be required in the country in which the work will be performed. We considered and find it desirable that each country should spoil in its territory the material it excavates from the channel in accordance with the work assigned to it.

We find that the work required for replacement of one diversion dam is equal to about 3976 cubic yards (3043 cm) of excavation and we considered that removal of a diversion dam should be performed as a part of the excavation.

Accordingly, it is proposed that each government be assigned the performance of the construction work described below and detailed in Exhibit 7 attached, with the understanding that the allotments of work are subject to adjustment in the light of the construction experience to effect an equal division of work and to facilitate the work.

To the United States

The clearing and excavation required to obtain the minimum cross-section in the part of the reach extending from Cajoncitos to diversion dam number 23 (RD 23) at Ruidosa (22.8 miles (36.5 km) downstream from Capote Creek), estimated to amount to 558,343 cubic yards (426,898 cm), and the work of removing two diversion dams and replacing one diversion dam in the assigned section. All overbank clearing on the 1177.5 acres (476.5 hectares) on the left side of the river channel in the 169.5-mile (272.9 km) reach from Cajoncitos to Haciendita (excluding canyon sections), to effect a cleared width of 56 feet (17.1 m) in an area parallel to the channel, and the 23-foot (7 m) diagonal floodway strips connecting to the channel. In addition, the United States should perform the work of relocating all fences, gates, or other structures located in its territory as may be affected by the work proposed herein.

To Mexico

The clearing and excavation required to obtain the minimum cross-section in the part of the reach extending from diversion dam number 23 (RD 23) at Ruidosa (22.8 miles (36.5 km) downstream from Capote Creek) to Haciendita, estimated at 538,464 cubic yards (411,702 cm), and the work of removing four diversion dams and replacing six diversion dams in these reaches, whose locations are shown on Exhibit No. 3c. All overbank clearing on the 1177.5 acres (476.5 hectares) on the right side of the channel in the 169.5 miles (272.9 km) reach from Cajoncitos to Haciendita to effect a cleared width of 56 feet (17.1 m) in an area parallel to the channel and the 23 feet (7 m) diagonal floodway strips connecting to the channel. In addition, Mexico should perform the work of relocating all fences, gates, or other structures located in its territory as may be affected by the work proposed herein.

Construction Program

In accordance with the 1970 Boundary Treaty, the work to preserve the channel of the Rio Grande as the international boundary should be executed by the two governments through the Commission at the earliest practical date, to avoid loss of the channel and international problems relating to the location of the boundary. Each government should perform its part of the work through its Section under the supervision of the Commission. The work should be performed by the two governments as concurrently as practical.

Maintenance

The maintenance of the channel and cleared overbank areas will be required periodically to preserve the character of the river to mark the boundary throughout the length of the reach, excepting the narrow canyon sections. The maintenance work should be divided equally by assigning to each government the maintenance of one-half the channel length of the reach excluding the narrow canyon sections, and the maintenance of the cleared overbank areas in its territory. Each government should maintain its part of the channel through its Section under the supervision of the Commission.

We consider that complete clearing of the overbank should be performed at intervals of not more than three years, in one stage, or several stages, according to circumstances. The channel excavation maintenance should be performed to the extent possible each year, as may be required, to maintain the agreed-upon minimum cross-section, allowing for a reasonable amount of aggradation between the intervals of channel excavation maintenance.

Diversion dams should be maintained, or removed if abandoned, by the country which used such hydraulic structures. Accordingly, the maintenance of the channel initially should be divided between the two Sections as described in the following paragraphs, with the understanding that at the end of six years a review should be made of the amount of maintenance performed by both countries to maintain the minimum cross-section, with the objective of making such adjustments in the division of work as may be required to insure that future maintenance work is equally divided between the two governments.

To the United States

Initially, all channel maintenance in the valley sections of the river from Cajoncitos to near Rancho Buena Vista aggregating 84.75 miles (136.4 kms), and all overbank clearing in the United States and all other works located in its territory.

To Mexico

Initially, all channel maintenance in the valley reaches of the river from near Rancho Buena Vista to Haciendita, aggregating 84.75 miles (136.4 kms), and all overbank clearing in Mexico and all other works located in its territory.

Joint Inspections

We considered it desirable that every two years, the Principal Engineers of the two Sections of the Commission should carry out a joint inspection of the maintenance of the entire reach of the Rio Grande from Cajoncitos to Haciendita, and render a joint report to the Commission on work required to assure the preservation of the Rio Grande as the international boundary throughout the reach.

Recommendations

It is recommended that:

1. The reach of the Rio Grande between Cajoncitos and Haciendita be preserved to mark the international boundary in accordance with the engineering plan described in this report and the drawings attached.

2. The two governments through their respective Sections carry out the construction works described in this report under the supervision of the Commission, as soon as practical and as concurrently as possible.

3. To effect an equal division of such work, the allocation of items of construction work described in this report be adopted, with the understanding they are subject to adjustment to achieve an equal division of work.

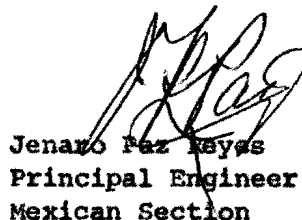
4. The entire reach of the channel excluding the narrow canyon sections, the adjacent floodways, and other works be maintained periodically to retain the preserved channel in good state and work be divided equally as described herein.

5. The Principal Engineers perform a joint inspection of the Rio Grande from Cajoncitos to Haciendita every two years and prepare a joint report on conditions of the works and such additional work as may be necessary to preserve the channel as the international boundary, and every six years review the maintenance performed for the purpose of maintaining an equal division of work.

Respectfully submitted,



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United States Section



Jenaro Paz Reyes  
Principal Engineer  
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