

INTERNATIONAL BOUNDARY AND WATER COMMISSION

UNITED STATES AND MEXICO

**November 11, 1992
Ciudad Juarez, Chihuahua**

**JOINT REPORT OF THE PRINCIPAL ENGINEERS
RELATIVE TO DETERMINATION OF PRESENCE OF TOXIC SUBSTANCES
IN THE WATERS OF THE RIO GRANDE IN ITS
INTERNATIONAL BOUNDARY REACH**

**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 engineering report which proposes a special intensive program of sampling and analyses in the waters of the Rio Grande in its international reach from El Paso, Texas/Ciudad Juarez, Chihuahua to the Gulf of Mexico, with the objective of determining the presence of toxic substances, in the context of agreements and understandings between the United States and Mexico regarding quality of the waters of this international boundary river.

We considered the powers and duties given to the International Boundary and Water Commission (IBWC) by the two Governments to carry out observations on the quality of the international waters in the United States/Mexico border area. We also refer to the joint memorandum of the IBWC engineers of July 1977, entitled "Recommendation of an Initial International Program for Observation of the Quality of International Waters of the United States and Mexico," approved by the IBWC in the United States Commissioner's letter of July 9, 1977 and the Mexican Commissioner's letter of July 14, 1977. Specifically, we reference the recommendation in that memorandum that the IBWC may agree to undertake sampling at sites and analyses for additional parameters other than those in that memorandum. This power is in Articles 2, 3, 20 and 24 of the United States/Mexico Treaty for Utilization of the Waters of the Colorado and Tijuana Rivers and the Rio Grande, dated February 3, 1944.

We also noted the increased cooperation between the United States and Mexico regarding water quality matters, reflected in the Integrated Border Environment Plan (IBEP) approved by United States President George W. Bush and Mexican President Carlos Salinas de Gortari on February 25, 1992. Specifically, in the IBEP, is the understanding that in cooperation with the responsible agencies of both countries, the IBWC will develop a

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monitoring program and appropriate database for a systematic observation of the water quality in receiving bodies common to both countries. In the United States, those agencies are the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), the U.S. National Park Service (USNPS), the Texas Water Commission (TWC), the Texas Department of Health (TDH) and the Texas Department of Parks and Wildlife (TDPW). In Mexico, those agencies are the Secretariat of Social Development (SEDESOL), the National Water Commission (CNA), and the state and municipal agencies responsible for water management in the states bordering the United States.

Pursuant to the above, the IBWC convened a technical meeting on June 18, 1992 in El Paso, Texas in which it was recommended that there needs to be a joint program regarding the quality of the waters of the Rio Grande to determine the present magnitude and impact of contamination by toxic chemical compounds. It was also recommended that the program would cover measurement of conventional parameters selected in the water, determination of toxic substances in the water, sediment and fish tissues, as well as toxicity tests for water, sediment, and bioassessments of fish and benthic microinvertebrate communities. The program would include possible effects of discharges in the Rio Grande during the low flow periods. The contamination from storm runoff will not be directly evaluated. The effects of agricultural discharges probably will not be evaluated because the survey takes place during the dry period considering that the surface waters would be lower than that required for irrigation and return flows. However, the program would identify the flows of greater impact and would give an indication of the flow with respect to the point and non-point discharges which would facilitate determination of specific studies that could be required in the future.

Details for the international program includes the location of sampling sites, parameters to be analyzed, and capabilities of laboratories to be used in each country, along with procedures for mobilization of people, samples and equipment. These were discussed at meetings and inspections of United States laboratories in Austin, Texas on October 1, 1992 and in Houston, Texas on October 2, 1992, resulting in the program described below.

Program Design

The proposed program will be undertaken based on the following understandings: 1) All international activities will be coordinated through the IBWC, through its respective United States and Mexican Sections; 2) The number of parameters for analysis was increased to include conventional parameters which are observed regularly in Mexico by CNA; 3) Sampling will be carried out jointly by representatives of the two countries. A

list of participants in this project will be officially exchanged by the two countries through the IBWC; 4) The different types of samples for which the CNA has analytical capability (water, sediment, and fish tissue) will be collected in duplicate, for delivery to the appropriate laboratories in both countries; 5) There will be a complete exchange of data generated by both countries. The information cannot be used unilaterally by any of the parties without the prior consent of the other party expressed through the IBWC, before the obtained data can be used for purposes such as publication or establishment of additional regulatory actions. The reports generated by the both countries should be reviewed and approved by the IBWC before publication.

Location

Samples for a complete array of analysis will be taken at the 18 principal stations in the main stem of the Rio Grande, which are shown in the table enclosed as Exhibit A, including one totally in the United States. Twenty-two tributaries have also been identified for sampling, including 11 in the United States and 11 in Mexico. These sites were selected based on their potential of contributing toxic substance into the main stem. Each tributary will be sampled at the lowermost part of the confluence, but sufficiently distant from the mouth to avoid backwater flows. At these sites, samples for conventional analyses will be taken and tests for toxicity in the water and sediment will be made. At the same time, toxic substances will be analyzed in fish tissues and bioassessments of the fish will be undertaken where the stream channel morphometry will permit boat electroshocking.

Sampling Period

The period of November 1992 through March 1993 has been selected for field work. The sampling should be completed in four sampling trips each lasting one week in accordance to the schedule enclosed as Exhibit B.

Once the four sampling trips are started, they should be completed in the least time possible to minimize variability due to climatic and hydrologic changes. The shortest duration for the sampling phase of the entire program would be a period of eight weeks.

Sampling Characteristics

The procedures for sampling will be undertaken considering the best available technology for the type of samples to be collected (water, sediment and fish tissues). These should be taken in duplicate so that laboratories in the United States and Mexico are assured to have the same number and type of sample in accordance with the **Program Design**.

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Formation of Sampling Teams

Teams for the sampling at the selected sites will be formed such that to the extent possible the same number of United States and Mexican technicians participate. The IBWC, through the United States and Mexican Sections, will act as the liaison organization at the border to facilitate the formation of the sampling groups and to assure freedom of movement of the personnel and equipment from one country to the other, as well as handling from one country to the other of species and samples collected based on United States/Mexico agreements in force, including the provisions in Articles 2 and 20 of the 1944 Water Treaty. IBWC technicians will participate in the sampling when deemed appropriate by the IBWC.

Parameters and Evaluation of Results

Each country shall process and analyze the samples corresponding to its laboratories in accordance with the best available methods using the criteria established in the respective countries.

The list of parameters for analysis during the program and the distribution of parameter analysis between both countries is shown on Exhibit C.

For the purpose of analyses and evaluation of the results of data obtained from the laboratories of both countries, a binational team will be formed, which will meet periodically to develop this task.

Distribution of Costs

For the program implementation, each country shall absorb the costs of its participation in the program.

Duration of Program

Sampling will take place from November 1992 through March 1993. Analyses of samples, processing and assembly of results and development of a preliminary report should be completed in Spring 1994 period.

Handling of Results

Based on the understandings in the **Program Design**, the following procedures will be established for handling information generated during the program.

At the same time that the analytical results are obtained at each of the phases of the project, this information will be

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entered in an international computerized database established by the IBWC in its central offices in El Paso, Texas/Ciudad Juarez, Chihuahua. This assures that both Sections of the IBWC will have access at any given time to the information generated during the project.

Each Section of the IBWC will be responsible for distribution of the information obtained.

Both Governments agree that the information resulting from this program cannot be utilized by any of the two countries unilaterally without authorization by the other party through the respective Section of the IBWC.

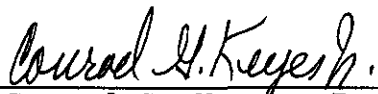
The IBWC shall publish the final results of this program in the corresponding part of its annual water bulletin.

RECOMMENDATION

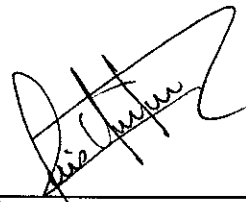
Based on the foregoing, we respectfully recommend:

1. That the Commissioners approve the above referenced program in the context of the joint memorandum of the International Boundary and Water Commission (IBWC) engineers of July 5, 1977, entitled "Recommendation of an Initial International Program for Observation of the Quality of International Waters of the United States and Mexico," approved by the IBWC in the United States Commissioner's letter of July 9, 1977 and the Mexican Commissioner's letter of July 14, 1977.
2. That the referenced program serve as a first stage that allows strengthening of referenced observation program agreed to by the IBWC in 1977, in a manner that based on evaluation of the results, additional measures can be recommended to the present systematic program for observation of the quality of international waters, giving special attention to the Rio Grande and Colorado River.

Respectfully submitted,



Conrad G. Keyes, Jr.
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Principal Engineer
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EXHIBIT A

Proposed Sampling Sites on the Rio Grande and Tributaries

Station Code	DESCRIPTION
-----MAIN STEM-----	
1	Rio Grande at Courchesne Bridge, 2.7 km upstream from American Dam, at river km 2,020.8
2	Rio Grande at Zaragoza International Bridge, at river km 1,992.8
3	Rio Grande 12.6 km upstream from Rio Conchos confluence, at river km 1,559.7
4	Rio Grande below Rio Conchos confluence at river km 1,528.5
5	Rio Grande at mouth of Santa Elena Canyon, at river km 1,424.7
6	Rio Grande at Foster Ranch near Langtry, at river km 1,058.2
7	Rio Grande 366 m upstream from Del Rio/Ciudad Acuna International Bridge, at river km 903.2
8	Rio Grande 5.4 km downstream from Del Rio/Ciudad Acuna International Bridge, at river km 897.8
9	Rio Grande 1.0 km upstream from Eagle Pass/Piedras Negras International Bridge, at river km 799.8
10	Rio Grande 14 km downstream from Eagle Pass/Piedras Negras International Bridge, near irrigation canal lateral 50, at river km 785.8
11	Rio Grande at Laredo water treatment plant, 5.1 km upstream from old Laredo/Nuevo Laredo International Bridge (U.S. 81), at river km 585.9

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Proposed Sampling Sites on the Rio Grande and Tributaries

Station Code	DESCRIPTION
12	Rio Grande 13.2 km downstream from old Laredo/Nuevo Laredo International Bridge (U.S. 81), at river km 567.6
13	Rio Grande at Penitas, near Edinburg intake canal, 26.2 km upstream from Anzalduas Dam, at river km 300.4
14	Rio Grande 0.8 km downstream from Anzalduas Dam, at river km 273.3
15	Rio Grande at Hidalgo/Reynosa International Bridge at river km 256.7
16	Rio Grande below Anhele Drain south of Las Milpas, at river km 244.1
17	Rio Grande 6.3 km downstream from San Benito pumping plant and 15.3 km southwest of San Benito, at river km 155.8
18	Rio Grande 0.3 km downstream from El Jardin pumping plant and 11.2 km downstream from Brownsville/Matamoros International Bridge (U.S. 77), at river km 78.3
-----TRIBUTARIES-----	
1a	El Paso Public Service Board Haskell Street WWTP outfall, in El Paso County, Texas
2a	Ciudad Juarez sewage discharge canal (Dren de Descarga) at highway crossing in Nuevo Zaragoza, 1.1 km west-southwest of Zaragoza International Bridge, in the Mexican state of Chihuahua
3a*	Rio Conchos 1.0 km upstream from mouth and 4.0 km northwest of Ojinaga, in the Mexican state of Chihuahua

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Proposed Sampling Sites on the Rio Grande and Tributaries

Station Code	DESCRIPTION
3b	Alamito Creek 91 m upstream from FM 170, 0.6 km upstream from mouth, and 9.7 km southeast of Presidio, in Presidio County, Texas
4a	Rio San Antonio 0.1 km upstream from mouth and 9.1 km northeast of San Carlos, in the Mexican state of Chihuahua
5a	Terlingua Creek 4.2 km upstream from mouth and 13.7 km south of Terlingua, in Brewster County, Texas
6a*	Pecos River at Shumla Bend upstream from Amistad Reservoir
6b*	Devils River at Pafford Crossing upstream from Amistad Reservoir
7a	Arroyo de la Vacas at bridge in Ciudad Acuna, 0.8 km upstream from mouth, in the Mexican state of Coahuila
7b*	San Felipe Creek at Silos Farm road bridge, 1.8 km upstream from the mouth and 3.2 km south-southeast of Del Rio, in Val Verde County, Texas
8a	Rio San Diego 7.0 km upstream from mouth and 6.0 km west of Jimenez, in the Mexican state of Coahuila
8b*	Rio San Rodrigo 1.6 km upstream from mouth at El Moral, in the Mexican state of Coahuila
8c	Maverick Irrigation District Lateral 15, 0.1 km upstream from mouth and 8 km north-northwest of Eagle Pass, in Maverick County, Texas
9a	Unnamed tributary 0.1 km upstream from mouth and 3.6 km south of Eagle Pass/Piedras Negras International Bridge, in the Mexican state of Coahuila

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Proposed Sampling Sites on the Rio Grande and Tributaries

Station Code	DESCRIPTION
9b*	Rio Escondido 0.1 km upstream from mouth and 5.9 km east of Villa de Fuente, in the Mexican state of Coahuila
10a	Manadas Creek 1.7 km upstream from mouth at FM 1472 near northern city limit of Laredo, in Webb County, Texas
11a	Zacate Creek 0.1 km upstream from mouth in Laredo, in Webb County, Texas
11b	Chacon Creek 0.1 km upstream from mouth in Laredo, in Webb County, Texas
12a	Los Olmos Creek 2.1 km upstream from mouth at U.S. 83 south of Rio Grande City, in Starr County, Texas
12b	Puertecitos Drain 0.1 km upstream from mouth and 12.3 km west-northwest of Ciudad Diaz Ordaz, in the Mexican state of Tamaulipas
13a	Morillo Drain 0.1 km upstream from mouth and 14.2 km west-northwest of Anzalduas Dam, in the Mexican state of Tamaulipas
15a	Anhelo Drain 0.1 km upstream from mouth and 3.2 km east of Reynosa, in the Mexican state of Tamaulipas

* Tributaries targeted for fish tissue analysis and fish community assessment.

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EXHIBIT B

TENTATIVE SAMPLING SCHEDULE

SURVEY AREA	TIME FRAME	STATIONS TO BE SAMPLED
El Paso/Cd. Juarez - Presidio/Ojinaga - Big Bend	Nov. 10-17, 1992	1, 1a, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 5a
Falcon Dam - Brownsville/Matamoros	Jan. 11-15, 1993	12a, 12b, 13, 13a, 14, 15 15a, 16, 17, 18
Del Rio/Cd. Acuna	Feb. 15-19, 1993	6, 6a, 6b, 7, 7a, 7b, 8, 8a, 8b, 8c
Eagle Pass/Piedras Negras - Laredo/Nuevo Laredo	Mar. 22-26, 1993	9, 9a, 9b, 10, 10a, 11, 11a, 11b, 12

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EXHIBIT C

List of Toxic Chemicals to be Analyzed in
Water, Sediment, and Fish Tissue

Phenols and Cresols

parachlorometa cresol
pentachlorophenol
phenol (C₆H₅OH) single compound
phenolics recoverable
2-chlorophenol
2-nitrophenol
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2,4,6-trichlorophenol
4-nitrophenol
4,6-dinitro-ortho-cresol

Ethers

bis (chloromethyl) ether
bis (2-chloroethoxy) methane
bis (2-chloroethyl) ether
bis (2-chloroisopropyl) ether
2-chloroethyl vinyl ether
4-bromophenyl phenyl ether
4-chlorophenyl phenyl ether

Haloogenated Aliphatics

bromodichloromethane
bromoform
carbon tetrachloride
chloroethane
chloroform
dibromochloromethane
dichlorodifluoromethane
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
methyl bromide
methyl chloride
methylene chloride
tetrachloroethylene
trichloroethylene
trichlorofluoromethane
vinyl chloride
1,1-dichloroethane
1,1-dichloroethylene

1,1,1-trichloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
1,2-dichloroethane
1,2-dichloropropane
1,2-trans-dichloroethylene
1,3-trans-dichloropropane
1,3-cis-dichloropropene

Polycyclic Aromatic Hydrocarbons

acenaphthene
acenaphthylene
anthracene/phenanthrene
benzo (A) anthracene
1,2-benzanthracene
benzo (B) fluoroanthene
benzo (GHI) perylene
1,12-benzoperylene
benzo (K) fluoranthene
benzo-A-pyrene
chrysene
fluoranthene
fluorene
indeno(1,2,3-CD) pyrene
naphthalene
pyrene
1,2,5,6-dibenzanthracene

Monocyclic Aromatics

benzene
chlorobenzene
ethylbenzene
hexachlorobenzene
nitrobenzene
styrene
toluene
xylene
1,2-dichlorobenzene
1,2,4-trichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
2,4-dinitrotoluene
2,6-dinitrotoluene

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Nitrosamines and Other
N Compounds

acrylonitrile
benzidine
n-nitrosodi-N-propylamine
n-nitrosodimethylamine
n-nitrosodiphenylamine
1,2-diphenylhydrazine
3,3-dichlorobenzidine

Metals +

aluminum
antimony
arsenic
beryllium
cadmium
chromium
copper
lead
mercury
nickel
selenium
silver
thallium
zinc

Pesticides

acrolein
aldicarb
aldrin
alpha benzene hexachloride
atrazine
beta benzene hexachloride
carbaryl
carbofuran
chlordan
chlorfenvinphos
chlorothalonil
chlorpyrifos
chlorsulfuron
p,p' DDD
p,p' DDE
p,p' DDT
delta benzene hexachloride
demeton
diazinon

dibromochloropropane
(dbcp)
dicamba
2,4-dichlorophenoxyacetic
acid (2,4-D)
dicofol (kelthane)
dicrothophos
dieldrin
dinoseb
endosulfan alpha
endosulfan beta
endosulfan sulfate
endrin
endrin aldehyde
fenthion (baytex)
gamma-bhc (lindane)
guthion
heptachlor
heptachlor epoxide
isophorone
malathion
metsulfuron
methomyl
methoxychlor
metolachlor
mirex
parathion
picloram
prometon
simazine
tetraethylpyrophosphate
(tepp)
toxaphene
2,4,5-TP (silvex)

PCB's and Related Compounds

arochlor 1016
arochlor 1221
arochlor 1232
arochlor 1242
arochlor 1248
arochlor 1254
arochlor 1260
2-chloronaphthalene

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Phthalate Esters

bis (2-ethylhexyl)
phthalate
di-n-butyl phthalate
di-n-octyl phthalate
diethyl phthalate
dimethyl phthalate
n-butyl benzyl phthalate

General Inorganics

Cyanide

Conventional Parameters +

ammonia nitrogen
pH
TOC Total Organic Carbons
TDS Total Dissolved Solids
TSS Total Suspended Solids
total hardness
specific conductance
chloride

+ - metals and conventional parameters will jointly be analyzed by United States and Mexico