

IMPERIAL IRRIGATION DISTRICT'S
DRAIN WATER QUALITY IMPROVEMENT PLAN
JUNE 7, 1994

INTRODUCTION

The Imperial Irrigation District (IID) receives about 2.8 million acre feet per year of irrigation water for the approximately 500,000 acres of farm land in the Imperial Valley. This irrigation water is from the Colorado River and is brought into the Valley via the All-American Canal. In conjunction with an irrigation network consisting of more than 1600 miles of canals, IID has constructed and operates an agricultural drainage system consisting of about 1450 miles of surface drains. These drains were designed to collect and transport discharge waters consisting of surface and subsurface flows from the agricultural fields of the Imperial Valley and convey them to the Salton Sea.

Waters from sources other than agriculture are also transported by IID's drains and the New and Alamo Rivers into the Salton Sea. These sources include storm water flows, municipal wastewater treatment plant effluent, and industrial effluent discharges. Highly contaminated waters from Mexico enter the Imperial Valley via the New River (about 180,000 AF per year). All the aforementioned discharge sources contribute to the degradation of water quality within IID drains.

The State's Water Quality Assessment document, adopted by the State Water Resources Control Board on May 18, 1992 and by the Regional Board on January 18, 1994, classifies the Alamo River, the New River and the Salton Sea as waterbodies impaired by agricultural nonpoint sources.

On December 21, 1993, the Regional Board's Executive Officer sent a letter to Imperial Irrigation District requesting that IID take "accelerated action to address degraded water quality conditions in Imperial Valley drainage ways". In a letter of response dated January 26, 1994, IID provided to the Regional Board a tentative time schedule for implementation of a proposed "Drain Water Quality Improvement Plan". On April 6, 1994, the Regional Board responded with a letter, addressing elements of concern they considered relevant to the preparation of a Drain Water Quality Improvement Plan. Through a cooperative effort of Regional Board staff, staff members of IID and input from the April 6, 1994 letter, a Drain Water Quality Improvement Plan has been prepared by IID.

DRAIN WATER QUALITY IMPROVEMENT PLAN (Plan)

This Plan is designed to specify those actions that IID will take to protect the beneficial uses of water bodies receiving agricultural drainage flows and the time schedule and estimated cost (enclosed) for implementing those actions. IID has contracted the professional services of Jones and Stokes Associates, Inc. to prepare and initiate many of the technical elements required in the "start-up" of this Plan.

The principle intent of the Plan is to address the immediate and long term needs of the following elements:

Monitoring: Initiate a water quality monitoring program to identify and quantify the extent of drain water pollution within the IID service area.

Best Management Practices: Identify, test and implement Best Management Practices (BMPs), both on and off farm and in-stream, that have the potential to improve the drain water quality within the drainage channels of the IID.

Education: To provide an educational program to farmers within the service area of the IID.

IMPERIAL IRRIGATION DISTRICT
DRAIN WATER QUALITY IMPROVEMENT PLAN
ACTION ITEMS

1.0 SILT LOAD REDUCTION

1.1 This Plan is designed to achieve a reduction in the amount of Total Suspended Solids (i.e. sediment load) that can be discharged by agricultural drain waters. Achievement of this reduction will be determined at the outlet of the Alamo River to Salton Sea. IID recognizes that the Regional Board's current assessment of the average suspended sediment load in the Alamo River is 365 mg/L of Total Suspended Solids (TSS) in the Alamo River at Garst Road Bridge. This information is based on the Regional Board's previous ten years of quarterly sampling at this location.

2.0 BEST MANAGEMENT PRACTICES (BMPs)

2.1 IID will submit to the Regional Board within three months of the date of adoption of this Plan a list of BMPs to improve drain water quality. This list will include descriptions of all relevant BMPs already in use in the Imperial Valley, their effectiveness, their cost, and their applicability for widespread implementation.

2.2 IID will submit to the Regional Board within four months of the date of adoption of this Plan a workplan describing a program to test the pollution prevention ability and cost effectiveness of two of the proposed BMPs noted above. Initial BMPs are to focus on sediment reduction practices on-farm.

2.2.1 IID will submit additional workplans (as described above) for testing of additional BMPs to the Regional Board as needed.

2.2.2 Upon successful testing of BMPs identified in the workplans, and approval of the Regional Board, IID will implement the BMPs valley wide within a reasonable time period.

3.0 BMPs WORKPLAN

3.1 The workplans identified above in 2.2 will contain at least the following:

3.1.1 A detailed technical description of the proposed BMPs, the constituent it is designed to control, the type of crop and the type of irrigation practice that it is applicable to, and any documented history of its use elsewhere.

3.1.2 A testing program designed to quantify the amount of pollution that is prevented from entering surface waters and the cost effectiveness of the BMPs. This will include the use of a control (unaltered) field to measure the baseline discharge of constituents where applicable.

- 3.1.3 A sampling and analysis plan detailing the type and frequency of needed sampling.
- 3.1.4 A quality assurance/quality control plan to insure the validity of the testing program.

4.0 BMPs EDUCATION PROGRAM

- 4.1 IID will submit to the Regional Board within one year of adoption of this Plan a proposal to conduct a BMPs education and outreach program directed to the area's farmers. Upon approval of the Regional Board, the program will be implemented in a timely manner.

5.0 MONITORING

- 5.1 IID will immediately implement a drain water quality monitoring program (see Appendix A) to identify and quantify drain water pollution within the service area of IID.
- 5.2 Contained in Appendix A of this Plan are the details of the analyses to be conducted. The monitoring elements shall include:
 - 5.2.1 Inflow Monitoring
 - 5.2.2 Drain Water Sampling Locations
 - 5.2.3 Chronic Toxicity Testing
 - 5.2.4 Biological and Sediment Testing
- 5.3 IID will retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring, instrumentation and copies of all reports for a period of at least five years from the date of the sample, measurement, or report. Records of monitoring information will include:
 - 5.3.1 The date, exact place, and time of sampling or measurement.
 - 5.3.2 The name of person(s) who performed the sampling or measurement.
 - 5.3.3 The date(s) analyses were performed.
 - 5.3.4 The name of person(s) who performed the analyses.
 - 5.3.5 The results of such analyses.
- 5.4 All monitoring contained in Appendix A will be evaluated on an annual basis. Constituents with repeated negative or consistently recurring results will be considered for elimination or for sampling on a less frequent basis.

6.0 CHRONIC TOXICITY TESTING

- 6.1 The initial sampling point for toxicity will be at the outlet of the Alamo River and at a representative inflow location in the All American Canal. If toxicity exceeds established limits at this location, IID will conduct a Toxicity Identification Evaluation (TIE) to determine the chemical(s) that are causing the toxicity.

- 6.2 IID will submit a report to the Regional Board summarizing the results of the toxicity testing as outlined in IID's Monitoring and Reporting Program (See Appendix A). This report will be submitted February 1, of each year and will include the following information:
 - 6.2.1 A summary of all toxicity testing sample collection and laboratory analyses activities.
 - 6.2.2 A description of any problems encountered during toxicity testing activities, including any deviations from established quality assurance/quality control procedures, and a description of all activities taken to correct past problems and prevent future problems.
 - 6.2.3 An analysis of the testing results to determine the extent of toxicity and the relative sensitivity of the species tested.
 - 6.2.4 Recommendations about the appropriateness of the species tested, the sampling frequency, and the sampling locations.
- 6.3 At the end of one year of toxicity testing, IID will make a recommendation as outlined in 6.2.4 as to the appropriateness of the species tested and any suggested change/deletion of the three tested species identified in Appendix A, 3.1.

7.0 DELINEATION OF MAJOR DRAINS

- 7.1 IID will submit a report to the Regional Board within six months of adoption of this Plan that delineates the major discharges into their drain water system. This report will include the following information:
 - 7.1.1 The name, location, and annual discharge volume of the ten largest agricultural drains as measured at their points of discharge to the Alamo River, New River, or Salton Sea.
 - 7.1.2 The sources of water in each of these ten drains will be evaluated to determine the amount of flow contributed from agricultural sources, from storm waters, from municipal wastewater treatment plants and industrial facilities having NPDES Permits, and from any other significant sources.
 - 7.1.3 The size (in acres) of the contributory watershed of each of the ten drains and a map showing the location of these watersheds.

APPENDIX A

IMPERIAL IRRIGATION DISTRICT
DRAIN WATER QUALITY IMPROVEMENT PLAN
MONITORING AND REPORTING PROGRAM

Imperial Irrigation District will report monitoring data and report to the Regional Board in accordance with the following schedule:

1.0 INFLOW MONITORING

- 1.1 Water samples from the All-American Canal or other representative inflow locations will be collected quarterly and analyzed for the parameters listed below under "DRAIN WATER SAMPLING".

2.0 DRAIN WATER SAMPLING

- 2.1 Water samples will be collected monthly from the following locations:

- 2.1.1 Alamo River at Garst Road Bridge
- 2.1.2 New River at the USGS gauging station north of Westmorland
- 2.1.3 South Central Drain near its outlet to Alamo River
- 2.1.4 Holtville Main Drain near its outlet to Alamo River
- 2.1.5 Trifolium 12 Drain near its outlet to Salton Sea
- 2.1.6 Greeson Drain near its outlet to New River

- 2.2 The six drain water sampling locations listed above will be sampled as follows:

<u>Constituent</u>	<u>Unit</u>	<u>Sample Type</u>
Total Dissolved Solids	mg/L	Grab
Total Suspended Solids	mg/L	Grab
Volatile Suspended Solids	mg/L	Grab
Nitrate (as Nitrogen)	mg/L	Grab
Total Phosphate	mg/l	Grab
Ammonia (NH ₃ /NH ₄ ⁺ -N)	mg/L	Grab
Hardness	mg/L	Grab
Boron	μg/L	Grab
Selenium	μg/L	Grab
pH	pH	Grab
Dissolved Oxygen	mg/L	Metered
Flow	cfs	Metered
Fecal Coliform	MPN/100 ml	Grab
Settleable Solids (30 minutes)	ml/L	Grab (field measurement)
Turbidity	NTU	Grab (field measurement)
Temperature	°C	Field Measurement
Specific Conductance	μmhos/cm	Metered

2.3 The collection, preservation, and holding times of all samples will be in accordance with U.S. EPA-approved procedures. All analyses will be conducted by a laboratory certified by the State Department of Health Services to perform the analysis, unless the Regional Board's Executive Officer allows otherwise.

3.0 CHRONIC TOXICITY TESTING

3.1 IID will conduct chronic toxicity testing on grab samples collected quarterly from the Alamo River at Garst Road Bridge and quarterly from the INFLOW MONITORING location (described above). Critical life stage toxicity tests will be conducted using three species as described below:

<u>Species</u>	<u>Effect</u>	<u>Test Duration</u>	<u>Reference</u>
fathead minnow (pimephales promelas)	larval survival and growth stage	7 days	Horning & Weber, 1989
water flea (Ceriodaphnia dubla)	survival; number of young	7 days	Horning & Weber, 1989
alga (Selanastrum capricornutum)	growth test	4 days	Horning & Weber, 1989

- 3.2 Toxicity Test Reference; Horning, W.B. and Weber, C.I. (eds); 1989. Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms. Second edition. U.S. EPA Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. EPA/600/4-89/001.
- 3.3 Standard dilution water should be used for these tests. The sensitivity of the test organisms to a reference toxicant will be determined concurrently with each bioassay and reported with the test results.
- 3.4 Chronic toxicity will be expressed and reported as toxic units (tu_c) where; $tu_c = 100/NOEL$ and the No Observed Effect Level (NOEL) is expressed as the maximum percent effluent of test water that causes no observed effect on a test organism, as determined in a critical life stage toxicity test (indicated above).
- 3.5 Acute toxicity will be calculated from the results of the chronic toxicity tests described above and will be reported along with the results of each chronic test. Acute toxicity will be expressed as percent survival of the test organisms over the full testing period.

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MONITORING AND REPORTING PROGRAM (con't)

4.0 BIOLOGICAL AND SEDIMENT TESTING

4.1 IID will conduct biological and sediment testing as described below:

4.1.1 Biological: Samples of two different aquatic species, including at least one fish species, will be collected each six months from the Alamo River and/or from a large drain tributary to the Alamo River.

4.1.2 Sediment: Bottom sediment samples will be collected at the same time and location as the biological samples described above.

4.2 The biological and sediment samples described above will be analyzed for the following chemicals in accordance with the appropriate established federal and/or state guidelines:

Organics

Aldrin	Endosulfan I
Chlordene, Alpha	Endosulfan II
Chlordene, Gamma	Endosulfan sulfate
Cis-chlordane	Total Endosulfan
Cis-nonachlor	Endrin
Oxychlordane	HCH, Alpha
Trans-chlordane	HCH, Beta
Trans-nonachlor	HCH, Delta
Total Chlordane	HCH, Gamma (Lindane)
Chlorpyrifos	Total HCH
Dacthal	Heptachlor
DDD, o,p'	Heptachlor Epoxide
DDD, p,p'	Hexachlorobenzene
DDE, o,p'	Methoxychlor
DDE, p,p'	Oxadiazon
DDMS, p,p'	Parathion, Ethyl
DDMU, p,p'	Parathion, Methyl
DDT, o,p'	PCB-1248
DDT, p,p'	PCB-1254
Total DDT	PCB-1260
Diazinon	Total PCB
Dichlorobenzophenone, p,p'	Pentachlorophenol
Dicofol (Kelthane)	2,3,5,6-tetrachlorophenol
Dieldrin	Toxaphene

Metals

Arsenic
Cadmium
Chromlum
Copper
Lead

Mercury
Nickel
Selenium
Silver
Zinc

5.0 REPORTING

5.1 IID will prepare quarterly reports summarizing all data collected and will submit them to the Regional Board by January 15, April 15, July 15 and October 15 of each year.

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