UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA

Case No. 88-1886-Civ-Moreno

UNITED STATES OF AMERICA,

Plaintiff,

v.

SOUTH FLORIDA WATER MANAGEMENT
DISTRICT, et al.

Defendants.

____________________________________/

DECLARATION OF CARLOS ADORISIO

I, Carlos Adorisio, declare as follows:

I am presently employed by the South Florida Water Management District as Engineer Supervisor, Everglades Regulation Division, Water Resource Regulation Department. A copy of my résumé is attached as Exhibit 1.

Page C-5, Appendix C, of Consent Decree provides: “The District will also design and implement control programs for other watersheds outside of the EAA [Everglades Agricultural Area] discharging into the EPA [Everglades Protection Area], including L3, S140, L28I.” The “L3” is a reference to the C-139 Basin that discharges to the L-3 Canal. The “L28I” is a reference to the Feeder Canal Basin that discharges to the L28-I Interceptor Canal. The “S140” is a reference to the L-28 Basin that discharges to the L-28 Canal. These basins are shown in Figure 1-1. Each basin and its phosphorus control programs are discussed below.
Figure 1-1. Location of C-139, Feeder Canal, and L-28 Basins
C-139 BASIN

*Basin Description*

The C-139 Basin is located in Hendry County, west of the Everglades Agricultural Area (see Figure 2-1), and covers an area of approximately 168,450 acres (263 square miles). The basin is primarily agricultural. The land has been historically used for cattle operations, sugarcane, and winter vegetables. Since the mid-eighties, citrus groves moved into the basin and winter vegetable production expanded through leases with leading producers. As shown in Fig 2-2, the primary conveyance canals within the C-139 Basin are the L-1, L-2 and L-3 canals along the northern and eastern boundaries. Discharges from the basin are directed to Stormwater Treatment Area 5 (STA-5).
Figure 2-1. C-139 Basin: Location and Monitoring Structures
**Phosphorus Source Control Programs**

As required by the 1994 Everglades Forever Act (EFA), the primary source control strategy for the C-139 Basin has been the mandatory implementation of Best Management Practices (BMPs) under Chapter 40E-63, Florida Administrative Code (FAC). The first year of BMP implementation and compliance determination for the program was Water Year 2003 (WY2003) with an initial requirement of 15 BMP points. BMP implementation levels were progressively increased, and in WY2006, permittees were required to implement a minimum of 35 BMP credits (in comparison to 25 points in the EAA basins). Permittees are also required to submit annual BMP implementation reports and are subject to inspections by District staff. Because required phosphorus levels were not achieved by WY2006, the District initiated rule development in May 2007. On September 12, 2010, the District’s Governing Board approved sweeping changes to the rule which will become effective in November 2010, and will require more stringent criteria for the 35-point BMP Plan.

Concurrent with implementation of a mandatory BMP program via permit requirements and compliance activities, the District has conducted additional activities to maximize the phosphorus removal capacity of BMPs. With that goal, the District conducted technical investigations including water quality analysis, hydrology evaluations and demonstration projects to maximize total phosphorus (TP) removal at the

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1 A BMP point is a numerical value assigned to a BMP, as described in Appendix B1 of Part IV of 40E-63, F.A.C. The points are used for regulatory permit review to ensure a comparable level of effort in BMP implementation among permittees. The points are an indication of relative BMP effectiveness. The points are based on expert review, technical publications, best professional judgment, and cooperative workshops with stakeholders.
source, using BMPs. Also, the District has cost-shared implementation of higher-cost BMPs, implemented an upstream water quality monitoring network, conducted integrated regulatory approaches with water use and environmental resource permitting groups within the District, and enhanced stakeholder interaction and outreach. These activities and the rationale for their selection are summarized below:

1. In 2002, concurrent with mandatory BMP requirements, the District established a “C-139 and Western Basins Grant Program”. The grant accelerated implementation of infrastructure BMPs (e.g., tail water reuse projects.) Competition for funds occurred in 2002, 2004, and 2005, with a District total funding of $900,000.

2. In 2004, the District evaluated historic water quality data within the basin and conducted a phosphorus source and transport analysis in the canals with historically higher TP levels. The results highlighted substantial differences in TP concentration within the basin, the lack of information on runoff contribution, and the higher fraction of soluble reactive phosphorus. Thus, pointing for a focused approach for a more effective BMP program. A subsequent evaluation was conducted in 2005, verifying the 2004 results.

3. In 2005, a hydrologic study was conducted to determine hydrologic sub-basins and locations for sub-basin water quality and flow monitoring. A monitoring network of permanent TP and flow stations, and synoptic sampling locations for phosphorus speciation was established. Since then, the District has progressively instrumented additional stations and analyzed the resulting water quality and quantity data.

4. In 2005, also, C-139 Basin vegetable growers were engaged to participate in a demonstration project to optimize phosphorus application rates on vegetables. The project has continued for five years. The project evaluates a variety of strategies to reduce phosphorus in runoff including: varying application rates, phosphorus partitioning in C-139 Basin soils, use of different soil extraction methods, soil pH amendments, slow release phosphorus fertilizers, and reduced application through fertigation and foliar means.

5. In 2007, the District started the “C-139 Basin BMP Demonstration Grant” to demonstrate the feasibility and effectiveness of optimized BMPs. The grant is funding the compartmentalization of an above-ground impoundment (AGI) to optimize water quality treatment and detention. The grant is also funding a chemical precipitation project to treat farm runoff that is not retained by an AGI or
reused in a tailwater recovery system. The projects include water quality and quantity monitoring to determine effectiveness.

6. In 2007, also, the District introduced an integrated regulatory approach by initiating a review of Surface Water Management (SWM) permits which address water quality treatment, attenuation and storage, and Consumptive Water Use (CWU) permits which address water use and conservation authorizations in the C-139 and Feeder Canal basins. The integrated permit compliance initiative approach generally consists of review of all permits, consultation with permittees, and a request for submission of outstanding items or a timeline for addressing them. These permits work in concert with the BMP program permit requirements with regard to quantity and quality of discharges.

7. Since 2008, the District has been funding the evaluation of the performance of an AGI by the University of Florida, Institute of Food and Agricultural Science (IFAS). The project will result in recommendations to optimize the AGI for TP removal, followed by implementation and verification of performance.

8. In 2009, the District initiated a feasibility analysis of potential regional projects to address water quality issues across the C-139, Feeder Canal, and L-28 basins.

9. In addition to the District’s BMP program, there is a statewide non-regulatory or incentive-based agricultural BMP program by the Florida Department of Agriculture and Consumer Services (FDACS). Agricultural landowners may opt to participate by submitting a Notice of Intent to Implement to the FDACS and receive a presumption of compliance with state water quality standards, including those established by the Total Maximum Daily Load (TMDL) program. In the C-139 Basin, landowners that have active Chapter 40E-63, FAC, BMP permits from the District, qualify for the FDACS BMP program without having to implement additional FDACS program requirements.

**Water Quality Summary**

Table 2-1 provides a summary of the results of the compliance analysis for total observed and predicted TP loads, where the predicted load is the pre-BMP baseline period load adjusted for differences in rainfall volume. Compliance is determined by comparing the observed TP load for the current water year to the predicted target load from the pre-BMP baseline period. Target loads are calculated based on the 50th percentile confidence level under the current year’s rainfall conditions, while limit loads
are calculated based on the 90th percentile. A single-year exceedance of limit loads verifies noncompliance, while target loads are in noncompliance only when exceeded for three consecutive years.

Implementation of the BMP program and the additional activities to maximize TP removal have translated into improved BMP implementation, as indicated by WY2008 and WY2010 phosphorus loading results for the C-139 Basin showing compliance with EFA requirements. Over the period WY2003 through WY2010, the mean annual flow was 176.125 thousand acres-feet (kac-ft), the mean annual TP load was 52.775 metric tons (mt), and the average flow-weighted mean TP concentration was 243 parts per billion (ppb).
Table 2-1. WY1980-WY2010 C139 Basin TP Measurement and Calculations

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<tr>
<th>Water Year</th>
<th>Observed TP Load (mt)</th>
<th>Predicted Target TP Load $^1$ (mt)</th>
<th>Predicted Limit TP Load $^1$ (mt)</th>
<th>Annual Rain (inches)</th>
<th>Annual Flow (kac-ft)</th>
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$^1$ Using the rainfall adjustment, target loads are calculated based on the 50th percentile confidence level value for predicted loads under the year’s rainfall conditions, while limit loads are calculated based on the 90th percentile confidence level.

$^2$ First year of compliance measurement was WY2003.
FEEDER CANAL BASIN

Basin Description

The Feeder Canal Basin (FCB) covers an area of about 68,883 acres (107.6 square miles) in southeastern Hendry County (see Figure 3-1). Land uses include cattle on unimproved and improved pastures, citrus, row crops, and large tracts of undeveloped natural areas. A portion of the Big Cypress Seminole Indian Reservation (approximately 13,500 acres) is located in the southeast corner of the basin. The canals and structures within this basin provide flood protection and convey excess runoff to Water Conservation Area (WCA) 3A for water supply and environmental use. The two major canals associated with the FCB are the North Feeder Canal and the West Feeder Canal. These two canals merge in the lower southeastern corner of the basin and discharge south through the S-190 structure into the L-28 Interceptor Canal and eventually into the WCA 3A. The flow volume and TP load through S-190 represent the total runoff and load from the Feeder Canal Basin.

As depicted in Figure 3-2, the FCB is divided into three major hydrologic areas:

1. The McDaniel Ranch area or North Feeder Canal Sub-basin (comprised of 4 landowners) with a total area of 23,150 acres. Water quality from this area is measured at structures G-108 and PC-17A, which discharge to the North Feeder Canal.

2. The West Feeder Canal area or Sub-basin (comprised of about 30 private owners) with a total area of 31,900 acres. Water quality from the West Feeder Canal Sub-basin is measured at the WWEIR structure which discharges to the West Feeder Canal.

3. A portion of the Big Cypress Seminole Indian Reservation with total area of 13,850 acres. There are also four large parcels within the boundaries of the reservation that are not part of the reservation. The District has no jurisdictional authority to enforce the implementation of phosphorus source controls within FCB.
tribal and/or federal lands. The Seminole Tribe and the U.S. Army Corps of Engineers (USACE) are implementing a project known as the Seminole Tribe Water Control Plan (WCP) Project. The project includes four water resource areas (WRA) designed to improve water quality, restore wetland hydrology, increase water storage capacity, and enhance flood protection within the reservation. As of mid 2010, only one of the four WRA has been completed.

Figure 3-1. Feeder Canal Basin Location
Cooperative Phosphorus Source Control Programs and Supplemental Projects

Phosphorus source control efforts in this basin include the cooperative source control programs and supplemental projects described below.

McDaniel Ranch’s Landowner Agreement. A 1996 Landowner Agreement between the McDaniel Ranch and the Seminole Tribe of Florida requires McDaniel Ranch to achieve a 50 ppb TP concentration in discharges to the North Feeder Canal. In order to achieve this requirement, McDaniel Ranch implemented BMPs and obtained an Environmental Resource Permit to build a surface water management system to provide for stormwater detention and pre-treatment of agricultural runoff prior to discharge. The District has been working with the McDaniel Ranch owner to certify the system, to
ensure appropriate water quality treatment and implementation of BMPs, and to ensure discharges from this area meet a TP concentration of 50 ppb. The McDaniel Ranch surface water management system has been substantially completed.

**Everglades Plantation.** A portion (3,256.8 acres) of the original McDaniel Ranch has been sold to McDaniel Reserve Realty Holdings, LLC (MRRH). The sold property is also known as Everglades Plantation and its stormwater discharges are directed to the PC-17A structure. Because Everglades Plantation's new owner is not a part of the 1996 Landowner Agreement between the McDaniel Ranch and the Seminole Tribe of Florida, the District has worked with the new owner to implement and maintain BMPs appropriate to current land use to reduce phosphorus in stormwater discharges from the property. A Joint Agreement with MRRH for implementation and maintenance of the BMPs was executed in July 2010. Any proposed land use change on the Everglades Plantation property will require an Environmental Resource Permit that would address any water quality concerns from the proposed land use.

**BMP Grant Program.** The District launched the BMP grant program in 2002 to promote BMP implementation for phosphorus reduction. Between 2002 and 2006, the Everglades Program contributed almost $550,000 for BMP implementation in the FCB. The sources of these funds are Everglades program funds and Long-Term Plan funds. The Natural Resources Conservation Service (NRCS) and FDACS partnered with the District to increase the funding provided to landowners and stakeholders with the funds being administered by the Hendry Soil and Water Conservation District.
**Integrated Permit Compliance Initiative.** As referenced in the C-139 Basin section above, in 2007 the District introduced this initiative in the FCB, which include review of SWM and CWU permits. This review is done to ensure the water quality requirements of these permits are met, and to facilitate implementation of BMPs in the FCB.

**C-139 Regional Feasibility Study.** Also as referenced in the C-139 Basin section above, in 2009 the District initiated a feasibility analysis of potential regional projects to address water quality issues across the C-139, Feeder Canal, and L-28 basins.

**Water Quality Summary**

Figure 3-3 summarizes the annual TP load, flow-weighted mean TP concentration (FWMC), rainfall, and flow volume for the S-190 structure for WY1998 through WY2010. The annual flow values ranged from 24.019 to 142.469 kac-ft, the annual load values ranged from 2.989 to 27.195 mt, and the flow-weighted mean concentration values ranged from 73 to 215 ppb. The mean annual flow was 77.448 kac-ft, the mean annual load was 10.941 mt, and the average flow-weighted mean concentration was 115 ppb.

The annual flow, load, and TP data for PC-17A and G-108, and WWEIR are summarized in Figures 3-4 and 3-5. It must be noted that historically, a significant portion of the North Feeder Canal Sub-basin (McDaniel Ranch area) drained via structure G-108. However, in May 2007, and as part of the construction of the surface water management system within the McDaniel Ranch property required by a Landowner Agreement between the Ranch and the Seminole Tribe, a new structure, W-D1AB, was constructed by the landowner (McDaniel Ranch) immediately upstream of G-108. The new structure, in fact, eliminated flows at G-108, except those storm events exceeding a
10-year return period. Therefore, most of the flows from the North Feeder Canal Sub-basin are now discharged via PC-17A.

As depicted in Figure 3-4, which covers WY1999 through WY2010, the annual flow values for PC-17A and G108 ranged from 1.719 to 43.205 kac-ft, the annual load values ranged from 0.084 to 9.277 mt, and the flow-weighted mean concentration values ranged from 40 to 516 ppb. The mean annual flow for PC-17A and G108 was 18.824 mt, the mean annual load was 4.343 mt, and the average flow-weighted mean concentration was 187 ppb.

As depicted in Figure 3-5, which covers WY1998 through WY2010, the annual flow values for WWEIR ranged from 13.066 to 74.861 kac-ft, the annual load values ranged from 0.694 to 7.544 mt, and the flow-weighted mean concentration values ranged from 25 to 96 ppb. The mean annual flow for WWEIR was 48.656 mt, the mean annual load was 3.848 mt, and the average flow-weighted mean concentration was 64 ppb.

Figure 3-6 presents TP water quality data derived from mass balance calculations for Seminole area for the period WY1999 through WY2010.
Figure 3-3. Feeder Canal Basin S-190 annual TP load, FWM TP concentration, rainfall, and flow volume to the EPA for WY1998-WY2010

Figure 3-4. Upstream structure PC-17A and G108 TP load, TP FWMC, and flow volume for WY1999-WY2010
Figure 3-5. Upstream structure WWEIR TP load, TP FWMC, and flow volume for WY1999-WY2010

Figure 3-6. Seminole Area of FCB TP load, TP FWMC, and flow volume for WY1999-WY2010
4 - L-28 BASIN

**Basin Description**

The L-28 Basin is approximately 72,000 acres (112 square miles) in size with portions located in Broward, Hendry, and Collier Counties (see Figure 4.1) and is entirely occupied by four landowners. The C-139 Annex (approximately 25 percent of the basin) is a citrus grove owned by the Southern Garden Corporation, a subsidiary of the U.S. Sugar Corporation. The Big Cypress Seminole Indian Reservation occupies approximately 34 percent of the basin. Approximately 28 percent of the basin is situated within the Miccosukee Indian Reservation. The remaining 13 percent of the basin is within the Big Cypress National Preserve. Land uses within the Big Cypress Seminole Indian Reservation include cattle on unimproved and improved pastures and large tracts of undeveloped natural area. The Miccosukee Indian Reservation includes largely native areas with only a single cattle operation and a commercial fuel facility. The District has no jurisdictional authority to enforce the implementation of phosphorus source controls within L-28 Basin tribal and/or federal lands.

The surface water management system in the L-28 Basin provides drainage and flood protection in addition to providing water to WCA 3A when necessary for water supply purposes. The L-28 borrow canal is the primary drainage canal, running north/south for a distance of approximately 10 miles along the eastern border of the basin. The L-28 borrow canal conveys stormwater runoff to the S-140 pump station which discharges it directly into WCA 3A. A new structure (weir) on the L-28 borrow canal, just south of Interstate Highway 75, was installed in 2009 as part of a
demonstration project to re-hydrate approximately 8,000 acres of historic Everglades within the triangular area of the L-28 Basin south of Interstate Highway 75. The structure (weir) reduces stormwater drainage from the triangular area to the S-140 pump station. The L-28 Interceptor Canal, which borders the basin on the southwest, conveys discharges from the S-190 structure (Feeder Canal Basin) to WCA 3A and is separated from the L-28 Basin by a levee.

A substantial reduction of flows from the L-28 Basin is expected starting in WY2012 as a result of the diversion of the C-139 Annex flows into STA-6. The C-139 Annex presently drains, by way of the USSO structure, to the L-28 borrow canal at the north line of the Big Cypress Seminole Indian Reservation. Upon completion of the diversion, the total area of the L-28 Basin will be effectively reduced to approximately 85 square miles.

**Phosphorus Source Control Program**

C-139 Annex flows are expected to be diverted to STA-6 in WY2011. An Environmental Resource Permit has been issued authorizing the operation of a new C-139 Annex discharge structure to the STA-6. This permit requires the landowner to implement BMPs, monitor TP load in discharges, and maintain the historic annual TP load in discharges. The C-139 Annex property has been participating in the statewide FDACS BMP program described above since 2005.
Water Quality Summary

Figure 4-2 summarizes the annual TP load, flow-weighted mean concentration, rainfall (at station S-140), and flow volume for the S-140 structure for WY1998 through WY2010. These data include flow and TP loads from the C-139 Annex Sub-basin. The annual flow values ranged from 62.972 to 203.575 kac-ft, the annual load values ranged from 4.046 to 15.543 mt, and the flow-weighted mean concentration values ranged from 36 to 144 ppb. The mean annual flow was 128.430 kac-ft, the mean annual load was 8.364 mt, and the average flow-weighted mean concentration was 53 ppb.
As depicted in Figure 4-3, which covers WY1998 through WY2010, the annual flow values for USSO ranged from 24.270 to 65.731 kac-ft, the annual load values ranged from 2.992 to 6.901 mt, and the flow-weighted mean concentration values ranged from 69 to 138 ppb. The mean annual flow for USSO was 41.685 kac-ft, the mean annual load was 4.902 mt, and the average flow-weighted mean concentration was 95 ppb.

Figures 4-4, presents TP water quality data derived from mass balance calculations for Seminole and Miccosukee areas for the period WY1998 through WY2010.

Figure 4-2. L-28 Basin S-140 annual TP load, FWM TP concentration, rainfall, and flow volume to the EPA for WY 1998-WY2010
Figure 4-3. Upstream structure USSO TP load, TP FWMC, and flow volume for WY1998-WY2010

Figure 4-4. Seminole and Miccosukee Area of L-28 Basin TP load, TP FWMC, and flow volume for WY1998-WY2009
I declare, under penalty of perjury, that the foregoing is true and correct.

By: ____________________________________________
    Carlos Adorisio

Executed: October 7, 2010
SUMMARY OF QUALIFICATIONS: Professional Engineer with over 19 years of progressively increased responsibilities. Strong knowledge of hydrology, hydraulics and environmental restoration, H&H modeling, and management of consulting and construction contracts. Good understanding of South Florida’s natural and man-made drainage systems and ecosystem restoration programs. Ability to work with members of multidiscipline teams and negotiate with stakeholders balanced solutions that everybody can accept. Self starter, proactive, and highly motivated.

PROFESSIONAL EXPERIENCE:

ENGINEER SUPERVISOR
South Florida Water Management District, West Palm Beach, FL  March 2004-Present
- Heading and supervising non-Everglades Construction Project (non-ECP) section of Everglades Regulation Division. Charge with implementing the requirements of non-ECP permit and Part 3 of the 2003 Long-term Plan (1994 and 2004 Everglades Forever Act). Develop and coordinate implementation of mandatory and voluntary phosphorus source controls programs and projects in eight non-ECP basins: C-111, C-11 West, North New River Canal, North Springs Improvement District, Boynton Farms, Village of Wellington Acme Basin B, L-28, and Feeder Canal. Oversee implementation of cooperative agreements with drainage districts, municipalities, and other stakeholders within non-ECP basins to improve water quality. Oversee development and implementation of grant programs for Best Management Practices (BMPs). Seek and negotiate modifications to Environmental Resource Permits (ERP) to include operational changes, implementation of additional water quality improvement projects, implementation of BMPs, and pollutant effluent limitations. Provide technical support, engineering expertise, and guidance on water management and quality improvements projects. Coordinate with other District departments implementing CERP, ECP and A8 projects that affect or will affect flows and water quality of non-ECP basins. Coordinate with District’s Operations Division operation of structures affecting flows from non-ECP basins. Oversee management of consulting contracts for evaluation of water quality data and flow, feasibility evaluations of water quality improvement, and flood impact analysis. Oversee coordination with other District departments to ensure accurate collection and reporting of water quality and quantity data for non-ECP basins. Coordinate with tribal staff projects affecting Seminole and Miccosukee reservations within the L-28 and Feeder Canal basins. Oversee and coordinate non-ECP public outreach program. Coordinate with internal departments all revisions to non-ECP permit and Part 3 of the Long-term Plan. Provide technical support, engineering expertise, and guidance on development of technology-base effluent limitations (TBEL). Lead author of non-ECP section of Chapter 4 of the South Florida Environmental Report. Develop section’s fiscal year budgets and track projects expenditures. Support BMP rulemaking effort being undertaken by Northern Everglades Section of the Everglades Regulation Division.

SENIOR ENGINEER
South Florida Water Management District, West Palm Beach, FL  May 2001-March 2004
- Managed two non-basins (formerly known as Everglades Stormwater Program basins): C-11 West and North New River Canal. Developed, implemented, and managed Local Cooperation Agreements with local independent drainage districts and municipalities to implement water quality improvement...
Developed consulting contracts documents and managed consulting contracts for development and evaluation of water management improvements projects. Developed portions of Urban BMP manual. Coordinated development and implementation of Turf and Landscape, Nursery, and Equine BMPs. Participated in development of public outreach plan. Coordinated water quality sampling program. Coordinated with internal departments and outside agencies. Provided technical support, engineering expertise, and guidance on water management improvements projects and for the development of Part 3 of the 2003 Long-term Plan for the two C-11West and North New River Canal basins. Prepared work achievement reports and presentations.

ASSISTANT CITY ENGINEER
City of Hallandale Beach Department of Public Works, Hallandale, FL March 1997-May 2001

- Performed general engineering and administrative work of a technical nature in connection with public service activities. Prepared and develop engineering plans, specifications, and contracts for street and drainage improvements projects (CDBG, CRA, and ISTEA projects). Performed engineering survey work. Designed stormwater systems. Obtained necessary construction permits from government agencies. Coordinated required advertising for bids, reviewed construction bids, and made necessary recommendations for award of bid. Provided project management for the construction of municipal public works projects performed by outside contractors and City's Public Works Department. Ensured contractor compliance with time and budget constraints. Performed construction inspections. Advised and assisted other City departments in technical matters. Reviewed private project development plans for compliance with codes, regulations, and standards, adequacy of applications for permits and compliance with approved plans. Responded to public or other inquiries relative to engineering policies and procedures on specific projects and other municipal issues. Coordinated and worked with other public governmental entities on issues of municipal concern. Coordinated implementation of and compliance with City's NPDES permit requirements. Assisted in preparation of Grant applications. Conducted investigative studies or research and prepared written reports on findings. Prepared detailed written reports on progress of assigned projects and on items requiring City Manager or City Commission approval.

WATER RESOURCES ENGINEER

- Designed flushing programs for City of Washington, D.C.’s water distribution system. Responsibilities included development of detailed instructions including marked-up maps of selected areas detailing valves and fire hydrants to be used for flushing.

WATER RESOURCES ENGINEER

- Supervised the review and technical evaluation of floodplain analysis and stream channel design for areas of the Western United States. Responsibilities included evaluation of completed and proposed flood-mitigation works, such as levees, dams, detention basins, channel improvements, and diversions, with regard to regulatory compliance with National Flood Insurance Program (NFIP) regulations and floodplain impact. Coordinated with consultants and local floodplain management officials to address technical and regulatory issues. Possess in-depth knowledge of hydrology and hydraulics and computer models such as HEC-1, HEC-2, HEC-RAS, TR-20, WSP2, AHYMO, WSPG, POND-2, WSPRO, SWMM, and other water resources software applications. Evaluated sediment transport capacity (erosion and deposition) of natural and manmade channels in arid Southwest Region. Administrative duties included preparation of technical correspondence, time and cost evaluation, and training of new employees for both technical and administrative procedures.
ASSISTANT ENGINEER
La Inmobiliaria S.A., Lima, Peru  
**June 1988-December 1988**
- Supervised construction crew of approximately 50 workers as the lead on-site engineer for a nine-story parking garage. Planned and scheduled construction. Purchased construction materials. Estimated material requirements for office buildings, churches, banks, and parking garages.

ASSISTANT ENGINEER  
Rolbecsa, Lima, Peru  
**December 1985-May 1988**
- Supervised construction crew of approximately 10 workers as the lead on-site engineer responsible for construction of residential housing. Provided detail directions, explained design, tracked schedules, and secured structural integrity. Estimated cost of residential projects.

OTHER EXPERIENCE:
- Teaching Assistant, Pontificia Universidad Catolica del Peru in Lima, Peru, Hydroelectric Power Plants, undergraduate course of approximately 20 students. Proposed and graded homework (September 1987-December 1987).
- Private Tutor of Math, Physics, and Calculus for college and high school students (1982-1988).

ACADEMIC EXPERIENCE:
- Bachelor Thesis: *Transient Phenomena in Hydroelectric Power Plants*, 1988. The thesis presented a computer program to compute dynamic pressure waves (water hammer) and surge chambers oscillations in hydroelectric systems using the Method of Characteristics. The program allows the analysis of valves closing in complex hydroelectric systems with multiple tunnels, penstocks, and surge chambers.

EDUCATION:
University of Maryland in College Park, Maryland  
**Master of Science, Civil Engineering**, May 1995
Gunston Center in Arlington, Virginia  
Pontificia Universidad Catolica del Peru, Lima, Peru  

REGISTRATION AND MEMBERSHIP:
Professional Engineer, State of Florida, 1998  
Professional Engineer, District of Columbia, 1996  
Member, American Society of Civil Engineers, 1998

LANGUAGES:
Fluent in English and Spanish.