RIO GRANDE CANALIZATION PROJECT
WATER BUDGET STUDY
Final Report

Appendix L
Scope of Work Items
December 6, 2013

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RIO GRANDE CANALIZATION PROJECT
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Final Report

Scope of Work Dated June 12, 2012

SCOPE OF WORK FOR THE
RIO GRANDE CANALIZATION PROJECT (RGCP)
WATER BUDGET STUDY

1. BACKGROUND

The purpose of this project is to conduct an evaluation of the water budget components along the Rio Grande Canalization Project (RGCP) and the local groundwater basin for the ongoing 2010 to 2012 drought period. Through a quantification and comparison of the relative magnitudes of the water budget components, this study is intended to help the stakeholders to manage single or multiple water release timings and volumes during years of water scarcity.

The RGCP is a 105.4-mile river corridor that conveys Rio Grande flows from downstream of Percha Dam in Sierra County, New Mexico, to the American Dam in El Paso County, Texas, as shown in the U.S. Army Corps of Engineers (USACE), 2007 report (Figure 1). Flow releases from the upstream Elephant Butte and Caballo Dams conveyed within the RGCP are used for irrigation, water supply and also to meet the requirements of equitable distribution of the Rio Grande waters with Mexico based on the Convention of May 21, 1906, entitled "Equitable Distribution of the Waters of the Rio Grande." While the RGCP is a flow conveyance corridor, it also serves to provide flood protection up to the 100-year storm event to adjoining communities through a system of levees on either side. The United States International Boundary and Water Commission (USIBWC) is currently in the process of rehabilitating segments of the RGCP levees to meet the levee accreditation criteria as set forth by the U. S. Federal Emergency Management Agency (FEMA).

In years of adequate supply, water releases from the Elephant Butte and Caballo reservoirs typically occur from March to September. The stakeholders who regulate the Rio Grande Project Water Supply along the RGCP include the U.S. Bureau of Reclamation (USBR), the Elephant Butte Irrigation District (EBID) and the El Paso County Water Improvement District No. 1 (EPCWID No. 1). The U.S. and the Mexican Sections of the International Boundary and Water Commission (IBWC) are responsible for the implementation of the 1906 Convention and the obligations thereunder with respect to Mexican water.

The El Paso area has been experiencing severe drought in 2011 and 2012 as a result of the La Niña weather phenomenon. The current La Niña has weakened in April 2012 and is unlikely to redevelop later this year according to the USBR. During such drought years, the timing and volume of water releases from the Elephant Butte and Caballo reservoirs requires additional cooperation with different stakeholders preferring different release dates. This situation is currently being experienced in 2012 where the country of Mexico through the Mexican Section of the IBWC has requested water in late March while U.S. irrigators deviated from past practice and requested deliveries in mid-May.

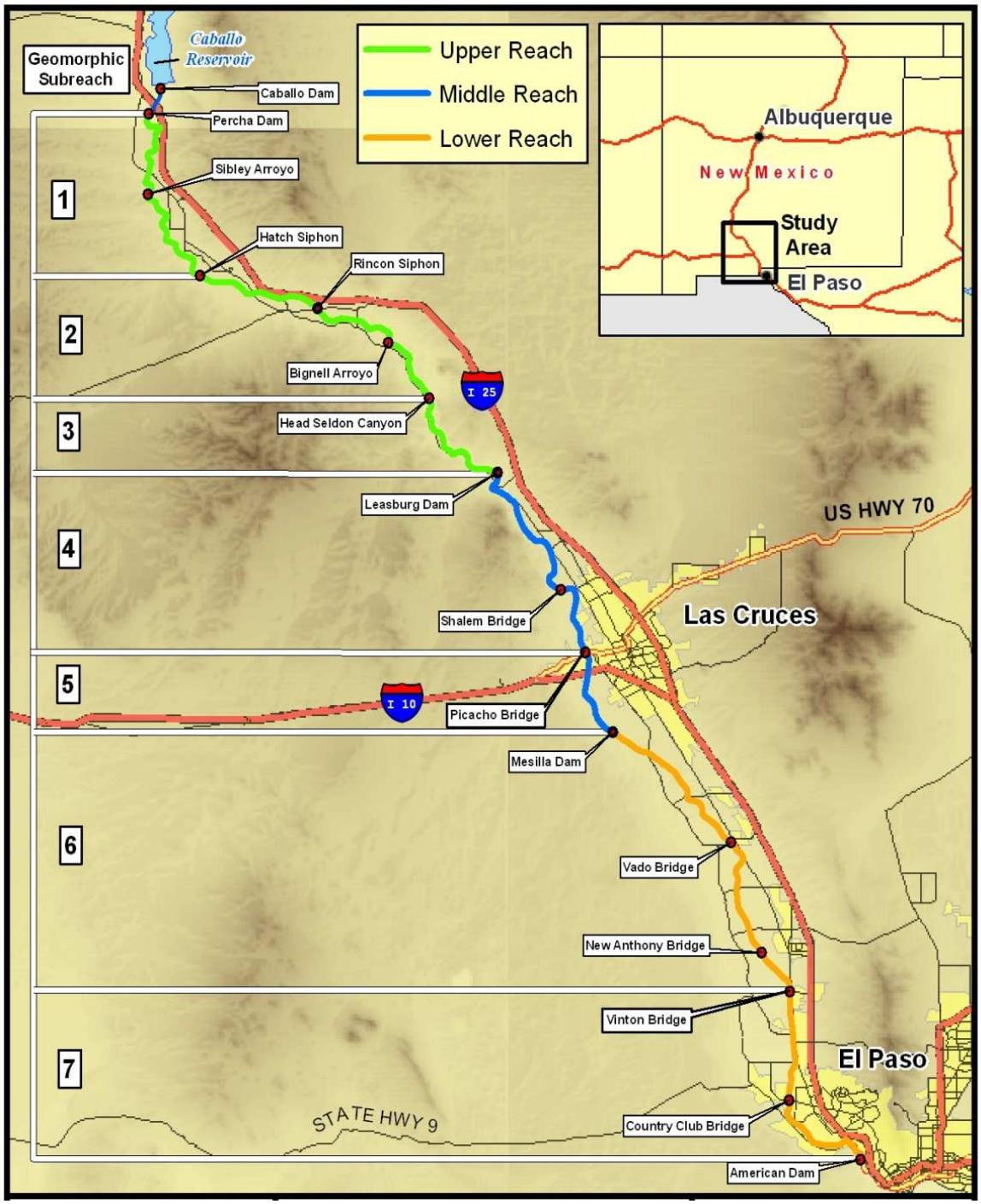


Figure 1: Location of the Rio Grande Canalization Project (Adapted from USACE, 2007)

2. STUDY AREA

The study area extends from the Elephant Butte Reservoir at the upstream end to the Acequia Madre Canal at the downstream end. The study will focus on both the RGCP and the adjoining surface water and groundwater basins.

3. PROJECT DESCRIPTION

The average peak release rate from the Caballo Dam is 2,350 cfs. This flow is mostly contained within the main channel which, under ideal conditions, has a hydraulic capacity ranging from 2,500 to 3,000 cfs in the upper Rincon Valley to less than 2,000 cfs in the Lower Mesilla and El Paso Valleys (USIBWC, 2001).

Historically, the water release occurs as a single pulse extending from March into September. In some years such as 2003 and 2004, there was an early short release pulse in March followed by a longer sustained release. In the current 2012 year, Mexico requested a water release in late March. The U.S. irrigators requested a later release occurring in mid-May. The EBID and EPCWID No. 1 contend that there would be significant channel seepage associated with the normal release of water to Mexico in the current drought year.

In drought years, there is obviously a benefit with maintaining a short duration release. This will improve conveyance efficiency while minimizing channel seepage. In contrast, an initial release followed by a much later release will result in replenishment of the unsaturated (vadose) zone twice, potentially increasing channel seepage. Such a two (2) or more pulse release may be unavoidable during drought years if stakeholders propose very different release dates.

The amount of channel seepage is an unknown. Channel seepage, delivery of water through canals and laterals and, in addition, the irrigation of project acreage recharges the unsaturated zone and the aquifer. Groundwater pumped from the aquifer is used to irrigate the crops and it is believed that only a small portion of the channel seepage should be considered a loss to the overall water budget through evaporation from the unsaturated zone.

Evaporation from the Elephant Butte Reservoir and the Caballo Reservoir represents a significant loss of surface water. Estimates of these losses would be useful. In particular, the reduction in evaporative loss resulting from reduced area of standing water that results from a normal release in March could represent potential savings in water volumes compared to a late release in May. The larger surface area of standing water and higher summer temperatures into May should result in a

higher evaporative loss.

There are several unknowns in the RGCP water budget that need quantifying in order to help in water management decision making. The project work will focus on obtaining an understanding of the relevant water budget components along the RGCP and adjoining surface and groundwater basins. The information collected and results from the analysis will inform the stakeholders on the implications of single and multiple upstream reservoir water releases in terms of conveyance efficiency, and water budget components such as channel seepage, and evaporation loss, among others.

Due to the complexity of the project, the consultant will hire a suitable specialist or specialists who are knowledgeable in hydrological processes that govern the water budget. These experts will be consulted throughout the duration of the project and also while summarizing the conclusions of the study. The consultant will ensure that the hired specialist does not have a contract currently with the stakeholders of this project.

4. METHODOLOGY

In order to achieve the project goals, the following steps will be followed.

a. Data Collection

The consultant will first assemble data required for the water budget from prior and ongoing surface water and groundwater measurements, and detailed studies in the project area. Important data include, but is not limited to, precipitation, groundwater levels, streambed elevation from LiDAR, soil properties and seepage, water release data from dams, irrigation diversions, reservoir evaporation, and evapotranspiration. Example agencies that have conducted such studies and disseminate data include the USBR, U.S. Geological Survey (USGS), Texas Water Development Board (TWDB), the USIBWC, the EBID, the EPCWID No 1, El Paso Water Utilities, the University of Arizona at Tucson, the University of Texas at El Paso (UTEP), New Mexico State University (NMSU), New Mexico Interstate Stream Commission (ISC) and the New Mexico Office of the State Engineer (NMOSE). The assembled data will be supplemented with water budget calculations of components such as channel seepage and evaporation using equations from the literature. Final water budget calculations will be summarized in Microsoft Excel spreadsheets. Results showing the magnitudes of each water budget component will also be presented in tables and figures. No field data collection is required as part of this Scope of Work (SOW).

b. Parameters

Suitable physical parameters required for the water budget calculations described below will be adopted from previous studies and the literature. Where data is not available, reasonable assumptions should be made.

c. Water Budget Calculations

A water budget is the scientific method for measuring or quantifying the amount of all water inflows and outflows, and resulting change in storage within a defined hydrologic domain over a time period. The consultant will perform water budget analysis at two scales: (1) the RGCP scale and (2) the local basin scale. The local basin scale will focus on both surface water and groundwater budgets. Each water budget will focus on a typical drought period. **For this study, the period starting from January 1, 2010 and ending on June 30, 2012 will be used for the water budget calculations. Two (2) additional scenarios of a wet year and a normal year are optional items which may be included in the SOW at a later date. The water budgets will be determined for a daily time step (Δt). Final results will be reported on daily, weekly, monthly and annual basis.**

In addition, the consultant will also research past studies such as Moreno and Bawazir (2008) and ongoing measurements by the USBR for evaporation loss estimates from the Elephant Butte and Caballo Reservoirs. Monthly results will be tabulated for a typical drought year and for the period of study. The implications of possible increases in evaporation losses due to delayed releases in May will be analyzed taking into consideration relevant portions of the Rio Grande Compact and losses of evaporation charged to the State of New Mexico.

In order to evaluate the distance between the water table and the riverbed, the most recently available water level data will be tabulated along with the riverbed elevations from the 2010 LiDAR at various points along each reach of the river.

The consultant will include a discussion of the results obtained from this study with those documented in the RGP (2012) study in the final report.

The general water budget equation is:

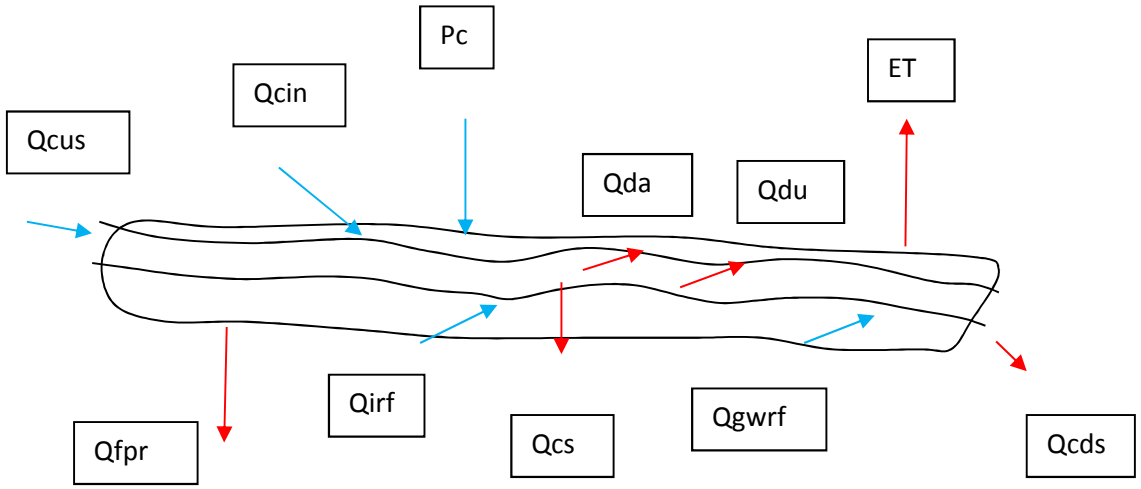
$$\Delta S = I - O$$

where ΔS = change in storage, I = inflow and O = outflow.

The RGCP Scale or Channel Water Budget Equation

Figure 2 shows a schematic of the channel water budget for the RGCP scale.

Figure 2: Channel Water Budget



For a given time Δt, the channel water budget equation is:

$$\Delta S_{ic} = \left(Q_{cus} + P_c + Q_{cin} + Q_{irf} + Q_{gwrf}\right) - \left(Q_{cds} + Q_{cs} + Q_{fpr} + ET + Q_{da} + Q_{du}\right)$$

where ΔS_{ic} = in-channel change in storage, Q_{cus} = upstream dam release or inflow, P_c = precipitation, Q_{cin} = in-channel stormwater inflow, Q_{irf} = irrigation return flow, Q_{gwrf} = groundwater return flow, Q_{cds} = downstream channel outflow, Q_{cs} = channel seepage, Q_{fpr} = floodplain recharge, ET = evapotranspiration, Q_{da} = diversions authorized, and Q_{du} = diversions unauthorized.

The RGCP reach will be divided into four (4) segments. The Upper Reach (Caballo to Leasburg metering stations) and Middle Reach (Leasburg to Mesilla metering stations) as shown in Figure 1 are two segments. The Lower Reach in Figure 1 will be split into the remaining two segments – a third segment from Mesilla to Anthony metering station, and a fourth segment from Anthony to downstream of American Dam. A water budget analysis will be conducted on each segment. This will lay the basis for more detailed water budget calculations along the seven (7) segments referred to in Table 2.2 of the USACE (2007) FLO-2D study: (1) Upper Rincon, (2) Lower Rincon, (3) Selden Canyon, (4) Upper Mesilla, (5) Las Cruces, (6) Lower Mesilla and (7) El Paso. For the purpose of this study, only four (4) segments will be analyzed.

This analysis will yield a water budget equation that will predict downstream channel outflow in response to an upstream dam release for a typical drought year.

A component of special interest is channel seepage. The consultant will analyze channel seepage using both the HEC-RAS and the FLO-2D software. Each approach presents certain advantages and limitations as described below. Three (3) inflow hydrographs that peak at the average maximum release rate will be developed with one (1), two (2) and three (3) release pulses. Using existing studies, LiDAR data and data from field measurements by others, the consultant will determine the depth to the water table along the RGCP. The consultant will discuss modeling details and parameter selection with the USIBWC before starting the channel seepage analysis.

For the HEC-RAS analysis, the latest model developed along the RGCP will be used. The model will be updated, if required, to the current version of the HEC-RAS software. The existing model will be modified into an unsteady hydraulic model to enable analysis with the three (3) inflow hydrographs. The groundwater interflow internal boundary condition will be used to quantify channel seepage. The coefficient of saturated hydraulic conductivity (Ksat) is a data item to be input for channel seepage calculations using the Darcy's equation in HEC-RAS. The software allows the entry of unique Ksat values for each cross-section if needed. The HEC-RAS model will be run for the three inflow hydrographs. HEC-RAS only calculates the seepage for conditions where the portion below the cross-section (the RGCP main channel, for this study) is saturated. However, there is an unsaturated zone with a widely variable depth that needs to be replenished first before such fully saturated flow can commence. This is a limitation

of the HEC-RAS software and model results from the initial phase of the inflow hydrograph when the unsaturated zone exists below the channel will not be representative of conditions in the field.

There is an existing two-dimensional FLO-2D hydraulic model that was developed for the RGCP with channel infiltration quantified using the Green-Ampt method (USACE, 2009). The Green-Ampt method has been adopted in similar semiarid environments and is also used by agencies such as the Flood Control District of Maricopa County in Arizona. In this method, infiltration is modeled as the progress of a wetting front into the subsurface. In the USACE (2009) model, uniform parameters were used for the entire channel reach. The consultant will update the model to the current version and adopt a unique set of Green-Ampt parameters for each of the four (4) segments in consultation with the USIBWC. Parameters such as Ksat used for the modeling must be consistent with those used for HEC-RAS modeling. The original FLO-2D model will be modified to include these parameters and the resulting base model will be run for the three (3) inflow hydrographs. It should be noted that the water table is assumed to be at depth by the FLO-2D software. However, the FLO-2D version 2009 has recently been updated and the infiltration component has been revised to include an entry for the water table depth. With this update, while floodplain seepage will stop when the wetting front reaches the water table, channel seepage will continue to occur. The consultant will study these software updates and consider them in the estimation of channel seepage. The consultant will calculate channel seepage rates based on Darcy's equation once the wetting front has reached the water table and determine if the FLO-2D seepage rates adequately match these.

Because of the importance of the channel seepage component in the water budget, the consultant will explore the implications of parameter uncertainty through sensitivity analysis. Three (3) FLO-2D model runs will be made by increasing the Ksat parameter value by 10%, 20% and 30% from the base model for the three (3) inflow hydrographs. Also, three (3) FLO-2D model runs will be made by decreasing the Ksat value by 10%, 20% and 30% from the base model for the three (3) inflow hydrographs. The consultant will document and discuss the channel seepage results from these FLO-2D modeling runs. A similar sensitivity analysis will also be performed for the HEC-RAS modeling.

Channel seepage results obtained from the HEC-RAS and FLO-2D approaches will be compared for reasonableness with the USGS seepage rate measurements in the Mesilla basin and rates reported in the literature for similar soil and hydrogeologic conditions. Based on such comparisons and values of other components of the hydrologic budget, the consultant will explain differences in results obtained by the HEC-RAS and FLO-2D approaches and recommend the result to adopt.

Considering the methods of seepage calculations in HEC-RAS and FLO-2D and verifying their individual limitations as described above, the consultant will explore the

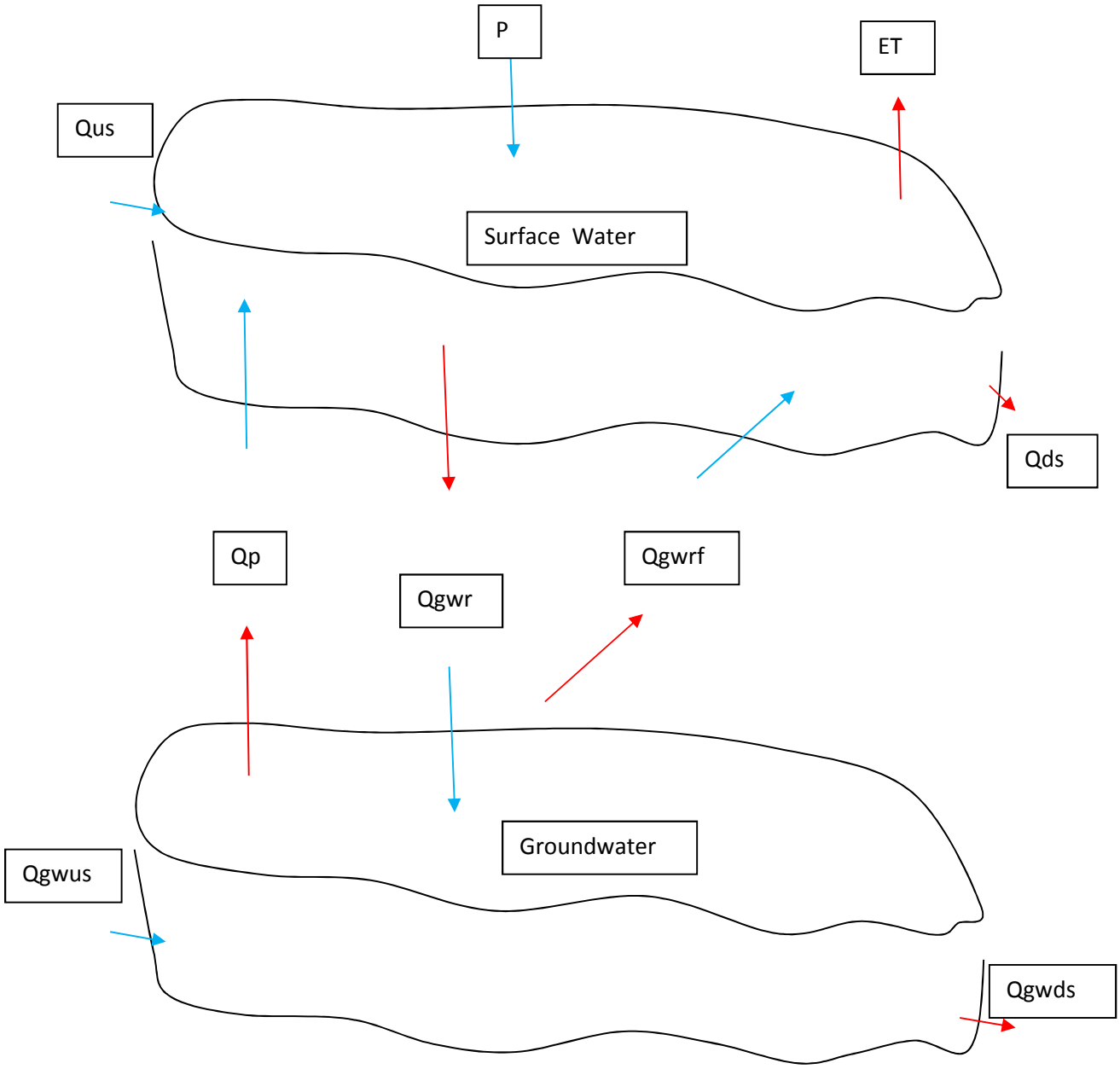
combination of FLO-2D seepage until the wetting front reaches the water table with that from HEC-RAS thereafter.

Most of the channel seepage is expected to recharge the aquifer. The consultant will research papers on vadose zone evaporation and provide a qualitative estimate on the expected amount of evaporative loss from the vadose zone underlying the channel.

The Local Basin Scale or General Water Budget Equation

Figure 3 shows a schematic for the local basin scale, surface water and groundwater budgets.

Figure 3: Surface Water and Groundwater Budgets



For a given time Δt, the equation for the surface water budget is:

$$\Delta S_{sw} = \left(Q_{us} + P + Q_p + Q_{gwrf}\right) - \left(Q_{ds} + Q_{gwr} + ET\right)$$

where ΔS_{sw} = change in surface water storage, Q_{us} = upstream dam release, P = precipitation, Q_p = pumping, Q_{gwrf} = groundwater return flow, Q_{ds} = downstream channel outflow, Q_{gwr} = groundwater recharge and ET = evapotranspiration.

For a given time Δt, the equation for the groundwater budget is:

$$\Delta S_{gw} = \left(Q_{gwus} + Q_{gwr}\right) - \left(Q_p + Q_{gwrf} + Q_{gwds}\right)$$

where ΔS_{gw} = change in vadose zone and groundwater storage, Q_{gwus} = upstream groundwater inflow, Q_{gwr} = groundwater recharge, Q_p = pumping, Q_{gwrf} = groundwater return flow and Q_{gwds} = downstream groundwater outflow.

The ET represents the sum of the contributions from the different vegetative species and irrigated crops in the study area.

This analysis will provide an understanding of the water budget components during a typical drought year.

5. DELIVERABLES

The Contractor will deliver the following items to the USIBWC's Headquarters Office, which is located at 4171 N. Mesa, Suite C-100 in El Paso, TX:

Twenty (20) hard copies of the project report. The report will include a detailed description of the sources of data used, assumptions made, analyses conducted, results with tables and figures, discussion, recommendations on best water management practice to be followed in the spring of 2013, 2014, 2015 and beyond, suggested water management investments (water pump monitoring),

and recommendations and suggestions for further study. The report will also include agricultural trends that are impacting the aquifer. Results will include water budget analysis at two scales: (1) the RGCP scale, and (2) the local basin scale. The water budget components at daily intervals will be summarized in Microsoft Excel format. The results will also be summarized as weekly, monthly and annual totals. The amount of channel seepage that recharges the aquifer as determined from FLO-2D and HEC-RAS modeling for the three (3) inflow hydrographs and from earlier studies will be discussed. In cases where channel seepage loss estimates vary significantly between the FLO-2D and HEC-RAS modeling approaches, the consultant will provide explanations for such differences along with recommendations on which estimate is more realistic. Combined channel seepage estimates as described earlier in the light of the limitations of each software will also be provided. The report will also include monthly estimates of evaporation from the Elephant Butte and Caballo Reservoirs for a typical drought year and for the period of study. The implications of possible increases in evaporation losses due to delayed releases in May will be discussed taking into consideration the Settlement Agreement between the two districts and the USBR, and implications of evaporation loss responsibilities under the Rio Grande Compact. The report will include a discussion of the results obtained from this study with those documented in the RGP (2012) study.

Based on the results of the analysis, the consultant will recommend better ways to manage water deliveries to all water users south of the Elephant Butte and Caballo reservoirs. The consultant will also provide recommendations on improving channel conveyance along the RGCP through methods including vegetation removal and sediment removal, but within the framework of the USIBWC Record of Decision (USIBWC, 2001).

The report will include a DVD with digital copies of water budget data, modeling, CAD and ArcGIS files, and also a pdf file of the entire project report. A DVD Readme file will be included both in the report and in the DVD providing a description of the DVD contents.

6. ADMINISTRATIVE WORK REQUIREMENTS

a. The Contractor will attend a project kickoff meeting with USIBWC and stakeholder's representatives. The date and time of the meeting will be scheduled with the USIBWC's Contracting Officer (CO). The Contractor will prepare an agenda and minutes of the kickoff meeting.

b. The Contractor will prepare a project schedule for presentation and discussion at the kickoff meeting discussed below. The Contractor will update and present the schedule monthly, and as needed through the duration of the project.

c. The Contractor will prepare and submit to the USIBWC a biweekly update report on work

performed. The report will include major accomplishments for the reported period, significant problems and proposed solutions, and any issues with contractual requirements. The report, along with an updated schedule, will be submitted by e-mail no later than the sixth day and the twentieth day of the following month.

d. The Contractor will submit the draft minutes of all meetings and conference calls to the USIBWC within three (3) calendar days after the day of the meeting. The USIBWC will provide comments within three (3) calendar days of receipt of the draft minutes. The Contractor will address the comments and submit the final minutes to the USIBWC within three (3) calendar days after receipt of USIBWC's comments.

7. PERIOD OF PERFORMANCE

a. The Contractor will submit the 60% progress report sixty (60) calendar days from Notice to Proceed. The USIBWC will provide comments within ten (10) calendar days of receipt of these deliverables. The Contractor will review the Government's comments and provide responses to the comments with the 90% deliverables; however, if there are comments that the Contractor does not concur with, then the Contractor will inform the CO and the Contracting Officer Representative (COR) within seven (7) calendar days. It is critical that any Government comments that the Contractor does not agree with be resolved between both parties prior to the submission of the 90% deliverable.

b. The Contractor will submit 90% of the report and calculations within thirty (30) calendar days from receipt of USIBWC comments.. The USIBWC will provide comments within seven (7) calendar days.

c. The Contractor will incorporate the Government's comments and submit the final design deliverables (report, drawings, digital models) to the Government within five (5) calendar days from the receipt of USIBWC comments. The final deliverables will include the Contractor's responses to all Government's comments. If the Contractor does not concur with any Government's comments, then the Contractor will notify the CO and COR of the issue prior to submission of the final deliverables. Concurrence on all issues must be reached between the Government and Contractor prior to the submission of final deliverables.

8. INFORMATION PROVIDED BY THE USIBWC (THE GOVERNMENT)

The USIBWC will provide the following existing project documents to the Contractor (The Contractor shall provide the USIBWC with an external drive (minimum 1 terabyte capacity) in which USIBWC will load USIBWC provided data and send back to the Contractor).:

a. Reports and models related to the U.S. Army Corps of Engineers FLO-2D and related hydraulic models of the RGCP.

b. 2010 LiDAR data.

c. Precipitation and Gage Data along the RGCP.

d. Data from stakeholders and public agencies.

All of the documents provided to the Contractor are/shall remain property of the USIBWC and shall be returned at the end of the project. Information provided by the USIBWC in the form of reports or data cannot be used for work outside of the current scope without written consent of the USIBWC.

9. REFERENCES

The following are some of the studies that have been referred for the preparation of this SOW. This list should in no way be considered exhaustive, and the consultant will research additional studies, web sites and the literature as needed during the execution of the contract.

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END OF SCOPE OF WORK

RIO GRANDE CANALIZATION PROJECT
WATER BUDGET STUDY
Final Report

Modification no. 1 to Scope of Work Dated December 4, 2012

MODIFICATION NO. 1
SCOPE OF WORK FOR THE
RIO GRANDE CANALIZATION PROJECT (RGCP)
WATER BUDGET STUDY

1. ANALYSIS AND REPORT

The following changes will be made to the Water Budget Study calculations and reflect an addition to the original Scope of Work (SOW). These changes are a result of the technical review comments from stakeholders to the 60% report and discussions of the same. Other elements in the original SOW remain unchanged.

Most of the 2012 data required for the additional work has been provided to the Consultant, Tetra Tech, by the USIBWC. However, the Consultant will obtain clarifications on miscellaneous data questions and obtain any remaining data required directly from the relevant agencies or from their web sites.

The end date for the water budget analysis will be extended from July 30, 2012, to November 30, 2012, thereby including the entire irrigation season of 2012. The technical review comments obtained for the 60% submittal from the USIBWC and other stakeholders will be addressed.

The hydraulic models HEC-RAS and FLO-2D will be calibrated using the upstream irrigation release and hydrometric data along the RGCP for the 2012 year. Since 2012 is a very dry year, this would represent a good calibration year for channel seepage as the surface water-groundwater interaction should be negligible. The 2012 year has two (2) irrigation release pulses and will represent the **baseline scenario**.

The calibrated models will be used to complete the water budget calculations for the 2010 and 2011 years, in addition to the 2012 calibration year.

The calibrated models will also be used to analyze two (2) irrigation release scenarios from the upstream reservoirs – a **delayed single-pulse scenario** and a **three-pulse scenario** – to predict the impact on channel seepage and other water budget components. These release pulses will be provided by the Rio Grande Project (RGP) Water Allocation Committee. As stated above, the two-pulse release case is represented in the 2012 data and is the baseline scenario to which comparisons from other release scenarios will be made.

The HEC-RAS modeling and related water budget analysis will be included in the main report. The FLO-2D modeling and related water budget analysis will be included in a separate report appendix. Each seepage analysis will be separate and a combination of HEC-RAS and FLO-2D seepages will not be analyzed.

The reservoir evaporation calculations will be included in a separate appendix of the report.

2. DELIVERABLES

The Contractor will deliver the following items to the USIBWC's Headquarters Office, which is located at 4171 N. Mesa, Suite C-100 in El Paso, TX:

Twenty (20) hard copies of the project report. The report will include a detailed description of the sources of data used, assumptions made, analyses conducted, results with tables and figures, discussion, recommendations on best water management practice to be followed in the spring of 2013, 2014, 2015 and beyond, suggested water management investments (water pump monitoring), and recommendations and suggestions for further study. The report will also include agricultural trends that are impacting the aquifer. Results will include water budget analysis at two scales: (1) the RGCP scale, and (2) the local basin scale. The water budget components at daily intervals will be summarized in Microsoft Excel format. The results will also be summarized as weekly, monthly and annual totals. The amount of channel seepage that recharges the aquifer as determined from FLO-2D and HEC-RAS modeling for the baseline (two-pulse) scenario and for the two (2) irrigation release scenarios (delayed single-pulse and three-pulse), and from earlier studies will be discussed. In cases where channel seepage loss estimates vary significantly between the FLO-2D and HEC-RAS modeling approaches, the consultant will provide explanations for such differences along with recommendations on which estimate is more realistic. The report will also include monthly estimates of evaporation from the Elephant Butte and Caballo Reservoirs for a typical drought year and for the period of study. The report will include a discussion of the results obtained from this study with those documented in the RGP (2012) study.

Based on the results of the analysis, the consultant will recommend better ways to manage water deliveries to all water users south of the Elephant Butte and Caballo reservoirs. The consultant will also provide recommendations on improving channel conveyance along the RGCP through methods including vegetation removal and sediment removal, but within the framework of the USIBWC Record of Decision (USIBWC, 2001).

The report will include a DVD with digital copies of water budget data, modeling, CAD and ArcGIS files, and also a pdf file of the entire project report. A DVD Readme file will be included both in the report and in the DVD providing a description of the DVD contents.

3. ADMINISTRATIVE WORK REQUIREMENTS

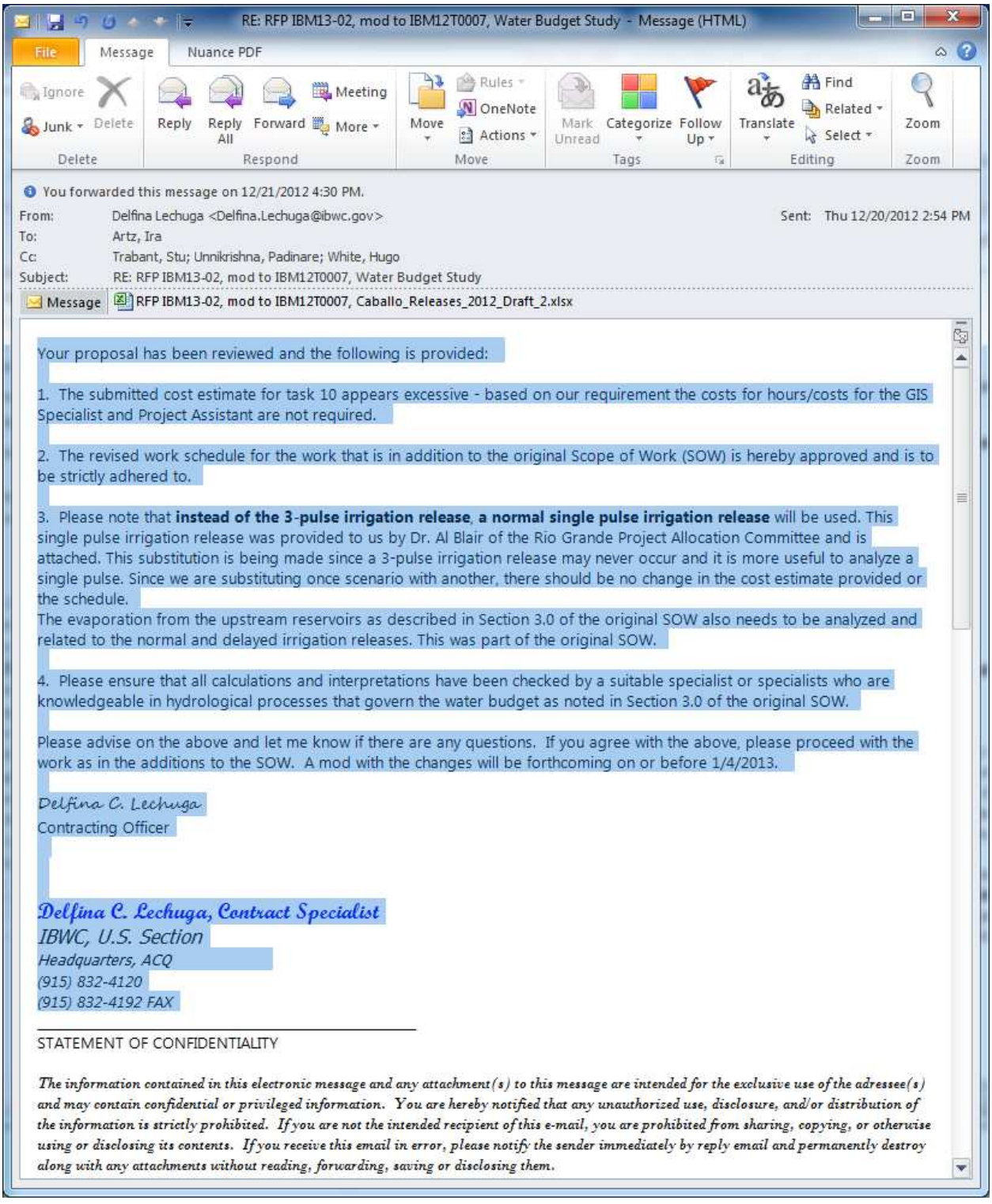
e. The Contractor will prepare a revised project schedule. The Contractor will update and present the schedule monthly, and as needed through the duration of the project. The revised schedule will include a 75% submittal before the 90% submittal. The 75% and 90% report and model submittals will be digital only and not include hard copies.

f. The Contractor will make a presentation on the results of the Water Budget Study after the completion of the 90% report at a venue to be determined by the USIBWC.

END OF MODIFICATION NO. 1 TO THE SCOPE OF WORK

RIO GRANDE CANALIZATION PROJECT
WATER BUDGET STUDY
Final Report

E-mail Regarding Modification no.1 to Scope of Work dated December 21, 2012



RE: RFP IBM13-02, mod to IBM12T0007, Water Budget Study - Message (HTML)

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You forwarded this message on 12/21/2012 4:30 PM.

From: Delfina Lechuga <Delfina.Lechuga@ibwc.gov> Sent: Thu 12/20/2012 2:54 PM

To: Artz, Ira

Cc: Trabant, Stu; Unnikrishna, Padinare; White, Hugo

Subject: RE: RFP IBM13-02, mod to IBM12T0007, Water Budget Study

Message | RFP IBM13-02, mod to IBM12T0007, Caballo_Releases_2012_Draft_2.xlsx

Your proposal has been reviewed and the following is provided:

1. The submitted cost estimate for task 10 appears excessive - based on our requirement the costs for hours/costs for the GIS Specialist and Project Assistant are not required.

2. The revised work schedule for the work that is in addition to the original Scope of Work (SOW) is hereby approved and is to be strictly adhered to.

3. Please note that **instead of the 3-pulse irrigation release, a normal single pulse irrigation release** will be used. This single pulse irrigation release was provided to us by Dr. Al Blair of the Rio Grande Project Allocation Committee and is attached. This substitution is being made since a 3-pulse irrigation release may never occur and it is more useful to analyze a single pulse. Since we are substituting once scenario with another, there should be no change in the cost estimate provided or the schedule.
The evaporation from the upstream reservoirs as described in Section 3.0 of the original SOW also needs to be analyzed and related to the normal and delayed irrigation releases. This was part of the original SOW.

4. Please ensure that all calculations and interpretations have been checked by a suitable specialist or specialists who are knowledgeable in hydrological processes that govern the water budget as noted in Section 3.0 of the original SOW.

Please advise on the above and let me know if there are any questions. If you agree with the above, please proceed with the work as in the additions to the SOW. A mod with the changes will be forthcoming on or before 1/4/2013.

Delfina C. Lechuga
Contracting Officer

Delfina C. Lechuga, Contract Specialist
IBWC, U.S. Section
Headquarters, ACQ
(915) 832-4120
(915) 832-4192 FAX

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