August 31, 2004

Mr. Don Freeman Executive Director Cape Fear River Assembly P.O. Box 1089 Fayetteville, NC 28302

RE: Proposal for Developing New Cape Fear River Basin Hydrologic Model

Dear Mr. Freeman,

The purpose of this letter is to submit the enclosed proposal for services to develop a new Cape Fear River Basin Hydrologic Model with updates and enhancements. The project team will include Moffatt & Nichol and Hydrologics Inc. In accordance with the scope of work identified in the Request for Proposals, the model will include the hydrologic data for the period through 2003. Hydrologics Inc. will develop an OASIS model for the Cape Fear River Basin. The new model will be developed to include the drought management planning tools and other features desired by the model planning committee.

If you have any questions about the proposed services, please do not hesitate to contact me or Johnny Martin at (919) 781-4626.

Sincerely,

Peter Elkan, P.E. Project Engineer

Attachments Scope of Services A – Hydrologics Services to Meet General Model Requirements B – Letter Proposal Describing OASIS Model and Hydrologics Expertise C - Breakdown of Cost for Moffatt and Nichol Services D – Agreement Form of Proposal

Scope of Services

Moffatt and Nichol (M&N) will coordinate with the project partners, attend project meetings, perform data collection, assist in model review and maintain overall responsibility to deliver the project in accordance with schedule and cost. Hydrologics staff will perform the OASIS model development.

The proposed services that will be provided by M&N and Hydrologics staff are as follows:

TASK 1 – Meetings & Project Coordination

Representatives from both M&N and Hydrologics staff will participate in a total of 4 meetings with the Cape Fear Rive Assembly (CFRA) technical committee. M&N will assist in facilitation of meetings.

<u>Kickoff Meeting</u>. The purpose of this meeting will be to present the project methodology to the stakeholders for review and comment.

<u>Interim Meetings</u>. Two (2) interim project meetings with stakeholders. The purpose of these meetings will be to present model update progress to the project stakeholders and receive comments/guidance from the stakeholders.

<u>Final Meeting</u>. The purpose of this meeting will be to present the final results from the study and complete a technology transfer for the project.

<u>Project Management & Coordination.</u> M&N will interact with Cape Fear River Assembly Technical Review Committee to be chaired by the Division of Water Resources (DWR) to facilitate the project management and coordination of meetings. M&N will be responsible for coordination with subconsultants and transfer of interim and final deliverables.

TASK 2 – Data Collection, Formatting, Analysis and Creation of Model Time Series

M&N will perform data collection and analysis as required for model development and upgrades.

<u>Data Collection/Formatting.</u> As part of this task, M&N will collect and format the following datasets for the time period of 1999-2003:

- Twenty-eight (28) USGS Daily Gage Records
- Twenty-eight (28) NOAA Precipitation & Evaporation Daily Gage Records
- Agricultural Yearly Statistics and Census Data for Seventeen (17) Counties
- Discussions with Agricultural Extension Agents to Verify Recent Trends, % of Surface Water Versus Groundwater Irrigation and Livestock Water Use, % of Acreage in County, etc.
- NCDEH Database Water Withdrawals (Municipal)

- Phone Calls to Industrial Water Withdrawers
- NCDWQ NPDES Discharge Database
- 2000 Census Data to Interpolate and Extrapolate Unknown Years.

<u>Data Analysis.</u> The agricultural datasets will then be used to estimate agricultural water demands for years 1999-2003. The methodology followed will be identical to that used for the previous model (comparing crop acreages and crop water use curves to precipitation on a weekly basis with irrigation supplying the shortfall – for only the crops which are normally irrigated). Dr. Ronald Sneed will be providing technical oversight and QA/QC of the final water demand curves.

Municipal/industrial withdrawals and discharges will also be computed as based on personal interview via phone calls, review of databases and census data.

<u>Creation of Model Time Series</u>. The finalized USGS river discharge gage records, NOAA precipitation/evaporation gage records, and agricultural/municipal/industrial withdrawals and discharges will be transferred into a DSS file format readable by OASIS.

TASK 3 – Model Update, Enhancements, Calibration and Verification

Hydrologics will develop an OASIS model for the Cape Fear River Basin in accordance with the project requirements. M&N will review model calibration and provide limited QA/QC. The project team will then assist in the setup of one scenario desired by the project stakeholders and update the existing model documentation and reporting to assist in model application by project stakeholders.

We have included a detailed breakdown that outlines the parameters of the project model requirements (corresponding to sections 1.2 through 1.5 and 2.2 through 2.5 of the RFP) identified in Attachment A –Hydrologics Services to Meet General Model Requirements. A letter proposal provides additional information regarding the experience of Hydrologics and application of OASIS in Attachment B – Letter Proposal from Hydrologics.

2.0 Deliverables

<u>Documentation</u> - The consultant will provide a users manual that describes the model input data assumptions, default modeling parameters, and the basics of how to use the model. Twenty printed copies and an electronic version will be provided to DWR for distribution to the stakeholders. The consultant will provide documentation and software to facilitate model updates.

<u>Software & Training</u> – A total of 23 copies of the software with calibrated model will be provided. A two day training seminar will be held for the project stakeholders.

3.0 Schedule

The project team will be available to commence work as soon as authorization is provided. Assuming a project start date of October 1, 2004 the total estimated project duration is 6 months, with project completion March 31, 2005.

4.0 Estimate of Cost

The proposed services will be provided at a fixed price based on the scope of work identified. The estimated fee for services to be provided by Hydrologics is \$102,800. Estimated total fee for services by Moffatt and Nichol is estimated to be \$ 68,000. The total project cost is \$170,800.

Attachment A contains a breakdown of fees for work to be completed by Hydrologics in accordance with the project model requirements. Attachment C is a detailed breakdown of services to be completed by Moffatt & Nichol.

Any additional services beyond the base scope of work may be provided in accordance to the following hourly rates. Travel expenses and materials will be billed at cost with a ten percent markup for overhead costs.

October 2003 Fee Schedule

Moffatt & Nichol

Principal	\$136.00/hour
Senior Engineer	\$100.00/hour
Hydraulic Engineer	\$95.00/hour
Clerical	\$68.00/hour

HYDROLOGICS

Principal Engineer	\$115.00/hour
Senior Engineer	\$100.00/hour
Staff Engineer	\$90.00/hour

The following assumptions apply to scope and estimated fee estimate:

- Others will arrange for the facilities for setup of stakeholders meetings, presentations and workshop. Moffatt & Nichol will review and comment on meeting agendas and meeting minutes that will be prepared for by others.
- A total of 23 copies of the model software will be provided.
- The proposed schedule is six months assuming an October 1, 2004 notice-to-proceed.

Attachment "A"
Hydrologics Services to Meet General Model Requirements

Present Capability in OASIS =	YES
Partially Included in OASIS - Some Minor Development Required =	PARTIAL
Not Included in OASIS - Major Development Required =	NO

		Project Requirements as Stated in the RFP	OASIS Capabilty	Remarks	OASIS Cost
		1. The consultant must update the model input data files through calendar year 2003.	N/A	This Will Be Moffatt & Nichol's Responsibility.	See Moffatt & Nichol's Estimate
		operating policies for Jordan Lake and EMC Jordan Lake allocations.	Partial	Minor OCL code required (part of initial setup)	Note 1
		 The model must be developed in an open, cooperative manner and generally accepted among the project partners. This includes, but is not limited to, four meetings with the project 			
		partners. 3. The consultant must demonstrate the validity of the model prior	Yes	8 person-days assumed. Assumes emulation of a selected Mike Basin run and a one-day	\$ 6,400.00
	0	to the model's release.	Yes	"verification" workshop	\$ 4,800.00
	SENERAL REQI	describes the model input data assumptions and default model- operating parameters, and the basics on how to use the model and make changes such as add a new node. The consultant must provide twenty printed copies and an electronic version using MS Word or PDF format to the NC Division of Water Resources (DWR).	Partial	Includes generic OASIS Manual and Addendum with specifics of the Cape Fear application.	\$ 4.800.00
	UIREM	5. The model must be easily updated as new input data become			+ ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	ENT	available. The consultant must provide documentation and software to facilitate periodic model updates.	Yes	Documentation included in 5 above.	N/A
	ω	6. The consultant must provide DWR with five initial copies of the model software plus one copy for each of 18 funding partners. DWR prefers an installation package that can be easily downloaded over the Internet or distributed on a single CD that includes documentation. DWR prefers model software that does		Software will be distributed on CD. No bardware key required	
		not require a hardware key.	Yes	Software can be transmitted electronically. See Note 3.	\$ 43,000.00
		training session on how to use the model for DWR staff, project partners, and other interested users.	Yes	2-day workshop assumed.	\$ 3,200.00
		8. The consultant must provide software support to DWR for four years, with a two-day response time in which to provide either a complete response, or a plan and schedule for providing a complete response that addresses DWR's concern. Funds will be set aside to provide for this consultant support, and those funds will be released to the consultant on an annual basis, based on the consultant's ability to provide timely customer support and			
·		thoroughly tested software updates. 1. The model users must be able to evaluate a variety of "what if" scenarios.	Yes	10 person-days assumed over 4 year period.	\$ 8,000.00
		2. The model must simulate smaller impoundments such as	Destiel	le Malanatura anno 1997	¢ 0.400.00
		 The model must adequately account for storage in smaller impoundment areas - specifically, in the area between ordan 	Paniai		\$ 2,400.00
		Dam and Buclhorn Dam - during low flow periods. 4. The model must provide mass-balance simulations that	Yes		N/A
		reservoirs and flow conditions for major stream segments for the			
	MO	available hydrologic record. 5. The model must run daily time steps and be able to run	Yes		N/A
UPI	ODEL	periods of one year to the total period of record. 6. The modeled withdrawals and discharges must vary with every	Yes		N/A
DATE	FUN	time step of the simulation.	Partial	Initial setup required	Note 2
E THE EXISTI	ICTION	7. The model must incorporate varying seasonal water consumption from agricultural use based on climatic conditions during the growing season. The model must also incorporate varying annual water consumption from agriculture based on			
NG N		 The model must be flexible and allow the simulation of user- define the the simulation of user- 	Partial		
IODEL		defined withdrawals or discharge levels at any point on the river or lakes that differ from existing conditions.	Yes		N/A
I		9. The model must accurately keep separate accounts of water supply storage for each allocation holder, and for water quality (low flow augmentation) storage. The model must track and			
		display individual water supply allocation accounts (amount	Destial		Nets 4
		withdrawn and storage remaining). schematic showing locations of model nodes for reservoirs,	Partial	Minor OCL code required (part of initial setup)	Note 1
		stream segments, withdrawal points and discharge points. The user must have the ability to zoom-in on any feature or area. The			
		model user group prefers the map-based schematic to be 2. The model user must be able to control the model inputs using	Partial	Need to create schematic and add clickable feature	\$ 6,600.00
		simple menus or windows. Additional withdrawals and discharges			
	MOI	menu structure.	Partial	GUI needs to be customized for Cape Fear application.	\$ 800.00
	DEL OF	adding nodes for new withdrawals, discharges, or streamflow evaluation points. Nodes must not be hard-coded so that code			
	۶ERA	modification is needed to add or delete nodes. 4. The model's default conditions must correspond to the	Yes		N/A
	TION	calendar year 2003 withdrawal and discharge conditions (i.e., base case scenario). Stakeholders may determine that a default			
	~	drought conditions scenario also be included.	Yes		N/A
		 The model users must have the option of beginning a simulation with reservoir storage volumes that are <100%. The 			
		model must default to reservoirs at full normal pool. 6. The model must include the ability to input multiplication	Yes		N/A
	factors for any single withdrawal and discharge, or group of withdrawals and discharges.	Yes		N/A	

		1. The model runs must generate time-series outputs for each			
		specified time step.	Yes		N/A
		all selected model nodes during the simulation period for all major stream segments.	Yes		N/A
	M	3. The model must display the history of pool level, surface area,			
	ODEL	storage volume (for each allocation holder), and flow			
	C	modeled reservoir over the simulation period. This includes			
	PUT	water supply balances, and flow augmentation balances. The			
		model user must be able to define the period of analysis (e.g., water year, climatic year, calendar year, etc.).	Yes		N/A
		4. The model must produce stream flow profiles for a variety of flow scenarios including 7Q10 drought conditions.	Yes		N/A
		5. The model must produce stream flow output data for use in conjunction with EPA-approved water quality models.	Yes		N/A
		6. The model must produce flow output data at the downstream			
		boundary of L&D #1 that are suitable for input as boundary conditions for hydrodynamic, water quality and water quantity			
		models for the tidally-influenced portion of the Cape Fear River. 7. The model must include the ability to select HTML format for	Yes		N/A
		output tables.	Yes		N/A
		1. The model must simulate the Corps' existing and potential	Partial	Minor QCL code required (part of initial setup)	Note 1
					Note 1
		that differ from existing conditions (e.g., different storage			
		allocations, triggers, releases, flow targets, etc.), without resorting to the model developer to implement the changes.	Yes		N/A
		3. The model must track low flow targets downstream that vary by week and as a function of the water quality storage remaining			
		in Jordan Lake, or some other trigger or set of triggers (e.g., lake inflow, lake level, time of year, etc.).	Yes		N/A
		 The model must support drought management planning. Drought management planning includes, but is not limited to, the following: 			
		4a. Safe yield estimates for river withdrawals, return period			
	MO	yield values, tracking of user-defined minimum instream flow			
	DEL	and water supply benefits at any node from conservation			
	FUNC	estimating reservoir safe yield.	Partial	process	\$ 5,000.00
M	OTIO	4b. Conservation and drought response measures by water users need only be thresholds and associated percentage			
ODEL	ŝ	reductions in water use. 4c. Reduction thresholds must have a variety of potential	Partial	Minor OCL code required (part of initial setup)	Note 1
E N N		triggers or combinations of triggers, such as inflows (both current			
HANC		volumes, stream flows (in the case of run-of-river intakes), time of			Note 1
ÊME		4d. The model must be able to set a schedule of drought			Note 1
NTS		response triggers that vary week-to-week over the course of a year.	Yes		N/A
		4e. The model must be able to schedule a change in any downstream flow target as a triggered drought response.	Yes		N/A
		4f. The model must simulate both the Jordan Lake drought management plan and each system's Jordan Lake drought			
		management plan.	Partial	Minor OCL code required (part of initial setup)	Note 1
		Service Extended Streamflow Prediction System (ESP) data for			N//A
-	<u>ନ</u>	1. The model users must have the option of mathematically	Yes		N/A
	MOD PERA	linking selected withdrawals and discharges for any system. This includes systems with multiple withdrawals and discharges, as			
	TION	well as systems that have discharges upstream of their withdrawal.	Yes		N/A
ľ		1. The model must provide flow duration curves and flow statistics of model output at user-selected nodes. Model users			
	NODE	must be able to define the flow statistics (i.e., aQb, where the	Partial	Development of post-processor required to compute flow	\$ 5,000,00
	ЕÓ	2. The model output must include the tables and graphs similar to			ψ 3,000.00
	JTPU	the ones tound in the Cape Fear River Basin Water Supply Plan (http://www.ncwater.org/Water_Supply_Planning/Cape_Fear_Bas			
	-	in_Water_Supply_Plan/) to show impacts for the various model	Ves	Table/plot setup required (25 graphs assumed)	\$ 2,000,00

Ē	. п	Additional capabilities are needed in the model that will not be us	sed at this time	, but need to be available for DWR or other users to add in the fu	ture. F	or example,
JTUR		1. The model needs to be able to simulate hydropower projects. Yes Some OCL code may be required		\$	-	
T Z		2. The model needs to be able to mathematically link water				
IOD		systems with a complex mix of withdrawal, discharges, purchases and sales of water.	Yes	Some minor OCL code may be required	\$	-
EL ENHANG	. MODEL ES FOR R ADDED MENTS	 The model needs to be able to simulate a variety of different types of individual system drought management plans with the option of a basin-wide plan having a higher priority. 	Yes	Some minor OCL code may be required	\$	_
	Note 1:	Preparation of OCL code				\$4,800.00
	Note 2:	Importation of time series data				\$6,000.00
	Note 3:	OASIS uses a third-party solver during execution. A license for thi original submittal. There are no restrictions on the license except t model could be handed around for local use if not all funding partn number of copies is reduced from 23, licensing fees can be reduced	s solver costs s hat it not be us ers require a p d by \$1500 pe	\$1500. Hence, licensing fees have increased \$27000 since the sed on more than one machine at a time. That is, a copy of the ermanent copy of the software. To the extent that the total r copy.		
	GRAND TOTAL:				\$	102,800.00

ATTACHMENT "B" Letter Proposal Documenting OASIS Model and Hydrologics' Expertise

August 27, 2004

Mr. Peter J. Elkan, P.E. Moffatt & Nichol 1616 East Millbrook Road, Suite 160 Raleigh, North Carolina 27609

RE: Cape Fear River Basin Model Update RFP

Dear Mr. Elkan:

HydroLogics, Inc., is pleased to respond to the referenced Request for Proposal, which you forwarded to us via email on August 17. Our costs for the proposed work are detailed in the attached Decision Matrix provided by Moffatt & Nichol for the preliminary submittal. The costs are unchanged from that earlier submittal except as pertains to the requirement to provide 18 more copies of the software than were called for in the draft model specifications. Please refer to Note 3 in the Matrix for further information about this change.

HydroLogics' core business is assisting in the resolution of water allocation and flow management issues such as those in the Cape Fear River Basin. OASIS was designed from the ground up for use in this type of application and is already in use or under development for two other river basins in North Carolina. Consequently, other than the initial setup that would be needed for any application, there are only two relatively minor items in the specifications that will require any changes to the OASIS modeling platform. The first is the "clickable schematic" whereby the user could access both input and output data for any node by clicking on it in the schematic. This is a feature that does not currently exist in OASIS but is one that we had already considered and planned to add. The second change, which is not really a change to the modeling platform, is the development of a post-processor to automate the computation of flow statistics such as the 7Q10 from the flow output. Neither of these changes requires a significant amount of work.

Prompt and effective client service is a cornerstone of HydroLogics' business. One of our internal measures of success is the extent to which we can empower our clients to use and extend the models we develop. This requires the development of long-term relationships with our clients. We have a long history in North Carolina that has included work for a number of municipalities, the Division of Water Resources, and federal agencies. We propose to build and support the Cape Fear model from our Raleigh office. I will be the principal-in-charge of the project. My reputation and HydroLogics' ability to produce high-quality work are well known.

In short, we believe that HydroLogics has the people, process and programs to provide

excellent service to the users of the Cape Fear River Basin. We look forward to working with Moffatt & Nichol to improve the management of water resources in the Basin.

Sincerely yours, HydroLogics, Inc.

Brian J. McCrodden, P.E. Vice President

encl.

ATTACHMENT "C"

Breakdown of Cost for Moffatt and Nichol Services

PROJECT TASK COMPLETION CHECKLIST

Firm: Moffatt & Nichol, Engineers Project : Cape Fear River Basin Hydrologic Model Update

Scoping Date:

Date: 31-Aug-04

Dual Number:

Ν	loti	ice-	to-F	roc	eed	Date	Э:

Abit Serior Serior </th <th></th> <th colspan="5">MOFFATT & NICHOL</th> <th>SNEED</th> <th></th> <th></th> <th></th> <th></th>		MOFFATT & NICHOL					SNEED				
phydrauni Phynical Bingatesphydrauni EnginesGis EnginesGis SpecialisGene SpecialisDec Miss <t< th=""><th>TASK</th><th></th><th>Senior</th><th>Hydraulic/</th><th></th><th></th><th></th><th>Tot</th><th>als</th><th></th><th></th></t<>	TASK		Senior	Hydraulic/				Tot	als		
Principal Baling Rates Engineer 13:6:00 Engineer 10:00 Second Mathematical (8:00) Hrs.			Hydraulic	GIS	GIS		Dr.				
Billing RatesInitial<		Principal	Engineer	Engineer	Specialist	Clerical	Sneed	Hrs.	\$		
Task 1-meding and CoordinationHrs.Hrs.Hrs.Hrs.Hrs.Hrs.IntermScholl Meding10.000 <td>Billing Rates</td> <td>136.00</td> <td>100.00</td> <td>95.00</td> <td>83.50</td> <td>68.00</td> <td>100.00</td> <td></td> <td></td> <td></td> <td></td>	Billing Rates	136.00	100.00	95.00	83.50	68.00	100.00				
Kickof Meeting 1.00 8.00 6.00 5.00	Task 1 - Meetings and Coordination	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.				Total Hours	Total Dollars
Final Meeting (2) - 8.00 8.00 - 1.00 - Coordination with Model Developer & Dr. Sneed - 8.00 8.00 - - - 24.00 \$31.800 - - - 24.00 \$31.800 - - - 16.00 \$31.800 - - - 16.00 \$31.800 - - - 16.00 \$31.800 -	Kickoff Meeting	1.00	8.00	8.00	-	2.00	-			19.00	\$1,832
indem Project Meetings (2) - 8.00 16.00 - - - 16.00 52.322 Cordination with Model Developer & Dr. Sneed 1.00 32.00 40.00 3.00 - - - 16.00 \$1.300 \$3.00 57.00 \$7.300 \$7	Final Meeting	-	8.00	8.00	-	1.00	-			17.00	\$1,628
Coordination with Model Developer & Dc. Sneed 6.00 4.00 3.00 - 6.00 \$1,600 \$1,600 Task 1 Totals 1.00 32.00 40.00 - 3.00 - 67,600 \$7,340 76.00 \$5,360 Task 2 - Data Collection, Formatting, Analysis, and Creation of Time Series Files - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - - 32.00 - <t< td=""><td>Interim Project Meetings (2)</td><td>-</td><td>8.00</td><td>16.00</td><td>-</td><td>-</td><td>-</td><td></td><td></td><td>24.00</td><td>\$2,320</td></t<>	Interim Project Meetings (2)	-	8.00	16.00	-	-	-			24.00	\$2,320
Task 1 Totals 1.00 32.00 4.00 3.00 76.00 \$7.30	Coordination with Model Developer & Dr. Sneed	-	8.00	8.00	-	-	-			16.00	\$1,560
Task 2- blat Collection. Formatting, Analysis, and Creation of Time Series Files 32.00	Task 1 Totals	1.00	32.00	40.00	-	3.00	-	76.00	\$7,340	76.00	\$7,340
Callect & Formal 28 USAS Daily Gage Records - - 32.00 - - 32.00 2.2672 Collect & Formal 28 USAS Prophytikation & Evaporation Daily Gage Records - - 40.00 10.00 - 32.00 \$2.072 Collect AG Cansus & Statistic Data for 17 Counties - - - - - - - 32.00 \$2.072 Collect AG Cansus & Statistic Data for 17 Counties - - - - - - - - - 32.00 \$2.072 \$3.00 \$2.072 \$3.00 \$2.072 \$3.00 - - - - - - - 32.00 \$2.000 \$3.000 - <td< td=""><td>Task 2 - Data Collection, Formatting, Analysis, and Creation of Time Series Files</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	Task 2 - Data Collection, Formatting, Analysis, and Creation of Time Series Files										
Collect & Format 28+ NOAA Precipitation & Evaporation Daily Gage Records - - 32.00 -	Collect & Format 28 USGS Daily Gage Records	-	-	-	32.00	-	-			32.00	\$2,672
Collect Ag Census & Statistic Data for 17 Counties - - - 40.00 10.00 - - 50.00 \$4.902 Verify % of Surface Water/Groundwater Irrigation, % of Acreage Irrigated, % of Acreage -	Collect & Format 28+ NOAA Precipitation & Evaporation Daily Gage Records	-	-	-	32.00	-	-			32.00	\$2,672
Verify % of Surface Water/Groundwater Irrigation, % of Acreage Irrigated, % of Acreage - - - -	Collect Ag Census & Statistic Data for 17 Counties	-	-	-	40.00	10.00	-			50.00	\$4,020
In County, Recent Trends, and Other Info from Ag Extension Agents (Phone Calls) - 24.00 - 40.00 - - Complete Ag Water Demand Calculations Base and Ag Demand QA/QC - 40.00 - 88.00 - - 120.00 \$2.000 Collect NDDEH Database Withdrawals (Munic)a) - - 24.00 - - 24.00 - 24.00 \$2.000	Verify % of Surface Water/Groundwater Irrigation, % of Acreage Irrigated, % of Acreage	-	-	-	-	-	-			-	\$0
Complete Ag Water Demand Calculations Based on Above Data and Livestock Stats 40.00 80.00 - - - - - - - - 24.00 \$24.00 \$24.00 \$24.00 \$24.00 \$24.00 \$24.00 \$24.00 \$24.00 - - - - - - 24.00 \$24.00 \$24.00 \$24.00 \$24.00 \$24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 - - 24.00 -	in County, Recent Trends, and Other Info from Ag Extension Agents (Phone Calls)	-	24.00	-	40.00	-	-			64.00	\$5,740
Breakdown of County Percentages, Filling in Gaps, and Ag Demand QA/QC - - - 24.00	Complete Ag Water Demand Calculations Based on Above Data and Livestock Stats	-	40.00	-	80.00	-	-			120.00	\$10,680
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Breakdown of County Percentages, Filling in Gaps, and Ag Demand QA/QC	-	-	-	-	-	24.00			24.00	\$2,400
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Collect NCDEH Database Withdrawals (Municipal)	-	-	-	24.00	-	-			24.00	\$2,004
Collect 2000 Census Data for Filling in Data Gaps, Interpolations and Extrapolations - - 4.00 - <td< td=""><td>Collect Industrial Withdrawals (Phone Calls)</td><td>-</td><td>-</td><td>-</td><td>24.00</td><td>10.00</td><td>-</td><td></td><td></td><td>34.00</td><td>\$2,684</td></td<>	Collect Industrial Withdrawals (Phone Calls)	-	-	-	24.00	10.00	-			34.00	\$2,684
$ \begin{array}{ c c c c c c c } \hline Create Withdrawal Time Series & - & - & 20.00 & 60.00 & 10.00 & - & & & & & & & & & & & & & & & & &$	Collect 2000 Census Data for Filling in Data Gaps, Interpolations and Extrapolations	-	-	-	4.00	-	-			4.00	\$334
Collect NCDWQ NPDES Discharge Database ·	Create Withdrawal Time Series	-	-	20.00	60.00	10.00	-			90.00	\$7,590
Create Discharge Withdrawal Time Series $ 20.00$ 60.00 $ 80.00$ $\$60.910$ OA/QC of Municipal/Industrial Withdawals and Discharges 1.00 4.00 $ 579.00$ $\$69.912$ $\$536$ $\$536$ $\$536$ $\$536$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$49.912$ $\$59.00$ $\$69.01$ $\bullet 1.00$ $\bullet 1.0$	Collect NCDWQ NPDES Discharge Database	-	-	-	20.00	-	-			20.00	\$1,670
OA/QC of Municipal/Industrial Withdawals and Discharges 1.00 4.00 \cdot	Create Discharge Withdrawal Time Series	-	-	20.00	60.00	-	-			80.00	\$6,910
Task 2 Totals 1.00 68.00 40.00 416.00 30.00 24.00 \$49.912 579.00 \$49.912 Task 3 - Model Creation, Calibration/Verification, and QA/QC $ -$ </td <td>OA/QC of Municipal/Industrial Withdawals and Discharges</td> <td>1.00</td> <td>4.00</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td>5.00</td> <td>\$536</td>	OA/QC of Municipal/Industrial Withdawals and Discharges	1.00	4.00	-	-	-	-			5.00	\$536
Task 3 - Model Creation, Calibration/Verification, and QA/QC Input of Time Series Files Within MIKEBASIN/OASIS - <td>Task 2 Totals</td> <td>1.00</td> <td>68.00</td> <td>40.00</td> <td>416.00</td> <td>30.00</td> <td>24.00</td> <td>579.00</td> <td>\$49,912</td> <td>579.00</td> <td>\$49,912</td>	Task 2 Totals	1.00	68.00	40.00	416.00	30.00	24.00	579.00	\$49,912	579.00	\$49,912
Input of Time Series Files Within MIKEBASIN/OASIS \cdot	Task 3 - Model Creation, Calibration/Verification, and QA/QC										
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Input of Time Series Files Within MIKEBASIN/OASIS	-	-	-	-	-	-				
Model QA/QC - 40.00 20.00 - \$ - \$ - \$ - \$ - \$ - \$	Model Calibration/Verification	-	-	-	-	-	-			-	\$0
Scenario Setup -	Model QA/QC	-	40.00	20.00	-	-	-			60.00	\$5,900
	Scenario Setup	-	-	-	-	-	-			-	\$0
Two Day Training Session in Raleigh for Model Stakeholders - 16.00 16.00 - - 32.00 \$3,120 Create CD's of Models for Project Stakeholders - - - 10.00 - 10.00 \$800 <td>Model Documentation and Reporting</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td>	Model Documentation and Reporting	-	-	-	-	-	-				
Create CD's of Models for Project Stakeholders - - - 10.00 - 10.00 \$680 Task 3 Totals - 56.00 36.00 - 10.00 - 102.00 \$9,700 102.00 \$9,700 \$9,700 Total Man-Hours: - <	Two Day Training Session in Raleigh for Model Stakeholders	-	16.00	16.00	-	-	-			32.00	\$3,120
Task 3 Totals - 56.00 36.00 - 10.00 - 102.00 \$9,700 102.00 \$9,700 Total Man-Hours: - <th< td=""><td>Create CD's of Models for Project Stakeholders</td><td>-</td><td>-</td><td>-</td><td>-</td><td>10.00</td><td>-</td><td></td><td></td><td>10.00</td><td>\$680</td></th<>	Create CD's of Models for Project Stakeholders	-	-	-	-	10.00	-			10.00	\$680
Total Man-Hours: 2.00 156.00 116.00 416.00 43.00 24.00 757.00 \$66,952 Total Personnel Expenses: \$272 \$15,600 \$11,020 \$34,736 \$2,924 \$2,400 \$66,952	Task 3 Totals	-	56.00	36.00	-	10.00	-	102.00	\$9,700	102.00	\$9,700
Total Man-Hours: 2.00 156.00 116.00 416.00 43.00 24.00 757.00 \$66,952 Total Personnel Expenses: \$272 \$15,600 \$11,020 \$34,736 \$2,924 \$2,400 \$66,952					_		_	_		-	-
Total Personnel Expenses: \$272 \$15,600 \$11,020 \$34,736 \$2,924 \$2,400 \$66,952	Total Man-Hours:	2.00	156.00	116.00	416.00	43.00	24.00	757.00		757.00	\$66,952
	Total Personnel Expenses:	\$272	\$15,600	\$11,020	\$34,736	\$2,924	\$2,400		\$66,952		

Miscellaneous Expenses

Subsistence (2 days for 2 people @ \$50 Day):	\$200
Photographs, Telephone, Shipping, Supplies, & Misc. Expenses:	\$250
Reproduction:	\$500
Automobile & Travel (2 days @ \$50/day):	\$100
Total Miscellaneous Expenses:	\$1,050
Total Personnel Expenses:	\$66,952
==> Total M&N Expenses: \$	\$68,002

FORM OF PROPOSAL (PAGE 1 OF 2)

The undersigned bidder proposes and agrees if this proposal is accepted to contract with the Cape Fear River Assembly (CFRA) to furnish the services required herein, and to complete the scope of work as described in Parts I and II hereof. Services shall be accomplished in full and complete accordance with the specifications and contract documents to the full and entire satisfaction of CFRA and the Division of Water Resources, with a definite understanding that no money will be allowed for extra work except as may be set forth in written addendum to the contract, duly executed by all parties thereto.

The parties hereto agree that in consideration for performing all the requirements hereunder, CFRA shall pay the offeror *per the attached cost proposal* for the services as described herein, said sum to be full and complete compensation for the offeror's services required herein.

Pursuant to the provisions of G.S. 143-54, and under penalty of perjury, the signer of this proposal certifies that this proposal has not been arrived at collusively nor otherwise in violation of Federal or North Carolina antitrust laws.

MOFFATT & NICH	OL
Name of Firm or C	orporation submitting bid
Federal I.D Numb	95-1951343 Jin Ria
Typed Name:	TIM REID
Title:	VICE PRESIDENT
Address:	1616 East Millbrook Road, Suite 160 Raleigh, NC 27609
Phone:	(919) 781-4626 Fax: (919) 781-4869
Witness:	Marcia Gilpin

Failure to execute the Form of Proposal shall render the proposal invalid. By execution and delivery of this document, the offeror agrees that any additional terms and conditions, whether submitted purposely or inadvertently, shall have no force or effect.

Please indicate if one of the following applies:

Minority Owned/Controlled	Women Owned/Controlled
Handicapped Owned/Controlle	ed
Submitted this, day	of AUGUST, 2004

Attachment