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For Company XYZ Internal Bid Review
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PROPOSAL TO PREPARE CORRECTIVE MEASURES IMPLEMENTATION WORK PLAN

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1.0 INTRODUCTION

Cameron-Cole is pleased to present Company XYZ this proposal to prepare a Corrective Measures Implementation (CMI) Work Plan (Work Plan) for the Baton Rouge Facility. The CMI Work Plan will be prepared to meet the substantive requirements of the Administrative Order, Agency Interest # 1516 (AO) issued by the Louisiana Department of Environmental Quality (LDEQ) dated December 3, 2003. The AO requires that the facility develop the CMI Work Plan and implement the final remedy for the Areas of Concerns (AOCs) identified in the Corrective Measures Study (CMS).

General Approach and Philosophy

The proposal presented herein will provide the Work Plan elements to meet all substantive requirements of the AO, and allow Company XYZ the flexibility to schedule and manage the design and implementation to best match its budget and spending requirements, while minimizing disagreements with LDEQ. This will be accomplished by:

- Providing preliminary designs to Company XYZ early in the project so that concepts and rough costs are introduced and reviewed. In this way, compatibility with site logistics can be confirmed and value-engineering reviews can be performed to insure that the optimum construction is performed at the lowest cost.
- Providing these preliminary designs and concepts to LDEQ to get early concurrence, before spending time on detailed designs and construction specifications.

Cameron-Cole Unique Qualifications

Cameron-Cole is uniquely qualified to provide these technical services:

- National RCRA Subtitle C landfill design expertise (at Subtitle C landfills in Texas, South Carolina, Minnesota, California, Colorado, Utah, and Oklahoma), and long history with **practical landfill cover design and construction** through prior experience with USPCI, Laidlaw, Safety-Kleen, and Company XYZ.
- Comprehensive knowledge of the Baton Rouge facility groundwater systems from our ongoing monitoring program, and recent numerical modeling efforts.
- Our long history of working closely with Company XYZ, and with the former Safety-Kleen Chemical Services Division sites, to achieve alignment on spending, schedule and priorities. We keep small projects small.
- Working knowledge of LDEQ regulations (e.g. Risk Evaluation Corrective Action Program [RECAP]), and RCRA permitting and compliance support from our experience at a number of Louisiana sites.
- Cameron-Cole has assembled a concise, cleanly organized team of specialists with recent relevant experience in each primary area of the CMI: design of RCRA cover systems,

optimization of groundwater recovery systems, design of pumps and piping systems, and design and managements of sediment removal actions.

- Cameron-Cole will conduct a formal and comprehensive Quality Assurance process for the work proposed herein. The project QA process includes clear project assignments and accountability, a formal peer-review process for all calculations and designs, and high-level input, monitoring, and reviews by technical advisors. This QA process forms the basis of Cameron-Cole's client liability protection program, which is underwritten by our $5 million Professional Liability (Errors & Omissions) insurance coverage. This comprehensive client liability protection package is in recognition of our corporate clients' assets and the investments they make based upon Cameron-Cole's designs and recommendations. Cameron-Cole understands that its recommendations and analysis must stand for a period of years in many cases and these mechanisms provide a greater level of assurance than designs developed without the benefit of independent review and resources to back up the warrantee.

Proposal Organization

The proposal is organized as follows:

Section 2: Scope of Work
Section 3: Project Organization and Management
Section 4: Project Schedule
Section 5: Project Cost

A summary of projects completed by Cameron-Cole specifically involving the key staff assigned to this project is presented in Appendix A. Appendix B is a detailed CMI Work Plan project schedule.

2.0 SCOPE OF WORK

The proposed scope of work is organized under six tasks, including our proposed approach, summary of activities, planned deliverables and key staff assigned.

Task 1 CMI Work Plan Approach Submittal to LDEQ

Cameron-Cole has designed the scope of work and schedule contained in this proposal to be easily converted to a submittal to LDEQ. The submittal would present the proposed design and work plan tasks, interim deliverables to LDEQ and the design and CMI Work Plan preparation schedule.

Upon review of these components with Company XYZ, Cameron-Cole will revise the scope of work and schedule accordingly, and provide a final document for Company XYZ' submittal to LDEQ.

Task 2 NPDES Effluent Ditch Sediments

Per the CMS, the selected remedy for the NPDES Effluent Ditch is to excavate the PCB impacted sediments with disposal in a secure off-site landfill. The Corrective Action Objective for PCB identified in the CMS is 1 milligram per kilogram (mg/kg). A track hoe or dredge excavator would be used to remove impacted sediments. Sediments would be segregated, dewatered and profiled for disposal. If space is available, Company XYZ can dispose of those sediments that contain less than the 50 mg/kg total PCBs TSCA disposal criterion in an on-site cell.

Approach. Sediments in the Effluent Ditch were characterized in three discrete steps during the period 1991 through 1994. The data are now over 10 years old and may not represent a current representation of the lateral and vertical extent of contamination. Cameron-Cole recommends that a concise level of confirmation sampling be conducted before initiation of design to confirm the extent of impacted sediments. Results of this investigation will also provide a statistically significant data set to conduct hot spot analysis to identify discrete sediment removal areas.

Cameron-Cole has conducted a review of the historical sediment data. The PCB analyses performed were for Aroclors, presumably by USEPA Method 8082. These historic data show that PCB concentrations are highest within 150 meters downstream of the storm water outfall (concentrations in the range of 50 to 100 mg/kg), and then attenuate in the downstream direction to concentrations that meet the identified Corrective Action Objective of 1 mg/kg (objective met beginning at approximately 550 downstream from the outfall) (Figure 1). These data provide a cursory representation of PCB concentrations in sediments below the outfall at a time more than 10 years ago. The data do not fully define the vertical extent of PCB contamination. Maximum sample depths are generally 1 foot below sediment surface. The sample collected at the 1-foot depth does not define the vertical extent of PCB contamination with respect to the 1-mg/kg action level in any of the sediment sample locations where the shallow sample exceeds the action level.

An important part of the design will be the identification of those sediment volumes that can be disposed in on-site cells scheduled to be covered. Based on our experience with the LDEQ RECAP guideline, those sediments with PCB concentrations greater than the Corrective Action objective, but below the TSCA standard of 50 mg/kg can be disposed of onsite. Cameron-Cole suggests that this material be placed within a cell undergoing closure as part of the CMI work (the south landfill and 619/719 cell areas). Sediment placement on site may actually benefit the cover effort in the south landfill area, since fill may be required to establish design cover grade.

Cameron-Cole will formulate a remedial approach based on the results of the updated PCB distribution investigation. This approach will include excavation and subsequent verification sampling. Sediments with PCB concentration greater than 50 mg/kg will require segregation, based on TSCA requirements. Some dewatering of these sediments may be required before disposal. Water drained from these sediments will likely require segregation and testing before disposal.

The design will emphasize an implementation sequence that minimizes sediment transport to avoid downstream impacts to Devils Swamp Lake.

Scope of Work. The scope of work for Task 2 includes the following elements:

2a. Inspection of ditch and access routes
2b. Additional characterization of PCB-contaminated ditch sediment
2c. Preliminary design
2d. Final Design Construction drawings and specifications

These elements are further described below.

Task 2a-Site Inspection. An inspection will be performed for the Effluent Ditch corridor, and access routes to the ditch from adjacent roads. The inspection will be used to determine sediment sampling locations, amount and location of vegetation to be considered, access roads and opportunities, and (locations of water control and diversion).

Task 2b-Sediment Characterization. Cameron-Cole proposes to perform a concise effluent channel sampling program that will update and refine the extent of PCB contamination to a level of detail that will support design of a remedial approach. The investigation will include the following tasks.

- Collect samples from historic locations to determine if results are comparable or able to be correlated.
- Perform vertical profiling to determine the depth at which the Corrective Action Level is attained.

- Determine if a distinction can be made between native soils, and effluent channel sediments, that can be used as a delineation point for future excavation efforts. Previous work indicates that native soils may be comprised of a stiff clay. If this is verified, and if the stiff clay has minimal PCB impact, then a visual determination of PCB impacts may be possible to guide excavation activities. This will save in analytical costs.
- Determine the lateral extent of PCB contamination in the effluent channel. This investigation will be used to form a basic determination of the volume of sediment that may require excavation.
- Statistical analysis of PCB data. The results of the updated PCB distribution will be evaluated to determine if statistical analysis is warranted to minimize volumes of sediment that may exceed the 50 mg/kg TSCA action level precluding on-site disposal. If some sediments exceed the 50-mg/kg criterion, then a 95 percent upper confidence limit (UCL) calculation could be performed to identify hot spots for removal. Alternatively, a spatial distribution analysis (geostatistical) could be performed to identify sediments exceeding the criterion. As part of any statistical analysis, a sensitivity analysis would be performed to determine the efficiency of additional sampling and data analysis, versus excavation and disposal.

The Work Plan will be prepared in letter form for sediment characterization will be prepared for Company XYZ' review and submittal to LDEQ. For the purposes of this proposal, the downstream extent of investigation and design of the NPDES Effluent Ditch remedy is the railroad track crossing.

Task 2c-Preliminary Design. A preliminary design will be prepared for Company XYZ' review and comment. This design will have sufficient detail to clearly identify the design and implementation approach for the following aspects of the design.

- *Comprehensive analysis of current PCB distribution.* Based on the results of sediment characterization task, a current snapshot of PCB distribution in sediments will be made. This will provide information for use in developing the excavation strategy, as well as provide preliminary estimates of sediments available for disposal to the onsite landfills.
- *Access from adjacent roads to the Effluent Ditch.* Access to the ditch will be required for excavation equipment, dump trucks, and possibly light vehicles. Paths will be developed to minimize the effort needed to clear vegetation and subsequent restoration, while optimizing traffic efficiency. The work would be completed by entry at locations where the ditch flow line is in close proximity to the surface grade, where practicable.
- *Access of excavation machinery to the Effluent Ditch.* Characterization of the PCB-contaminated sediments and the ditch configuration will determine the type of excavation equipment used. The design will consider whether excavation equipment

will operate from the banks or will straddle the ditch. Consideration will be provided to minimize or eliminate disruption of the sediment prior to excavation. Care in excavation procedures will avoid mixing of uncontaminated soil with the PCB-contaminated sediments and reduce erosion damage.

- *Grubbing and clearing of vegetation.* Trees and other vegetation will be removed, as necessary, to provide clear working areas and to prevent incorporation of organic material with sediments.
- *Diversion of water around excavation areas.* Excavation cannot proceed while there is water drainage through the ditch. Methods will be developed to reroute low-flow drainage around this active excavation. It is anticipated that the ditch carries less that 5 gallons per minute unless there is precipitation run-off. One low-impact diversion method would be to install a temporary dam upstream of the excavation and pump water to a downstream point below the excavation. This method would not require reconfiguration of the ditch and would also be adequate during light rainfall. In the event of a heavy rain, the temporary dam could be removed and riprap placed at the downstream extent of the completed excavation to stabilize the ditch.
- *Erosion control.* Erosion control would be implemented during excavation to minimize damage to the ditch and minimize clean soil from mingling with PCB-contaminated sediment.
- *Sediment excavation.* The extent of excavation will be based on the sediment characterization. If, as expected, PCB impacts are limited to sediments physically confined by the underlying clay and the ditch bottom, the excavation cross-section will be on the order of 10-feet wide and 2-feet deep, on average. The design will define methods to determine the limits of excavation and confirmatory sampling.
- *Sediment management.* Sediment will be dewatered to pass the Paint Filter Test prior to disposal. A procedure will be defined to characterize waste for disposal.
- *Restoration of the ditch and adjacent areas.* Damage to the ditch and adjacent areas will be ameliorated to the extent required to prevent future erosion.
- *Implementation.* The key to successful implementation will be proper vehicle routing, sediment management, and sequencing to improve efficiency and decrease project cost.

The preliminary design will be summarized in a letter report that will include a site plan based on the survey that includes access routes, rationale for the limits of excavation, and a detailed description of each aspect of the design.

Task 2d-Construction Drawings and Specifications. Following review by Company XYZ and LDEQ, Cameron-Cole will prepare construction drawings and specifications incorporating design comments agreed upon by Company XYZ and LDEQ. Drawings and specifications will comply with industry standard format, such as the Construction Specifications Institute, and be sufficiently detailed for competitive bidding and construction.

Design Deliverables. It is anticipated that the following construction drawings and specifications will be provided.

Drawings

- Drawing 1: Title Page with Existing Topography
- Drawing 2: Site plan and elevation for the length of the Effluent Ditch delineating access routes, limits of clearing and grubbing, and sediment management areas
- Drawing 3: Limits of sediment excavation
- Drawing 4: Diversion dam and temporary conveyance; Erosion control details
- Drawing 5: Restoration details

Specifications

- General construction requirements
- Earthwork
- Plantings
- Site restoration and rehabilitation
- Material-handling equipment
- Piping

These items may be modified to fully describe the required work. Specifications will include appropriate submittals, quality control/quality assurance procedures, material, equipment, and construction or installation procedures.

Key Staff Assigned and Relevant Experience.

Task 3 RCRA Cover Design

The RCRA cover design will provide the details for closure as described in the CMS and subsequent addenda. Below describes the approach to cover system planning and design, the scope of work, design deliverables, and key staff.

Approach. Cameron-Cole proposes to plan and design engineered covers for two distinct areas of closed landfill cells, the South Landfill and the Cell 619/719 area [1] (Figure 2). General requirements for the cover system were identified in the Corrective Measure Study-Addendum 2. Specifically, Appendix A of CMS Addendum 2 provides Notice-of-Deficiency responses and Response 4 describes the cover system, which is also provided below:

- Three feet of re-compacted clay with at least 30 percent passing the No. 200 sieve, a liquid limit greater than 30, and a plasticity index greater than 15 constructed to have a permeability equal to or less than 1 x 10-7 cm/sec (or equivalent system);
- A 6-inch drainage layer consisting of clean sandy loam soil;
- A 6-inch layer consisting of clay loam topsoil; and

[1] Note: The ABCCell can be added to the Scope of Work, if necessary, for a modest increase in budget.

- Vegetative cover.

Cameron-Cole will also assure that the Work Plan is created to comply with the applicable and relevant requirements including (but not limited to) LAC Title 33 Part V Chapters 5, 25, and 44; and 40 CFR 264 Subpart N. Cameron-Cole recognizes that while the cover systems are conventional and relatively simple, perimeter space limitations and drainage must be carefully evaluated. The cover configuration may necessitate removal/relocation of obstructions, or roadways, and modification to drainage patterns, to accommodate the approved cover.

Cameron-Cole's approach includes the following aspects from initial conversations and review of the requirements. Appendix B provides a detailed schedule for the cover design work. These aspects can be modified or adjusted as necessary to assure that we are meeting Company XYZ's needs and finding ways to reduce project costs.

- Cameron-Cole has considered and discounted alternate cover designs such as geocomposite liner systems as cost prohibitive. This conclusion has been reached given that 1) an on-site clay source is available, and 2) the cost for relocating or working around obstructions to install a clay cover is not be expected to be cost prohibitive.
- Cameron-Cole will evaluate a reduced clay layer of 2' thickness with Company XYZ. It may be worthwhile to consider reducing the cover to a 2-foot layer.
- Cameron-Cole will also consider the merits of replacing the 6-inch drainage layer with a geomembrane drainage layer, as this may be a cost effective, industry-accepted modification.
- Cover configuration effort will be closely coordinated with the other project activities, ditch sediment remediation, and groundwater recovery system upgrades to assure a cost-effective, sound configuration that accommodates the needs of the other project activities. For instance, new monitor wells will be located in areas that will not interfere with a cost-effective cover, and one or both of the cover areas may need to accommodate ditch sediments.
- Finally, Cameron-Cole will evaluate and specify, as appropriate, a cost-effective means to re-use the upper portion of the existing temporary cover. For instance, if one foot of clay cover currently exists, verification of soil type and re-compaction may allow for a portion of this material to be reused as part of the final cover. Also, some of the material may be used as topsoil. The temporary cover may be best left in place, if little or no data are available on the soil type and thickness, or if possible exposure to the waste materials is expected to result in non-recoupable costs.

Scope of Work. The scope of work for Task 3 includes the following elements.

3a. Coordinate updating the topographic map as necessary.
3b. Verify and evaluate existing conditions.
3c. Perform a preliminary cover configuration and design.
3d. Prepare construction drawings and specifications.

Task 3a-Topographic Mapping. Cameron-Cole will coordinate with Company

XYZ's direct-contract surveyor to update the surface topography in and around the South Landfill and 619/719 cells. Cameron-Cole will limit the investigation to obtaining supplemental data necessary for the planning and cover system design. This is expected to include limited surveying of the cells, drainage features, and any nearby obstructions that are not assured to be accurate on the existing topographic map, based on discussions with Company XYZ.

Task 3b-Evaluate Existing Conditions. Cameron-Cole will evaluate existing conditions and verify our understanding of those conditions. Specifically, Cameron-Cole will:

- *Verify the edge of waste for the cells.* This edge will be the design outer limit of full cover thickness in compliance with CMS Addendum 2. The verification effort will be based on information provided by Company XYZ (since we understand that previous field work had been completed that would identify the edges). Surveying of Company XYZ visual understanding of the edge of waste may be completed in conjunction with topographic mapping (Task 3a).
- *Verify cover thickness soil type*-Cameron-Cole will evaluate and specify as appropriate a cost-effective means to re-use the existing temporary cover.
- *Obtain and evaluate the facility drainage plan*-Cameron-Cole will assure that cover system and drainage will be compatible with overall site drainage.
- *Verify the location of possible obstructions*-Cameron-Cole will locate wells (both newly proposed and existing), roadways, piping (both aboveground and underground, as applicable), and other obstructions that might require special design considerations or planning for relocation, based on visual observation and information provided by Company XYZ.

Task 3c-Premlinary Design. Cameron-Cole will create the initial configuration and design contours for the following surfaces both at the south landfill and 619/719 cell areas:

- Base of Cover System
- Top of clay liner
- Top of drainage layer, and
- Top of vegetative cover.

In addition, Cameron-Cole will perform engineering calculations as necessary to complete the design to the satisfaction of LDEQ. Cameron-Cole will work with Company XYZ to either perform calculations or provide an engineering opinion on the following aspects of the design.

- *Slope stability.* Typically, Cameron-Cole would not supply slope stability calculations for the work contemplated, based on 1) the existing topography, 2) the expectation that conventional cover and side slopes will suffice, 3) the relative stability of the existing cover, and 4) the absence of plastic liner material. Cameron-Cole will use Slope/w for final cover stability calculations, if necessary. Cover stability would include wedge-type or veneer stability calculation for the cover. Calculations for circular or semi-circular failure do not appear necessary given above described items.

- *Settlement analysis.* Cameron-Cole typically would design the cover grade to accommodate expected differential settlement of the cover, thus eliminating the need for settlement calculations. If necessary, Cameron-Cole would perform settlement calculations using the Consolidation Settlement (CSETT) program, which incorporates Boussinesq's equation and related earth-pressure theories to estimate the primary and secondary settlement of the clay cover and upper waste material. Company XYZ would provide whatever information available about the waste strength and other material properties. If data was not available, Cameron-Cole would work with Company XYZ to identify appropriate and conservative values for estimation of settlement (again, if such calculations are necessary).
- *Run-off estimation*. Cameron-Cole will use the rational method to estimate rainfall runoff. The rational runoff method is industry-accepted as a means for estimating the discharge from drainage areas up to 200 acres in size. The runoff will be estimated using a design storm event of 24-hour duration, 25-year frequency.
- *Hydrologic Evaluations of Landfill Performance (HELP).* Cameron-Cole will perform a hydrologic evaluation of the cover system using the HELP Model to estimate: 1) the ability of the cover layer and lateral drainage layer to remove storm water runoff from the cover system by means of surface runoff, evapotranspiration, and lateral drainage, and 2) the maximum head in the drainage layer generated from storm water infiltration.
- *Erosion Analysis*. An erosion analysis of the cover system will be performed using the Universal Soil Loss Equation (USLE). The analysis will be performed for two cases at each area: 1) erosion of the cover and 2) erosion of side slope, each at design grades. The results will be compared to the 2 tons per acre per year (tpapy) maximum recommended by USEPA.
- *Channel design*. A channel system design will be completed using the volume calculated from the runoff estimate and appropriate software to size the channels. Existing channels will be used wherever practical, with verification that any new channels are accommodated by the facility-wide drainage plan.

Cameron-Cole assumes that no hydrostatic, hydrodynamic, and scouring calculations will be necessary, since the areas are not within the 100-year floodplain. Also, no wind dispersion or dust management modeling will be necessary since waste will not be routinely exposed.

The preliminary design will be summarized in a brief letter report that will include plan view drawings of the design surfaces, and a cross-section for each closure area, and erosion control measures. This effort will be submitted concurrently with the preliminary design submittal that also addresses plans for ditch sediment remediation and groundwater pumping.

Task 3d-Construction Drawings and Specifications. Construction drawings will be prepared, upon review and concurrence from LDEQ. Any agreed upon modifications of the preliminary drawings will be incorporated into the construction drawings. Other conventional additions will be made such as adding a grid system, control points for surveying QA, construction notes, and references to specifications as appropriate. The construction drawings will be sealed by a Louisiana Professional Engineer on Cameron-Cole staff.

Construction specifications will be a combination of industry standard specifications, provided in ASTM's Standard General Conditions of the Construction Contract, Engineers Joint Contract Documents Committee, 1996 and site-specific specifications created by Cameron-Cole. Site-specific specifications are expected to include details on site preparation and earthwork requirements.

A storm water pollution prevention plan (SWPPP) will be prepared in strict compliance with the USEPA and LDEQ requirement for construction sites affecting an area greater than 5 acres. The plan will describe erosion control and water management plans that will be in place during construction.

Design Deliverables. Cameron-Cole will provide the preliminary design within a preliminary design package that includes details on the other project tasks or as a stand-alone document. The construction drawings will include.

Drawing 1: Title Page with Existing Topography
Drawing 2: Plan View-Base of Cover System
Drawing 3: Plan View-Top of 3' Clay Liner
Drawing 4: Plan View-Top of Drainage Layer
Drawing 5: Plan View-Top of Vegetative Cover
Drawing 6: Typical Cross Sections
Drawing 7: Details (channel profile, erosion control features, obstruction relocations)

Each of the drawings can be "split type," showing the south cell and 619/719 in separate portions of the page. Conversely, we can provide separate drawings for each area.

Key Staff Assigned and Relevant Experience.

Task 4 Groundwater Recovery and Conveyance System

The selected groundwater remedy includes hydraulic control of groundwater contaminants via an optimally located series of existing and new recovery wells. Careful placement of these wells will be conducted using the updated groundwater flow model, but in concert with site requirements for the landfill cell cover. The selected wells will be plumbed and recovered groundwater conveyed to the existing wastewater treatment plant (Task 4b).

Task 4a Groundwater Recovery Well Optimization. Task 4a will consist of optimizing the groundwater recovery well field at the site to achieve hydraulic containment, the remedial action objective established in the CMS Addendum 2. The final recovery well field design will involve a combination of existing groundwater recovery wells and additional previously proposed recovery wells at strategic locations within Units 3/4 and 6.

The objective of this task is to verify that the combination of existing and proposed recovery wells will achieve hydraulic containment and capture of the volatile organic constituent (VOC) plumes in each affected unit. To accomplish this objective, it is necessary to determine optimal locations for the additional recovery wells necessary to achieve hydraulic containment and to determine which wells can be shut off due to a lack of effectiveness.

At present, the existing (active) groundwater recovery wells include I-1 through I-10, R-1, 29A, and 30A (Figure 3). Recovery wells R-2 through R-4 were formerly in use but are no longer in operation due to the limited effectiveness of these wells in reducing VOC concentrations and to eliminate the possibility of pulling constituents from the South Landfill. The additional recovery wells to be evaluated for incorporation into the existing well field include:

(1) existing recovery wells I-11 and I-12 screened in Unit 4 in the Landfill Cell 619 area;
(2) existing recovery well I-13 in Unit 4 south of Landfill Cell 904,
(3) a previously proposed recovery well (designated herein as I-14) near monitoring well DM-3 in Unit 6 west of Basin 301 (Closed); and
(4) two previously proposed recovery wells (designated herein as I-15 and I-16) in Unit 6 at the South Landfill.

Based on our ongoing knowledge of the groundwater system, Cameron-Cole believes that the existing recovery well system, once supplemented with a limited number of proposed strategic wells, will achieve the remedial action objectives for the groundwater at the site. The existing and proposed recovery well locations that will be evaluated as part of the well optimization analysis are presented in Figure 3. The following sections describe the technical approach, scope of work, design deliverables, and relevant experience of the key staff assigned to the task.

Approach. The technical approach for the groundwater recovery well optimization will consist of a hydraulic capture zone analysis of the existing recovery wells and proposed wells. This analysis will be completed using Cameron-Cole's groundwater flow and particle-tracking model previously constructed using MODFLOW/MODPATH as part of the 1998 CMS Addendum and subsequently updated in 2000. The model will be used to determine the recovery well field design, including the locations, pumping rates, and estimated drawdown at the existing and proposed recovery well locations.

Because Cameron-Cole has already evaluated the existing and proposed well locations in terms of hydraulic capture and solute transport, the modeling evaluation will focus on capture zone analysis using the most recent groundwater elevation and analytical data from October 2003. Updating the solute transport component of the model is unnecessary since the remedial action objective is hydraulic containment and not VOC mass removal. Furthermore, the use of the solute transport model would require a full calibration of the model to historic and recent VOC data for each layer based on breakthrough curve matching and layer-specific plume matching. While this level of analysis would be useful, the benefits clearly do not match the costs with hydraulic containment as the remedial action objective. Therefore, in Cameron-Cole's proposed analysis, the model will be used to verify that the previously simulated recovery wells are located in optimal locations to achieve hydraulic containment. This approach meets LDEQ requirements and is consistent with our discussions with Company XYZ over the past year regarding the corrective measures implementation at the site.

Scope of Work. As stated above, Cameron-Cole has previously constructed and calibrated a site-wide MODFLOW groundwater flow model, which was updated in 2000 to incorporate water-level and hydraulic conductivity data from the Port Commission property to the south. MODFLOW (McDonald and Harbaugh, 1988; Harbaugh et al., 2000) was developed by the United States Geological Survey (USGS) and is the most widely used model in the industry. It is a three-dimensional numerical groundwater flow code that simulates groundwater surfaces. Capture zones, groundwater velocity vectors, and groundwater particle pathlines in porous media can be simulated using MODPATH, the particle-tracking code also developed by the USGS for use in conjunction with MODFLOW.

The calibrated MODFLOW model will require no new inputs except the most recent water levels from October 2003 to evaluate the existing and proposed recovery wells in terms of hydraulic containment. The recent water-level data will be input into the model and the model will be recalibrated. This recalibration is necessary to ensure that the hydraulic head fields and boundary conditions are able to accurately simulate existing conditions.

In the unlikely event that the simulated existing and proposed recovery wells fail to achieve capture based on the current configuration of the VOC plumes, or if the results are inconclusive, more recovery wells than those proposed or alternative recovery well locations may be required. Additionally, the capture zone analysis may reveal that some wells are not contributing substantially to the remediation effort and can be shut-off. As part of the capture zone analysis, Cameron-Cole will evaluate the need for incorporating additional recovery wells into the well field design and for varying pumping rates and eliminating ineffective wells to enhance the overall effectiveness of the corrective measure. All existing and proposed well locations will be reviewed with the RCRA Cover Design team to insure that well locations and conveyance piping will not interfere with the footprint of the planned landfill covers**.**

Design Deliverables. The Preliminary Design for the RCRA Cover System will identify the selected recovery well locations relative to cover footprint and preliminary piping conveyances.

The CMI Work Plan will include a summary of the results of the capture zone and recovery well optimization analysis and the resultant proposed recovery well field design, including these components:

- Demonstration that all existing wells retained as corrective action wells, as well as proposed wells I-11 through I-16 (and any additional recovery wells), will hydraulically contain VOC plumes based on the results from Cameron-Cole's calibrated MODFLOW/MODPATH groundwater flow-particle tracking simulator.
- Graphical presentation of the hydraulic capture zones of the final corrective measure pumping scenario using MODPATH overlain on VOC plumes in appropriate saturated units (Units 3/4 and 6).
- Present final well (x, y, z) locations and predicted pumping rates and drawdowns for all existing and proposed recovery wells on a map and also provide in tabular format.

Key Staff Assigned and Relevant Experience.

Task 4b Design of Groundwater Conveyance System. The selected recovery wells will be plumbed and recovered groundwater conveyed to the facility's wastewater treatment plant. The following subsections provide information about the approach to design, scope of work, design deliverables, and staff assigned.

Approach. The conveyance system will be designed with a perspective of coordination with competing site features, specifically the footprint of the planned cover system; the adequacy and usability of existing pumps, piping and associated equipment, and anticipated flow and pipe capacity and the adequacy of the power supply.

The Groundwater Conveyance design team will work closely with the Cover Design team to develop pipe layouts that do not interfere with the cover footprint nor anticipated site maintenance activities. Similarly, we will seek Company XYZ preferences for layout relative to facility access and maintenance activities. For example, does the grass cutting that is necessary around above ground piping merit consideration, including cost analysis, of below ground piping. Further, the use of existing equipment is generally preferable, but must be balanced with an objective evaluation of length of service, reliability, and life-cycle costs.

The electrical supply network will be incorporated into the conveyance design. Ideally, the power supply for the existing and proposed recovery pumps would be engaged only when the wastewater treatment plant could receive water. If existing pumps are powered from various non-discrete locations, then a separate task may be necessary to evaluate the cost of re-routing electrical power. Re-routing may be necessary to allow the recovery pumps to operate only when the wastewater plant can accept water. Integral to the power supply design is the wiring for the pump controls. Depending on the suitability of the existing pumps, new and upgraded "smart" pumps may be proposed that have local controls, slow starting capabilities, run dry shut off with automatic re-start, and alarms. The "smart" pumps would remove the need for electrical control wiring for individual pumps.

Scope of Work. The recovered groundwater conveyance system will be designed by implementing the following steps:

- *Site Inspection.* A site inspection will be conducted to identify pertinent site features, evaluate status of current pumps and piping, and to interview pertinent Company XYZ managers regarding design requirements and preferences and concerns.
- *Review of Current Information.* As-built information about the existing fluid conveyance system, electrical distribution network, recovery wells, well-head assemblies, recovery pumps, and the anticipated design of the landfill cap will be collected. Information about facility-accepted, piping methods will also be obtained.
- *Design Flow Determination.* A design flow will be developed that is based on historical and anticipated flows.
- *Evaluation of Pump Integrity.* Existing groundwater recovery pumps will be assessed to estimate whether replacing or upgrading is required.
- *Evaluation of Conveyance Hydraulics.* Pipe diameter will be chosen that accommodates the design flow while balancing the need for a minimum scouring velocity and allowing for future pipe restrictions caused by scaling. The resulting head loss will be compared to the pump's capabilities.
- *Evaluation of Existing Conveyance System.* Existing pipe conveyance system will be evaluated in terms of its ability to handle the design flow, anticipated pressure, and location (anticipated landfill cover footprint and other surface features). Based on the amount of useful, existing piping, a cost comparison between new below-grade, double-contained piping versus aboveground piping will be prepared.

Design Deliverables. The Conveyance System design will be completed in two phases to allow timely Company XYZ review and input, as well as a conceptual design deliverable for LDEQ review prior to completion of detail drawings and specifications.

A conceptual design will be developed that includes an evaluation of the existing equipment and electrical network, a design flow, a design pipe diameter, and a conceptual layout of the proposed conveyance system (accounting for the proposed landfill cap). This design would be reviewed by Company XYZ for submission to LDEQ.

After receiving comments/revisions from LDEQ, a detailed design would be prepared for inclusion into the CMI Work Plan. The detailed design would consist of the drawings and specifications that could be eventually incorporated in a request for quote (RFQ) for an installation subcontractor. Anticipated drawings are listed below.

Drawing 1: Title Page with Planned Topography and Site Features
Drawing 2: Piping Layout
Drawing 3: Details (Pumps, well-head connections, pipes)
Drawing 4: Details (Electrical supply, wiring, and controls, connection to the WWTP)

Key Staff Assigned and Relevant Experience.

Task 5 Supporting Work Plan Components

The AO requires a number of supporting plans, as well as an overall project implementation schedule. The scope of work for each component is described below.

Sampling and Analysis Plan. The Sampling and Analysis Plan (SAP) details the methods and procedures for analytical methods employed during the CMI-related sampling and data evaluation. Anticipated CMI-related sampling activities will likely include, but is not limited to well logging, ground water sample collection, and ditch sediment sample collection.
The SAP incorporates two separate, but related components: the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP). The FSP component will describe the sampling methodologies that the CMI contractor will follow, sampling handling procedures, and disposal of investigation derived waste. The QAPP component provides the blueprint for QA/QC activities during the sampling and analysis activities, and will include the identification of data quality objectives, analytical method requirements, quality control requirements, and data validation requirements and methods.

The draft SAP will be prepared for Company XYZ review. Comments and questions will be addressed and a final version of the SAP will be included in the CMI Work Plan.

Construction Quality Assurance/Quality Control Plan. The Construction Quality Assurance / Quality Control Plan (CQAP) describes the QA test and inspection procedures necessary to ensure that the final CMI product meets design specifications. The specific QA tests are used to provide quantitative criteria with which to accept the final product.

The CQAP will include, but not limited to, the following elements:

- Lines of authority and responsibilities of all key personnel involved in the CMI;
- Construction QA personnel qualification requirements;
- List of inspection activities, including the description and frequency of test and observations to be used to monitor the CMI construction and verify compliance with environmental requirements, OSHA requirements, and customary construction practices;
- List of sampling requirements; and
- All documentation requirements for reporting construction QA activities.

The draft CQAP will be prepared for Company XYZ review. Comments and questions will be addressed and a final version of the CQAP will be included in the CMI Work Plan.

Health and Safety Plan. A Health and Safety Plan (HASP) will be prepared that will apply to all CMI activities at the site. The HASP will include the requirements of 29 CFR 1910.120 for hazardous waste operations and will contain specific requirements to minimize the health and safety hazards associated with planned actions. The HASP will also include other relevant OSHA safety standards for traditional construction activities, such as piping layout and electrical connections.

Cameron-Cole will review the current Baton Rouge facility HASP to adopt relevance provisions and to insure consistency. Anticipated elements of the HASP include the following items.

- Key personnel and hazard communication plan
- Site control measures
- Worker training
- Medical surveillance
- Personnel protective equipment
- Air and personnel monitoring
- Confined space entry procedures
- Decontamination procedures
- Emergency response plan

The draft HASP will be provided to Company XYZ for review. A final version of the HASP will be included in the CMI Work Plan.

Project Implementation Schedule. In concert with design activities, a Project Implementation Schedule will be developed. The schedule will contain all key construction work elements using a Work Breakdown Structure (WBS), anticipated durations, and interconnections and interdependencies to other tasks. Anticipated durations and sequencing of construction elements will be determined from past experience on similar projects and form informal discussions with vendors. The schedule is intended to satisfy LDEQ requirements for the CMI, but will also serve as a valuable tool for Company XYZ to plan and budget the CMI construction.

Cameron-Cole will provide a draft CMI schedule for Company XYZ review. The sequencing and duration of construction elements will be reviewed with Company XYZ staff to incorporate site logistics (e.g. possible competing site activities) and capitol expenditures requirements and timing. Upon review and acceptance by Company XYZ, the CMI schedule will be included in the CMI Work Plan.

Task 6 CMI Work Plan Assembly

Cameron-Cole will assemble all design and work plan components into a stand-alone CMI Work Plan. We will create introduction, background and supporting sections, and sequence all drawing and table numbers. A draft document will be prepared for Company XYZ review. Upon incorporation of comments, a final CMI Work Plan will be prepared for Company XYZ submission to LDEQ.

Throughout the project, Cameron-Cole will conduct a formal and comprehensive QA process. The project QA process includes clear project assignments and accountability, a formal peer-review process for all calculations and designs, and high-level input, monitoring, and reviews by technical advisors.

3.0 PROJECT ORGANIZATION AND MANAGEMENT

Cameron-Cole has assembled a concise, cleanly organized team of specialists with recent relevant experience in each primary area of the CMI: design of RCRA cover systems, design of sediment removal actions, optimization of groundwater recovery systems, and design of pump and piping systems.

Project Organization and Management

Cameron-Cole's proposed project organization is presented on Figure 4, including project management structure and lines of communication. Key elements of the project management organization include:

- **Senior Project Manager**. Steve Weishar will serve as Senior Project Manager. In that role, he has ultimate technical and financial responsibility for the project, and will be the certifying professional engineer for each design deliverable.
- **Project Manager.** Matt Hudson will serve as Project Manager, responsible for the daily coordination of Cameron-Cole's activities, resources, schedule, and budget. He will communicate progress and issues regularly with Company XYZ management and work closely with Cameron-Cole Task Leads.
- **Project Advisors**. Larry Johnson (Landfill Cover Design) and Tony Truschel (Groundwater Recovery and Conveyance System) will serve as Project Advisors, providing consultation and technical quality reviews in their respective areas of expertise.
- **Task Leads**. Each assigned Task Lead has specific expertise in their respective task, and is responsible for their specific design and work plan component. In some cases, individuals fill more than one role to improve efficiency, thus reducing costs.

Key Staff

The role of each key staff assigned to this project is described in their respective scope-of-work tasks (Section II). A summary of their qualifications and experience is presented below:

4.0 PROJECT SCHEDULE

Cameron-Cole has prepared a proposed schedule for the preparation of the CMI Work Plan. A high-level summary is presented in Figure 5. A detailed breakout of tasks, including interdependencies is provided in Appendix B. Cameron-Cole created this detailed schedule as a means to demonstrate our capability to perform the work and integrate the various work tasks.

Key highlights of our proposed CMI Work Plan schedule include:

- Interim conceptual design deliverables for Company XYZ review and subsequent submittal to LDEQ. This is an important step to insure engineering concepts are reviewed before spending time on detailed design drawings and specifications.
- Key integration points between three primary components of the project (e.g. coordination of optimal ground water recovery well locations with preliminary foot print of the landfill cover
- The critical work task is ditch sediment removal. Derivation of ditch sediment volume is also a precursor to establishing preliminary cover surfaces (at least for the south landfill).

The proposed schedule is very useful in understanding our proposed scope of work. In addition, as described in Task 1 of our Scope of Work, the schedule can be part of the first submittal to LDEQ that outlines the scope of work and schedule that Company XYZ will follow for the CMI Work Plan.

Schedule Assumptions

Key assumptions made in the preparation of this schedule include:

- All interim deliverables submitted to Company XYZ show a 5 or 10 working day turnaround for review. If Company XYZ extends their review time, the overall schedule could be delayed.
- All interim deliverables submitted to LDEQ show a 30-day turn around for review. If LDEQ extends their review time, the overall schedule could be delayed.
- Final assembly of the CMI Work Plan will await completion of each of the individual task components, ditch sediment removal design, cover system design, and groundwater system optimization design.
- The construction QA/QC Plan and CMI Schedule will be initiated after completion of preliminary designs.
- Development of proposed well locations and initiation of the preliminary cover systems are interrelated tasks, requiring interaction of the groundwater optimization team and the cover design team.

5.0 PROJECT COSTS

Cameron-Cole's proposed cost to provide the CMI Work Plan services, as described in the Scope of Work Section, is presented task-by- task below:

Task No.	Task Description	Base Bid
1	CMI Work Plan Approach Submittal to LDEQ	
2a, b	NPDES Effluent Ditch Sediment - Confirmation Analysis	
2c, d	NPDES Effluent Ditch Sediment Removal Design	
3	RCRA Cover Design	
4a	Groundwater Recovery Well Optimization	
4b	Design of Groundwater Conveyance System	
5	Supporting Work Plan Components	
6	CMI Work Plan Assembly	
Total		

The scope of work and costs are organized such that Company XYZ can select Cameron-Cole for any or all parts of the project.

Assumptions

The proposed costs presented herein are predicated on the following assumptions.

- Company XYZ will provide the following information to Cameron-Cole:
  - Existing site survey information electronically in a form usable in ACAD;
  - Existing design or as-built drawings for groundwater recovery wells, recovery pumps wellhead assemblies, piping layout, and electrical system;
  - A copy of the current facility Health and Safety Plan; and
  - Information of edge of waste and temporary cover type and thickness for the cells to be covered, as available.
- Site survey work described in our RCRA Cover Design Scope of Work will be completed by the surveyor contracted by Company XYZ. No site survey work is necessary for the NPDES Effluent Ditch.
- The downstream extent of study and design of the NPDES Effluent Ditch remedy is the railroad track crossing.
- The PCB confirmation analysis for the NPDES Effluent Ditch sediments comprises a reasonable level of effort, with commensurate analytical costs. If the LDEQ review of the investigation letter work plan results in more extensive sampling and analysis than proposed, the budget may require adjustment.

- The analytical costs for the NPDES Effluent Ditch sediment analyses for PCBs are not included in this cost estimate. It is assumed that Company XYZ will contract directly with the analytical laboratory for this work.
- Pricing for the detailed design components of each task is predicated on a reasonable set of review comments by LDEQ. If the LDEQ response to conceptual designs deliverables are unreasonable or require a more elaborate level of effort than foreseen, the budgets may require revision.
- The design of the groundwater conveyance system does not include re-design of existing groundwater recovery wells.
- No meetings with LDEQ are included.
- Periodic project communication with Company XYZ includes monthly progress reports and weekly status conference calls.
- The ABC landfill is not included in this proposal. If requested, Cameron-Cole can include this cell at a modest increase in budget.