

DUBLIN ROAD WATER PLANT
CHLORINE STORAGE IMPROVEMENTS
PROJECT NO. 690379 – CONTRACT NO. 966
ENGINEERING SERVICES CONTRACT NO. EA025110-002

ADDITIONAL ENGINEERING SCOPE OF SERVICES

The scope of our additional engineering services on this project can be broken down under the following three separate construction contracts:

- Part 1 - Sedimentation Basin and Clearwell Rehabilitation
- Part 2 - Disinfection (Sodium Hypochlorite) Facility
- Part 3 - Temporary Emergency Chlorine Scrubber

A summary of our scope of additional engineering services included under each of the three construction contracts is presented below.

PART 1 - SEDIMENTATION BASIN AND CLEARWELL REHABILITATION

Detailed Design Services: The scope of our engineering services to prepare the construction contract drawings and specifications for the Sedimentation Basin and Clearwell Rehabilitation project included the following additional items which evolved during the extended three year design phase and contributed to the increase in the project construction cost from \$4.5 million to \$13 million:

1. Review and revision of the stairwell addition design criteria to comply with updated structural building code requirements.
2. Design of a green roof system on the stairwell addition to the Administration Building.
3. Demolition and replacement of the washout lines located on top of the Flocculation Basins and Sedimentation Basins.
4. Replacement of the rectangular butterfly valves located in the Transfer, Settled Water and Coagulated Water Flumes.
5. Design revisions and coordination of the plant-wide fire alarm and intercom system requirements in accordance with the vendor's updated specifications, the revised project construction sequence, and construction of Part 2 and the Raw Water Intake project prior to Part 1.
6. Several adjustments to the construction sequencing and basin/clearwell outages in coordination and review with plant operations.
7. Coordination and specification of bid allowances to cover the costs for valve adjustment, repair and replacement and for landscaping items.
8. Recurrent revisions to the front end documents to incorporate periodic changes and updates to the Bid Forms, Contract and Supplemental General Provisions.
9. Revisions and updates to the construction cost estimate to account for additional construction scope and cost escalation.
10. Participation and documentation relating to additional design review meetings.

ADDITIONAL ENGINEERING SCOPE OF SERVICES

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11. Preparation and submittal of additional design review drawings and specifications.
12. Attendance and participation in two additional pre-bid meetings and site tours.

Services During Construction: Our scope of services during the construction phase of this project was changed in accordance with the City's hiring of a Construction Manager (CM) to manage the project construction and provide an on-site resident project representative (RPR). Also, the size of the construction contract increased from \$4.5 million to \$13 million, the duration of the construction phase services was extended from 17 months to 20 months, and the project construction period was deferred three years with the Notice-to-Proceed issued on October 21, 2008 and a Final Completion Date of June 21, 2010. As the Design Professional (DP), Malcolm Pirnie's scope of services during construction of the Sedimentation Basin and Clearwell Rehabilitation project includes the following:

1. Management and administration of our engineering services throughout construction of the project including monitoring and updating task assignments, budgets and completion progress; performing administrative tasks such as monthly progress reports, budget forecasts, billings, follow-up communications; and project closeout activities.
2. Providing construction engineering assistance to the CM and City pertaining to technical issues and design intent, and coordination with the CM and City regarding miscellaneous engineering and design matters, questions and problems.
3. Review of shop drawings, product data, equipment submittals, substitution requests, and operation and maintenance (O&M) submittals. It is our understanding that the CM will process all submittals, and review and coordinate the Contractor's construction schedule, sequence of work, plant/basin shutdowns and tie-ins with the City and plant operations.
4. Preparation of responses to the Contractor's requests for information (RFIs) pertaining to technical and design related matters. We assume the CM will prepare responses to RFIs pertaining to the construction schedule, sequence, shutdowns, and tie-ins; and coordination with the City and plant operations.
5. Preparation of requests for proposal (RFPs) pertaining to technical and design related items and review of the associated cost quotes submitted by the Contractor. We assume the CM will prepare RFPs pertaining to the construction schedule, sequence, shutdowns and tie-ins; and will review and negotiate the Contractor's RFP cost quotes and prepare all change orders.
6. Assisting the CM and City in the review of the Contractor's claims and disputes pertaining to technical issues and design intent. Comprehensive claims evaluation, adjudication, prosecution and defense are not included in our scope of services.
7. Attendance and participation in the preconstruction meeting and construction progress meetings.

ADDITIONAL ENGINEERING SCOPE OF SERVICES

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8. Conducting periodic site visits to observe the Contractor's work, to clarify the intent of the Contract Documents, and to assist in defining the Contractor's scope/limits of concrete repair work. It is our understanding that the CM will provide an on-site RPR to monitor the quality and quantity of the Contractor's work, determine if the work in general is proceeding in accordance with the Contract Documents, and other RPR duties, responsibilities and limitations as defined in Specification Section 01000, Article 1.10 E.; and will also provide the construction material testing and laboratory services.
9. Assisting the CM and City in the review of the Contractor's monthly pay requests as pertaining to technical issues and design intent. It is our understanding that the CM will verify the quantities and dollar amounts of work completed on the Contractor's monthly pay requests.
10. Assisting the CM and City with the final inspection of the project and preparation of a final inspection punchlist.
11. Preparation of Record Drawings based on the record set of Contact Documents maintained in the Contractor's field office and subsequent to the RPR's periodic inspection to verify that the Contractor marked the changes, revisions, additions and deletions on the record documents in accordance with Specification Section 01720.

PART 2 - DISINFECTION (SODIUM HYPOCHLORITE) FACILITY

Detailed Design Services: The scope of our engineering services to prepare the construction contract drawings and specifications for use in bidding and constructing a new disinfection facility for the Dublin Road Water Plant that utilizes sodium hypochlorite included the following additional items:

1. Evaluation and cost analysis of alternative materials of construction for fabrication of the sodium hypochlorite storage and day tanks. The City requested that the feasibility of using titanium storage and day tanks be evaluated. A design memorandum was prepared to present the results of the alternative material evaluation, which included a life cycle cost analysis of titanium tanks, PVC lined steel tanks, fiberglass tanks and polyethylene tanks.
2. Redesign of the structural steel building frame from the original configuration based on storage of 1-ton chlorine containers to a revised configuration that would accommodate the 12,000 gallon sodium hypochlorite storage tanks and 10-ton monorail system. The extent of the structural changes required to the building design was greater than anticipated due to the City's 30-day storage requirements being different than expected.
3. Increase in the scope of the electrical design effort and the number of electrical drawings from what was originally anticipated and budgeted for this work. The revised sequencing of the construction projects, in which the Part 2 was

ADDITIONAL ENGINEERING SCOPE OF SERVICES

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- constructed prior to the Part 1, impacted the scope of the electrical design effort for various interrelated items such as the fire alarm and intercom systems.
4. Coordination with and response to the constructability review that was performed by H. R. Gray at the City's request. A constructability review was not included in the original scope of services.
 5. Preparation and submittal of CC drawings for the sanitary and storm sewer site piping. The preparation and submittal of CC drawings was not a standard practice on past DOPW projects and was not included in the original scope of services.
 6. Payment of the Ohio EPA plan review fee in an amount greater than budgeted (\$14,150 paid - \$10,000 budgeted = \$4,150 additional cost).

Services During Construction: The scope of our engineering services during the construction phase of this project included the following additional items:

1. Coordination and performance of lead paint testing on items to be demolished in the Bulk Chemical Unloading Building.
2. Review, inspection and testing of the welded seams in the sodium hypochlorite storage and day tanks, including removal of the deficient welds and the complete re-welding the steel tank joints.
3. Review, inspection and testing of the coating system applied on the interior and exterior surfaces of the sodium hypochlorite storage and day tanks, including removal of the non-specified coating product, surface preparation and recoating the tanks using the specified and approved coating product.
4. Review, evaluation and inspection of the defective PVC liners and the substitute PVC liners installed in the sodium hypochlorite storage and day tanks.
5. Observing and assisting with the startup, testing and troubleshooting of various equipment items and operating systems to a greater extent than originally anticipated and budgeted for this work.
6. Revising the layout and arrangement of the sodium hypochlorite day tank and storage tank fill piping to accommodate the plant's preference for the fill piping configuration.
7. Providing additional coordination and administration of the construction activities between the City and Contractor for the extended construction duration (final completion of 25 months versus 21 months budgeted).
8. Preparing, attending and documenting additional project meetings than originally budgeted, and conducting periodic project site visits and inspections during the extended construction duration.
9. Preparing responses to an excessive number of requests for information (RFIs) submitted by the Contractor; coordinating with the Contractor and City regarding construction issues, problems and difficulties resulting from the Contractor's uncompromising stance; and preparing, reviewing and negotiating an unreasonable number of requests for proposal (RFPs), cost quotes and change orders with the Contractor.

ADDITIONAL ENGINEERING SCOPE OF SERVICES

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10. Providing an on-site resident project representative (RPR) for the extended construction duration (substantial completion of 22 months versus 18 months budgeted).

PART 3 - TEMPORARY EMERGENCY CHLORINE SCRUBBER

Services During Construction: The scope of our engineering services during the construction phase of this project included the following additional items:

1. Preparation of an RFP for repair of the rapid mix slab, including structural inspection, testing, evaluation and design; concrete slab repair details; review and negotiation of Contractor's cost quote; and preparation of a change order.
2. Coordination, inspection and meeting in response to the failure of the chlorine scrubber vessel resulting from the Contractor's improper performance of the vacuum test.
3. Participation in the process hazard analysis (PHA) meetings to a greater extent than originally anticipated and budgeted for this work.
4. Coordination with the Contractor and chlorine scrubber manufacturer to certify the proper operation of the scrubber upon chlorine leak detection.