CARLSBAD SEAWATER DESALINATION PROJECT

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

REGION 9, SAN DIEGO REGION

ORDER NO. R-9-2006-0065

NPDES NO. CA0109223

FLOW, ENTRAINMENT AND IMPINGEMENT MINIMIZATION PLAN

ATTACHMENT 2 - COST ESTIMATE OF SUBSURFACE INTAKE ALTERNATIVES

March 9, 2009
304 MDG Intake Cost Estimates - October 2007

VERTICAL BEACH WELLS

Total Capacity = 304 MGD
Individual Intake Well Capacity = 1.5 MGD
Duty Number of intake Wells Needed = 203
Additional Standby Intakes Needed @ 25 % = 51
Total Intake Wells Needed = 253
Minimum Distance Between Wells (Best Case) = 150 ft
Length of Beach Occupied by Wells = 7.2 miles
Land Needed to Install Wells & Support Facilities = 8.6 acres

Cost of Installation of Individual Well = $ 1,200,000 per well
Total Costs of Well Installation = $ 304,000,000
Cost of Seawater Conveyance Pipelines @US$500/ft = $ 18,925,000
Cost of Intake Booster Pump Stations = $ 30,400,000
Cost of Electrical Power Supply for Well Pumps = $ 50,160,000
Total Construction (Direct) Costs = $ 403,485,000

Indirect Costs
Acquisition of Land to Install Wells & Support Struct. = $ 4,304,408
Engineering, Design and Procurement @ 25 % = $ 100,871,250
Environmental Mitigation Costs @ 15 % = $ 60,522,750
Contingency @ 20 % = $ 80,697,000
TOTAL INDIRECT COSTS = $ 246,395,407.71

TOTAL PROJECT EPC COSTS = $ 649,880,408
SLANT WELLS - Similar to Dana Point Desal Plant

Total Capacity = 304 MGD

Individual Intake Well Capacity = 5 MGD

Duty Number of Intake Wells Needed = 61

Additional Standby Intakes Needed @ 25 % = 15

Total Intake Wells Needed = 76

Minimum Distance Between Wells (Best Case) = 300 ft

Length of Beach Occupied by Wells = 4.3 miles

Land Needed to Install Wells & Support Facilities = 17.4 acres

Cost of Installation of Individual Well = $2,400,000 per well

Total Costs of Well Installation = $182,400,000

Cost of Seawater Conveyance Pipelines @ US$500/ft = $11,250,000

Cost of Intake Booster Pump Stations = $30,400,000

Cost of Electrical Power Supply for Well Pumps = $31,920,000

Total Construction (Direct) Costs = $255,970,000

Indirect Costs

Acquisition of Land to Install Wells & Support Struct. = $8,723,600

Engineering, Design and Procurement @ 25 % = $63,992,500

Environmental Mitigation Costs @ 15 % = $38,395,500

Contingency @ 20 % = $51,194,000

TOTAL INDIRECT COSTS = $162,305,600

TOTAL PROJECT EPC COSTS = $418,275,600
HORIZONTAL RANNEY WELLS

Total Capacity = 304 MGD

Individual Intake Well Capacity = 5 MGD

Duty Number of Intake Wells Needed = 61

Additional Standby Intakes Needed @ 25 % = 15

Total Intake Wells Needed = 76

Minimum Distance Between Wells (Best Case) = 400 ft

Length of Beach Occupied by Wells = 5.7 miles

Land Needed to Install Wells & Support Facilities = 17.4 acres

Cost of Installation of Individual Well = $2,500,000 per well

Total Costs of Well Installation = $190,000,000

Cost of Seawater Conveyance Pipelines @ US$500/ft = $15,000,000

Cost of Intake Booster Pump Stations = $30,400,000

Cost of Electrical Power Supply for Well Pumps = $33,060,000

Total Construction (Direct) Costs = $268,460,000

Indirect Costs

Acquisition of Land to Install Wells & Support Struct. = $8,723,600

Engineering, Design and Procurement @ 25 % = $67,115,000

Environmental Mitigation Costs @ 15 % = $40,269,000

Contingency @ 20 % = $53,692,000

TOTAL INDIRECT COSTS = $169,799,600

TOTAL PROJECT EPC COSTS = $438,259,600
SUBSURFACE INFILTRATION GALLERY (FUKUOKA TYPE INTAKE)

Total Capacity = 304 MGD
Capacity of Individual Intake Galleries = 101.3 MGD
Duty Intake Galleries Needed = 3
Additional Standby Intakes Needed @ 0 % = 0
Total intake Galleries Needed = 3
Length x Width x Depth Each Gallery = 5280x400x15 ft
Total Length of Intake System = 3.0 miles
Land Needed to Install Wells & Support Facilities = 17.9 acres
Cost of Installation of Individual Gallery = $120,000,000 per 100 MGD gallery
Total Costs of Gallery Installation = $360,000,000
Cost of Seawater Conv. Pipelines @US$500/ft = $7,922,606
Cost of Intake Booster Pump Stations = $12,160,000
Cost of Electrical Power Supply for Well Pumps = $18,608,000
Total Construction (Direct) Costs = $398,690,606

Indirect Costs
Acquisition of Land to Install Intake & Support Struct. = $8,956,114
Engineering, Design and Procurement @ 25 % = $99,672,652
Environmental Mitigation Costs @ 15 % = $59,803,591
Contingency @ 20 % = $79,738,121
TOTAL INDIRECT COSTS = $248,170,478

TOTAL PROJECT EPC COSTS = $646,861,084
NEW OPEN INTAKE - 1,000 FT INTAKE LINE W/ LOW-VELOCITY INTAKE STRUCTURE

Total Capacity = 304 MGD
Length of Intake Pipe = 1000 ft
Land Needed to Install Wells & Support Facilities = 2.3 acres

Cost of Installation of Intake Pipe @ US$45,000/ft = $45,000,000
Cost of Construction of Ocean Intake Structure = $10,500,000
Cost of New Intake Screens = $8,000,000
Cost of New Intake Pump Station = $24,320,000
Cost of Power Supply for New Pump Station = $5,223,000

Total Construction (Direct) Costs = $93,043,000

Indirect Costs
Acquisition of Land to Install Intake & Support Struct. = $1,147,842
Engineering, Design and Procurement @ 25 % = $23,260,750
Environmental Mitigation @ 15 % = $13,956,450
Contingency @ 20 % = $18,608,600

TOTAL INDIRECT COSTS = $56,973,642.06

TOTAL PROJECT EPC COSTS = $150,016,642