

CAPITAL AND OM&R

Project Construction, Ownership, and OM&R

Project facilities would be constructed through Reclamation. Ownership of all of the proposed project facilities would remain with Reclamation until a point in the future when the Navajo Nation and the city of Gallup would be capable, by mutual agreement, of taking over ownership. Until facilities are transferred from Reclamation, project OM&R would be the responsibility of Reclamation through contract to the Navajo Tribal Utility Authority (NTUA) and the city of Gallup. The costs of OM&R would be paid by the NTUA and the city. This arrangement would be detailed in an agreement among the entities. It is anticipated that the entire project's ownership and OM&R responsibility would be transferred to the Navajo Nation and the city of Gallup. The Jicarilla Apache Nation would pay its share of the project's OM&R costs and be party to all agreements pertaining to this proposed project's ownership and OM&R.

The appraisal design and construction cost estimate was provided by Reclamation's Denver Technical Service Center (TSC). This information was documented in the *Appraisal Level Designs and Cost Estimates Report*, April 2002 (volume II, appendix B). A peer review of the designs and cost estimates was performed by Boyle Engineering Corporation in February 2004. Based on results from this review and using current unit costs of materials, the TSC revised the proposed project construction cost estimate in April 2007. A summary of this April 2007 cost estimate is shown in table F-7 (based on January 2007 dollars).

Reclamation historically supports projects for construction after a feasibility report is completed, which includes a feasibility-level cost estimate. This appraisal-level cost estimate does not meet that requirement. Additional analysis, detail, and updates of the appraisal-level cost estimates presented in this draft report are needed before project construction authorization can be supported. Failure to complete this additional effort may result in reliance on a cost estimate for the proposed project that is not sufficient to characterize the expected cost. The appraisal-level design must be upgraded to feasibility level before Reclamation would begin construction. The cost of, and time for, completing this additional work would be substantial.

OM&R costs include electrical power, chemicals for water treatment, repair and replacement of components of the facilities, and personnel required to operate the system. Power costs were calculated using the January 2007 costs from the local power provider, NTUA, and the Colorado River Storage Project (CRSP). This analysis also included estimating the cost using power from the CRSP, and the economic analysis used NTUA and CRSP power rates for comparison purposes. Table F-8 details the OM&R costs.

Table F-7.—Preferred alternative cost estimate

Feature	Reclamation April 2007 cost estimate (\$)
Pipelines	202,546,620
Pumping plants	28,355,000
Water treatment plants	53,673,055
Tanks and air chambers	85,575,000
Transmission lines	26,677,200
Turnout structure	1,707,380
Gallup Regional System	25,754,500
Subtotal	424,288,755
Mobilization (5%)	21,000,000
Unlisted items (10%)	44,711,245
Subtotal	490,000,000
Contingencies (22.5%)	110,000,000
Subtotal (field costs)	600,000,000
Noncontract costs (27%)	162,000,000
Subtotal	762,000,000
New Mexico taxes on field costs (estimated at 6%)	36,000,000
Navajo Nation taxes on field costs, excluding Gallup Regional System field cost of \$30 million (estimated at 3%)	16,900,000
Subtotal	814,900,000
Land, relocation, and damage ¹	9,000,000
Cultural resource mitigation	34,500,000
Environmental mitigation	6,000,000
Total project cost	864,400,000

¹ The estimate includes ROW costs for the San Juan treatment plant only. Should it be determined that ROW for the rest of the features needs to be included in the project costs, an additional \$30–60 million should be added.

Table F-8.—Yearly OM&R costs (\$) (SJRPNM Alternative)

Item	San Juan Lateral	Cutter Lateral	Gallup Regional System
NTUA power costs (relift pumping plant)	4,962,000	597,000	82,000
CRSP power costs (relift pumping plant)	1,841,000	221,000	31,000
NTUA power costs (booster pumping plant)	215,000	35,000	
CRSP power costs (booster pumping plant)	80,000	13,000	—
Relift pumping plant OM&R	3,170,000	1,245,000	723,000
Booster pumping plant OM&R	78,000	12,000	
Canal OM&R	—	35,000	—
NTUA power cost water treatment plant	511,000	63,000	—
CRSP power cost water treatment plant	187,000	22,000	—
Water treatment OM&R	2,605,000	1,064,000	—
NTUA water treatment, miscellaneous 10%	312,000	113,000	
CRSP water treatment, miscellaneous 10%	279,000	109,000	
Power transmission OM&R	350,000	Included in San Juan Lateral	
Pipeline OM&R	801,000	187,000	57,000
Total NTUA	13,004,000	3,351,000	862,000
Total CRSP	9,391,000	2,908,000	811,000
Relift pumping plant power consumption (kilowatts [kW])	16,219	2,026	305
Booster pumping plant power consumption (kilowatts)	784	128	
Water Treatment Plant power consumption (kilowatts)	1,588	224	
Total kW	18,592	2,379	305

Notes: (1) CRSP rate is 10.43 mils/kilowatthour and demand charge of \$4.43 per kW/month.
(2) CRSP total project power cost is \$2,395,000.
(3) NTUA rate is 20 mils/kilowatthour and demand charge of \$16.50 per kW/month.
(4) NTUA total project power cost is \$6,465,000.
(5) Cost reflects April 2007 project cost estimate with January 2007 price level.

Construction and Associated Costs

Interest During Construction

A project construction schedule was developed to support the economic analysis and help the proposed project beneficiaries plan future water supplies. The first objective of the

schedule was to provide water to people in the shortest time period to get the earliest possible benefit from the proposed project. Consideration was given to constructing Cutter Lateral first to give the operators some years of experience operating a smaller scale facility before operating the very similar but larger facilities of the San Juan Lateral.

The Cutter Lateral would be constructed first. The San Juan Lateral from Twin Lakes to Window Rock and the Gallup Regional System would be next. This section of lateral would draw groundwater from the Twin Lakes area until surface water would be available from the San Juan River. The San Juan Lateral from the San Juan River to Twin Lakes and to Crownpoint would be the last segment constructed.

A construction schedule was developed based on the assumed limitation of \$60 million in appropriations annually until project completion. The schedule shown in table F-9 shows the assumed yearly expenditures by feature from project construction start to finish. The schedule was used to estimate interest accrued on potentially borrowed money during construction and to estimate when people would receive water—the start of project benefits.

Cost Allocation

The purpose of cost allocation is to assign shares of the overall project costs to the various participants. The proposed project would provide municipal water supplies to three participating groups—the Navajo Nation, the city of Gallup, and the Jicarilla Apache Nation. The overriding philosophy in allocating project costs is that the three participants are equal partners in the proposed project.

Costs are separated into capital, fixed OM&R, and variable OM&R costs. Each of these cost categories is further divided into specific project reaches and then allocated to the participating parties. The analysis assumes that construction would begin in 2011, with a construction budget of approximately \$60 million per year, and full project completion by January 1, 2027. The details of the cost allocation are documented in volume II, appendix D.

In allocating costs, specific project components were separated out by those that would be dedicated for the exclusive use by any single participant; the cost of those ***dedicated components*** was assigned to the beneficiary participant. These dedicated components typically include water storage tanks and pressurization pumps at most of the major delivery points. The bulk of the proposed project cost, however, is for components that would benefit more than one participant. These joint costs were allocated among the project participants to derive each participant's share of the total costs.

Joint costs were allocated according to the following principles:

- **Capital costs were allocated according to each participant's share of design capacity.** The idea is that the size and cost of the facilities depend on each participant's desired capacity and not on average use or use in any particular period.
- **Fixed OM&R costs were also allocated according to each participant's share of design capacity.** Here again, the fixed OM&R costs (staff size, dredging, equipment replacement, and pump maintenance) are primarily a function of the design capacity, not of flows in any particular period.
- **Variable OM&R costs were allocated according to each participant's share of annual water deliveries.** The variable OM&R costs consist mainly of energy and water treatment chemical costs. These costs vary according to the water flows in any period, so the method used to allocate these costs assigns cost shares in each year according to the projected use in that year.

The proposed project envisions water deliveries at many locations along two main laterals. Every delivery changes the relative shares of the water flow that continues along the pipeline beyond the delivery point. Because, as described above, the relative share of design capacity and projected flow serve as the basis for the cost allocation, the cost allocations change after every delivery point. Therefore, each pipeline branch has been separated into specific *reaches* that are defined as the intervals between each two succeeding delivery points. The diversion structure and water treatment plant on each branch is also treated as a separate segment or reach. Each participant's share of design capacity on each reach was computed in order to serve as the basis for allocating capital and fixed OM&R costs.

Gallup Regional System Costs

The design work and cost estimates for the Gallup Regional System were first prepared by DePauli Engineering (DePauli Engineering and Surveying Company, 2002). Reclamation used the DePauli design but re-estimated much of the cost. Some of the Gallup Regional System components were included in Reclamation's cost estimates for the overall system (e.g., Navajo Nation chapter water storage tanks), but most components were listed separately as Gallup-specific. The components included with the other Reclamation elements were treated as part of the overall system cost allocation. The remaining items (all joint facilities) were allocated by their cost to participants based on their respective shares of design capacity. The OM&R costs were estimated as

Table F-9.—Construction schedule (cost in \$ millions)
(\$60 million/year schedule)

Construction phase	Year																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Navajo-Gallup Water Supply Project	2.35	4.29	22.32	11.91													40.86
Cutter Lateral	5.99	7.53	4.27	16.20	16.14	21.72	21.70	17.19	7.41								118.14
Twin Lakes/Window Rock	0.78	0.21				19.94	30.76	2.23									53.92
Cutter Power	0.72	0.73	0.73		3.00	3.27	6.60	9.59									24.63
San Juan Power		0.78	1.57					6.00	18.26	0.00							26.61
Gallup Regional System	0.40	4.37	20.33	26.66	28.09												79.85
San Juan Lateral		8.47	3.63		7.78	15.07	0.94			33.18	32.74	53.00	60.00	54.31	57.03	34.91	361.04
San Juan Pumping Plant		3.51	1.16					8.16	16.00		8.48	7.00		5.69	2.97		52.97
San Juan Water Treatment Plant	5.33	2.48						16.85	18.33	26.83	18.78						88.59
Cutter Water Treatment Plant	1.11	0.46	6.00	5.23	4.99												17.79
Total allocated spending	16.67	32.82	60.00	34.91	864.40												
Percent distribution	1.93%	3.80%	6.94%	4.04%	100.00%												
Overall spending	16.68	32.84	60.04	34.94	865.00												
Interest during construction to January 1 of year 14	18.20	32.65	54.12	48.81	43.75	38.93	34.33	29.94	25.76	21.77	17.97	14.34	10.88	7.59	4.44	0.84	404.34

Note: The construction schedule assumes that annual appropriations will be indexed to keep in step with construction cost trends.

a lump sum (one each for the CRSP and NTUA energy rates). This overall annual OM&R cost was allocated to the participants based on their respective shares of design capacity.

The city of Gallup’s cost of purchasing 7,500 AFY of water that would be conveyed by the proposed project is included. At this point, the city of Gallup has not reached an agreement with any water supplier, so the cost estimates may change. For purposes of this analysis, the price per acre-foot of water was estimated at \$110, beginning when the city takes water in 2027. No financial cost for the water to be delivered to the Navajo and Jicarilla Apache Nation communities was included, although there may be some non-financial consideration between those two participants.

Cost of Water

In the absence of a water right settlement that establishes different terms, it is assumed that the Navajo Nation would pay for municipal and industrial water from Navajo Reservoir. These payments were estimated by Reclamation to have a present value of \$108.45 per acre-foot. The Jicarilla Apache Nation presently has rights to water they intend to use in the proposed project. It is assumed that there would be no cost for their water, as described in their Navajo Reservoir water supply contract.

The city of Gallup, however, will have to pay for obtaining water from a water right holder. The present value of a tentative purchase arrangement is \$20 million. Table F-10 shows how this cost translates to the levelized rate needed to cover the projected payments for water.

Table F-10.—Levelized water cost per thousand gallons
(2007\$)

	Navajo Nation	City of Gallup	Jicarilla Apache Nation	Project total
Present value of water costs	3,300,617	32,605,398	0	35,906,016
Annual amortization of water costs	177,317	1,751,636	0	1,928,953
Annual equivalent water deliveries (1,000 gallons)	9,889,759	2,443,890	560,120	12,893,770
Levelized cost per thousand gallons	0.02	0.72	0.00	0.15

Cost Allocation

Table F-11 summarizes the above analysis. The table addresses the capital, annual OM&R, and present value of OM&R costs for a scenario that assumes a construction budget of \$60 million per year. The table combines total construction costs, including taxes for the Reclamation-designed system and for the Gallup Regional System. Allocated costs were added for environmental mitigation, cultural resources, and land acquisition, then interest during construction was added. The present value of the annual fixed plus variable OM&R costs (discounted at 4.875 percent) was calculated and estimated under both the CRSP and NTUA energy rates. All financial costs are expressed as of the beginning of the year 2027, the year in which the proposed project would be completed. Interest during construction and interest on pre-project completion water purchase fees are compiled up to January 1, 2027, and post-completion OM&R and post-completion water purchase fees are discounted to January 1, 2027. Next, the total present value of all costs, including capital, fixed OM&R, and variable OM&R costs, is shown. Table F-11 allocates these costs to each of the participants. All costs are based on January 2007 price levels.

Figures F-6 and F-7 illustrate the components of overall cost. Figure F-6 shows how total project costs are split among capital cost, interest during construction, the present value of future OM&R costs, and the present value of water cost. Figure F-7 shows how total project costs are allocated to the three project participants. Figures F-8, F-9, and F-10 show how the cost allocated to each project participant is composed of capital, interest during construction, OM&R, and water costs. Figure F-11 shows what the levelized cost per thousand gallons would be to each project participant, assuming full self-funding.

ECONOMIC BENEFIT/COST ANALYSIS

This economic analysis section is distinct from a financial analysis because an economic analysis is concerned with the generation and use of societal resources instead of the financial analyses' focus on tracing cash receipts and expenditures. Because Reclamation is overseeing the planning of the proposed project and its participants are seeking monetary support from the Federal Government, the resources of concern are those of the United States as a whole. The principal differences between this economic analysis and a financial analysis are:

- Inclusion of non-cash project costs that would affect third parties (diminished power generation and increased salinity effects)