



TO: GOVERNANCE COMMITTEE
FROM: GEORGE OAMEK, EXECUTIVE DIRECTOR'S OFFICE
SUBJECT: COMPARATIVE COSTS OF WAP MEASURE
DATE: 3-10-2016

Review of CNPPID (Central's) Proposed Revisions to the J2 Reservoir Operating Agreement

Two proposed changes to the Water Service Agreement suggested by Central will have significant financial impacts to the remaining participants in the J2 project.

- On page 21, the Water Conveyance Charge portion of the Agreement will be based upon 1.5% of the actual O,M,&R for facilities used to deliver water to the J2 Reservoir. It had previously been based on 2% of the actual O,M,&R for these facilities. This reduction is attributable to a smaller J2 Reservoir project than previously planned.
- More substantial is the proposed change on page 5 under "Reservoir Cost Percentages", reducing Central's share of the reservoir's capital cost to 0.5% of construction cost rather than the previous 5%. This change is based on Central re-evaluation of the benefits they receive from a smaller J2 Reservoir. This change results in revised allocation of project costs, with proportionately more costs allocated to the Program and DNR.

Central's Estimated Cost for Water Service

There are five categories of costs considered by Central in the development of the charge for water service

1. Direct operation and maintenance for the J2 Reservoir.
2. Repair and replacements of J2 facilities.
3. Direct administrative and general costs (A&G)
4. Indirect A&G
5. Water Conveyance

These costs are further defined in Appendix A, Table A-1. As indicated above, the Water Conveyance charge is of interest here. In addition, Central has provided additional detail for the basis of the Indirect A&G allocation.



Water Conveyance Charge

Central proposes reducing the J2 Reservoir participants share of annual O,M,&R for the facilities used to deliver water to the J2 Reservoir from 2% to 1.5%. Included in these expenditures are:

- O,M,&R on Supply Canal
- O,M,&R on Kingsley Dam
- 95% of O&M specific to FERC facilities
- Capital replacements associated with the Supply Canal.

This reduction from 2% to 1.5% appears to match the impact to the anticipated yield of a smaller J2 relative to the total irrigation deliveries through the above facilities.

At 2% of O,M,&R, the annual obligation of the J2 participants was estimated to be \$142,350; at 1.5%, this obligation is reduced to \$106,744 (Appendix A, Table A-2). Therefore, the reduction in annual O,M,&R would be about \$35,600 throughout the life of the project (in 2012 dollars).

Administrative and General Expenses

Central's system-wide A&G expenditures that cannot be directly attributable to a function or activity are indirectly allocated based on revenue, meaning they are allocated based on the proportion of revenue these activities bring into the enterprise. This is a common method used by utilities for allocating costs otherwise difficult to directly allocate.

Table A-3 shows how the Indirect A&G allocation percentage is calculated. The table averages annual operating revenues over the 3-year period 2010-12. It assumes that revenues from J2 operation will be \$250,000 per year, or \$750,000 over 3 years. The \$250,000 per year estimate is derived in Table A-4. Overall, the J2 percentage of total revenue is about 1.27%.

Multiplying this 1.27% by system-wide A&G expenses of \$2.7 million results in an annual allocated cost of \$34,467 (Table A-3).

Total Water Service Charge

Appendix Table A-4 sums the components of the Water Service Charge in 2012 dollars. As shown, annual O,M,&R for the J2 Reservoir is estimated to be \$100,000. Direct A&G is estimated to be \$5,000. Indirect A&G is in Table A-3 to be \$34,476 and the Water Conveyance charge is estimated to be \$106,744 (Table A-2).

The sum of these components total \$246,211, or about \$250,000 per year.



Potential Impact to J2 Capital Cost Allocation

A smaller J2 Reservoir substantially reduces the hydro-cycling and irrigation benefits accruing to Central. This reduction in benefits is estimated to reduce their capital cost obligation from 5% of total construction cost to 0.5%.

The original cost allocation of 5% was based on Central's hydro-cycling and irrigation benefit, as estimated in 2011-12. The estimated net present value of the benefit over 30 years was about \$2.55 million, as described in an internal Central memo included in Appendix B and as shown in Appendix Table B-1. This benefit estimate was a portion of the data used to develop capital cost allocations using the Separable Cost Remaining Benefit (SCRB) method, which determined that Central's share of capital costs should lie between 2.5% and 6.5%, depending on assumptions about specific separable and joint costs. A 5% share was agreed upon.

Central updated their 2011-12 benefit analysis to 2016 for the original J2 size and configuration and estimated that the net present value was about \$2.59 million in 2016 dollars (Appendix B, Table B-2). However, when summer hydro-cycling and irrigation benefits are omitted, the net present value drops to \$351,000, or \$0.35 million.

The \$0.35 million estimate above is based exclusively upon spring and fall season hydro-cycling benefits and 2008-11 hydrology. For 2008-15 hydrology, the net present value of hydro-cycling benefit is \$364,000, or \$0.36 million.

Regardless of whether the benefit is \$0.35 million or \$0.364 million, Central's benefit is significantly reduced from 5% to approximately 0.3% of total project benefit. In light of this, the 0.50% percentage proposed in the revised Water Services Agreement appears reasonable. Moving forward, it is certain that the Program and NDNR will be paying a higher percentage of the reservoir construction cost. Instead of paying no less than 95% of construction costs, they would now pay no less than 99.5%.

The dollar impact to the Program and DNR is significant and further focused by the imposition of caps on Central's contribution. The former 5% allocation was capped at \$2.5 million of construction costs. The current 0.5% allocation is capped at \$0.4 million. Central's contribution is \$2.1 million less than previously calculated, and capped at \$400,000. Based on previous estimates, Central made an initial \$1 million contribution. Consequently, an adjustment to the project account would need to be made to reduce their contribution.



Appendix A

***Supporting Documentation Provided by CNPPID Regarding
Annual O,M,&R***



Table A-1. Definitions Used by CNPPID in the Water Services Contract

**Proposal for the Cost of Water Services
3/9/2016**

Cost of Water Services

The Parties would pay the actual cost of service. The following categories of costs would be included:

- | | |
|--------------------------|---|
| 1. Direct O&M | Direct labor, materials, vehicle use expense, etc. for J-2 reservoir project. |
| 2. Repair & Replacement | Repair and replacement costs of J2 reservoir project. |
| 3. Direct A&G | Liability insurance, property insurance, legal fees for the reservoir project. |
| 4. Indirect A&G | Allocation of indirect administrative expenses
Calculation is based on prior 3-year rolling average revenues. |
| 5. Water Conveyance Cost | 1.5% of annual cost of budgeted operations, maintenance and replacement of Central's water storage and conveyance system. True-up completed at end of year to actual. |

The above costs would be split between the Foundation, NDNR and Central according to the percentages in the agreement.

Table A-2. O,M,&R Expenditures for Delivery Facilities, 2012

Cost Analysis for J-2 Regulating Reservoir Water Conveyance Fee *

			Budgeted 2012
Supply Canal O&M			\$3,539,994
Kingsley Dam O&M			\$336,600
FERC O&M (95% used for calculation)	\$1,053,130	0.95	\$1,000,474
Supply Canal Capital			\$2,239,200
			<u>\$7,116,268</u>
Water Conveyance %			1.50%
Annual Fee			\$106,744

Notes:

1. Supply Canal O&M does not include McConaughy, Jeffrey and Johnson Lake Area Leases and Other Lease Expenses
2. Supply Canal O&M does not include Power Plant Expenses
3. Kingsley Dam O&M does not include Kingsley Hydro expenses
4. FERC O&M excludes 5% of expenses attributable to power plant expenses
5. Supply Canal O&M does not include any direct O&M for the J-2 Regulating Reservoir

Table A-3. Indirect A&G Allocations

Cost Analysis for Indirect A&G Allocation *

	Total	Hydro-Elec	Hydro-Irrig	Kingsley	Glendo	J2 Project
Operating Revenues (2009-2011 est)	\$58,885,723	\$39,418,409	\$9,093,111	\$9,563,213	\$60,990	\$750,000
Budgeted 2012 Allocation %	100.00%	66.94%	15.44%	16.24%	0.10%	1.27%
Indirect Allocation Amount	\$2,706,150					
Allocated A&G Amount - 2012 Budget	\$2,706,150	\$1,811,511	\$417,883	\$439,487	\$2,803	\$34,467

Notes/Assumptions:

- For this calculation, J2 Project revenues were estimated at \$250,000 per year. See Summary tab.
- During the first 3 years of Operations Phase, Allocated A&G will be fixed at \$35,000 for year one, \$40,000 for year two, and \$45,000 for year three (selected as reasonable amounts). After the third year is complete the Indirect A&G Allocation will be used.

* All numbers are based on 2012 Budget. All numbers will be adjusted using best available information when operations begin



Table A-4. CNPPID Calculations of Annual Cost of Water Service

Sample Calculation of Estimated Annual Cost of Water Services During the Operations Phase

Estimated Cost of Water Services as defined in Section 5.4:		2012
Direct O&M	Direct labor, materials, vehicle use expense, etc. for J-2 reservoir project	\$100,000
Direct A&G	Liability insurance, property insurance, legal fees (estimated)	\$5,000
Water Conveyance Percentage	1.5% of annual cost of budgeted operations, maintenance and replacement of Central's water storage and conveyance system. True-up completed at end of year.	\$106,744
Indirect A&G	Allocation of indirect administrative expenses Calculation is based on prior 3-year rolling average revenues.	\$34,467
Estimated Annual Costs to be split between Foundation, NDNR and Central		\$246,211
Estimated Annual Cost to Each Party:		
Central Share (5% of "Cost of Water Services")		\$12,311
Foundation Share (75% of remaining amount)		\$175,425
NDNR Share (25% of remaining amount)		\$58,475
Total Estimated Annual Cost		\$246,211

* All numbers are based on 2012 Budget. All numbers will be adjusted to current.



Appendix B

***Supporting Documentation of CNPPID's Economic Benefit from
the J2 Reservoir***



PRRIP – ED OFFICE

3/11/2016

CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT MEMORANDUM

To: Don Kraus
Mike Drain
Eric Hixson
Rochelle Jurgens

From: Cory Steinke

Date: December 31, 2015

Subject: J-2 Project Generation Benefits to CNPPID

The primary benefit of the J-2 Regulating Reservoirs Project (Project) for the Central Nebraska Public Power and Irrigation District (Central) is the increased efficiency of the J-2 Hydro plant. Under the original Water Service Agreement (Agreement) and design of the Project, Central received benefits during the spring and fall hydrocycling periods and during the irrigation season. In the analysis for the original Agreement Central calculated the potential increased generation of the project by comparing actual hydrocycling activities versus efficient operation using the same flows. Those calculations of potential increased megawatt-hour(MWH) production and associated data sets used for the calculations are as follows:

<u>Season (data set)</u>	<u>Annual Average Lost MWH</u>
Irrigation Season (1975-2011)	3090
<u>Hydrocycling Periods (2008-2011)</u>	<u>485</u>
Total	3575

A 30 year Net Present Value of this benefit was approximately \$2.5 million.

Under the new design and amended future Agreement, Central will receive increased generation benefits only during the spring and fall hydrocycling periods. The same analysis was completed for the future Agreement but was updated with additional data and eliminated the irrigation season benefits. Those calculations are as follows:

<u>Season (data set)</u>	<u>Annual Average Lost MWH</u>
Hydrocycling Periods (2008-2015)	503

A 30 year Net Present Value of this benefit is approximately \$400,000.



Table B-1. CNPPID Benefit Calculations from 2011.

Annual Escalation 2% NPV of Spring/Fall and Summer \$ 2,556,403
Discount Factor 5% in 2010\$
Spring/Fall Based on flow data from 2008 - 2011
Summer Based on flow data from 1975 - 2011

Year	Lost Generation			Lost Revenue	
	Summer MWH	Spring/Fall MWH	\$/MWH	Summer Revenue	Spring/Fall Revenue
2011	3090	485	\$ 36.93	\$ 114,114	\$ 17,911
2012	3090	485	\$ 37.67	\$ 116,396	\$ 18,269
2013	3090	485	\$ 38.42	\$ 118,724	\$ 18,635
2014	3090	485	\$ 39.19	\$ 121,098	\$ 19,007
2015	3090	485	\$ 39.97	\$ 123,520	\$ 19,387
2016	3090	485	\$ 40.77	\$ 125,991	\$ 19,775
2017	3090	485	\$ 41.59	\$ 128,511	\$ 20,171
2018	3090	485	\$ 42.42	\$ 131,081	\$ 20,574
2019	3090	485	\$ 43.27	\$ 133,702	\$ 20,986
2020	3090	485	\$ 44.13	\$ 136,376	\$ 21,405
2021	3090	485	\$ 45.02	\$ 139,104	\$ 21,833
2022	3090	485	\$ 45.92	\$ 141,886	\$ 22,270
2023	3090	485	\$ 46.84	\$ 144,724	\$ 22,716
2024	3090	485	\$ 47.77	\$ 147,618	\$ 23,170
2025	3090	485	\$ 48.73	\$ 150,571	\$ 23,633
2026	3090	485	\$ 49.70	\$ 153,582	\$ 24,106
2027	3090	485	\$ 50.70	\$ 156,654	\$ 24,588
2028	3090	485	\$ 51.71	\$ 159,787	\$ 25,080
2029	3090	485	\$ 52.75	\$ 162,982	\$ 25,581
2030	3090	485	\$ 53.80	\$ 166,242	\$ 26,093
2031	3090	485	\$ 54.88	\$ 169,567	\$ 26,615
2032	3090	485	\$ 55.97	\$ 172,958	\$ 27,147
2033	3090	485	\$ 57.09	\$ 176,417	\$ 27,690
2034	3090	485	\$ 58.23	\$ 179,946	\$ 28,244
2035	3090	485	\$ 59.40	\$ 183,545	\$ 28,809
2036	3090	485	\$ 60.59	\$ 187,216	\$ 29,385
2037	3090	485	\$ 61.80	\$ 190,960	\$ 29,973
2038	3090	485	\$ 63.04	\$ 194,779	\$ 30,572
2039	3090	485	\$ 64.30	\$ 198,675	\$ 31,184
2040	3090	485	\$ 65.58	\$ 202,648	\$ 31,807
Totals				\$ 4,629,374	\$ 726,617
NPV(2010\$, 5%)				\$2,209,590	\$346,813
					\$ 5,355,991
					\$ 2,556,403



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3/11/2016

Table B-2. CNPPID's Benefit Analysis in the 2020-2049 Time Frame, Assuming Summer Hydro-Cycling and Irrigation Benefits.

Annual Escalation 2% NPV of Spring/Fall only \$ 351,022
Discount Factor 5%
Spring/Fall Based on flow data from 2008 - 2011
Summer Based on flow data from 1975 - 2011

Year	Lost Generation			Lost Revenue		2016 NPV\$		
	Summer MWH	Spring/Fall MWH	\$/MWH	Summer Revenue	Spring/Fall Revenue	Summer	Spring/Fall	Total
2020	3090	485	\$ 43.27	\$ 133,704	\$ 20,986	\$ 109,999	\$ 17,265	\$ 127,264
2021	3090	485	\$ 44.14	\$ 136,378	\$ 21,406	\$ 106,856	\$ 16,772	\$ 123,628
2022	3090	485	\$ 45.02	\$ 139,106	\$ 21,834	\$ 103,803	\$ 16,293	\$ 120,096
2023	3090	485	\$ 45.92	\$ 141,888	\$ 22,270	\$ 100,837	\$ 15,827	\$ 116,664
2024	3090	485	\$ 46.84	\$ 144,726	\$ 22,716	\$ 97,956	\$ 15,375	\$ 113,331
2025	3090	485	\$ 47.77	\$ 147,620	\$ 23,170	\$ 95,157	\$ 14,936	\$ 110,093
2026	3090	485	\$ 48.73	\$ 150,573	\$ 23,634	\$ 92,439	\$ 14,509	\$ 106,948
2027	3090	485	\$ 49.70	\$ 153,584	\$ 24,106	\$ 89,798	\$ 14,094	\$ 103,892
2028	3090	485	\$ 50.70	\$ 156,656	\$ 24,588	\$ 87,232	\$ 13,692	\$ 100,924
2029	3090	485	\$ 51.71	\$ 159,789	\$ 25,080	\$ 84,740	\$ 13,301	\$ 98,040
2030	3090	485	\$ 52.75	\$ 162,985	\$ 25,582	\$ 82,318	\$ 12,921	\$ 95,239
2031	3090	485	\$ 53.80	\$ 166,244	\$ 26,093	\$ 79,966	\$ 12,551	\$ 92,518
2032	3090	485	\$ 54.88	\$ 169,569	\$ 26,615	\$ 77,682	\$ 12,193	\$ 89,874
2033	3090	485	\$ 55.97	\$ 172,961	\$ 27,148	\$ 75,462	\$ 11,844	\$ 87,307
2034	3090	485	\$ 57.09	\$ 176,420	\$ 27,691	\$ 73,306	\$ 11,506	\$ 84,812
2035	3090	485	\$ 58.24	\$ 179,948	\$ 28,244	\$ 71,212	\$ 11,177	\$ 82,389
2036	3090	485	\$ 59.40	\$ 183,547	\$ 28,809	\$ 69,177	\$ 10,858	\$ 80,035
2037	3090	485	\$ 60.59	\$ 187,218	\$ 29,385	\$ 67,201	\$ 10,548	\$ 77,748
2038	3090	485	\$ 61.80	\$ 190,963	\$ 29,973	\$ 65,281	\$ 10,246	\$ 75,527
2039	3090	485	\$ 63.04	\$ 194,782	\$ 30,573	\$ 63,415	\$ 9,954	\$ 73,369
2040	3090	485	\$ 64.30	\$ 198,678	\$ 31,184	\$ 61,604	\$ 9,669	\$ 71,273
2041	3090	485	\$ 65.58	\$ 202,651	\$ 31,808	\$ 59,843	\$ 9,393	\$ 69,236
2042	3090	485	\$ 66.89	\$ 206,704	\$ 32,444	\$ 58,134	\$ 9,125	\$ 67,258
2043	3090	485	\$ 68.23	\$ 210,838	\$ 33,093	\$ 56,473	\$ 8,864	\$ 65,336
2044	3090	485	\$ 69.60	\$ 215,055	\$ 33,755	\$ 54,859	\$ 8,611	\$ 63,470
2045	3090	485	\$ 70.99	\$ 219,356	\$ 34,430	\$ 53,292	\$ 8,365	\$ 61,656
2046	3090	485	\$ 72.41	\$ 223,743	\$ 35,118	\$ 51,769	\$ 8,126	\$ 59,895
2047	3090	485	\$ 73.86	\$ 228,218	\$ 35,821	\$ 50,290	\$ 7,893	\$ 58,183
2048	3090	485	\$ 75.33	\$ 232,782	\$ 36,537	\$ 48,853	\$ 7,668	\$ 56,521
2049	3090	485	\$ 76.84	\$ 237,438	\$ 37,268	\$ 47,457	\$ 7,449	\$ 54,906
Totals				\$ 5,424,127	\$ 851,360	\$ 2,236,410	\$ 351,022	\$ 2,587,432 NPV(2016\$, 5%)



Table B-3. CNPPID Benefit Analysis in the 2020-49 Time Frame Assuming No Summer Hydro-Cycling Benefits

Annual Escalation	2%	NPV of Spring/Fall only		\$	364,050
Discount Factor	5%	in 2016\$			
Spring/Fall Based on Flow Data from 2008 - 2015					
	Lost Generation		Lost Revenue		
	Spring/Fall		Spring/Fall		2016
Year	MWH	\$/MWH	Revenue		NPV\$
2020	503	\$ 43.27	\$ 21,765	\$	17,906
2021	503	\$ 44.14	\$ 22,200	\$	17,394
2022	503	\$ 45.02	\$ 22,644	\$	16,897
2023	503	\$ 45.92	\$ 23,097	\$	16,415
2024	503	\$ 46.84	\$ 23,559	\$	15,946
2025	503	\$ 47.77	\$ 24,030	\$	15,490
2026	503	\$ 48.73	\$ 24,511	\$	15,047
2027	503	\$ 49.70	\$ 25,001	\$	14,618
2028	503	\$ 50.70	\$ 25,501	\$	14,200
2029	503	\$ 51.71	\$ 26,011	\$	13,794
2030	503	\$ 52.75	\$ 26,531	\$	13,400
2031	503	\$ 53.80	\$ 27,062	\$	13,017
2032	503	\$ 54.88	\$ 27,603	\$	12,645
2033	503	\$ 55.97	\$ 28,155	\$	12,284
2034	503	\$ 57.09	\$ 28,718	\$	11,933
2035	503	\$ 58.24	\$ 29,293	\$	11,592
2036	503	\$ 59.40	\$ 29,878	\$	11,261
2037	503	\$ 60.59	\$ 30,476	\$	10,939
2038	503	\$ 61.80	\$ 31,086	\$	10,627
2039	503	\$ 63.04	\$ 31,707	\$	10,323
2040	503	\$ 64.30	\$ 32,341	\$	10,028
2041	503	\$ 65.58	\$ 32,988	\$	9,742
2042	503	\$ 66.89	\$ 33,648	\$	9,463
2043	503	\$ 68.23	\$ 34,321	\$	9,193
2044	503	\$ 69.60	\$ 35,007	\$	8,930
2045	503	\$ 70.99	\$ 35,707	\$	8,675
2046	503	\$ 72.41	\$ 36,422	\$	8,427
2047	503	\$ 73.86	\$ 37,150	\$	8,186
2048	503	\$ 75.33	\$ 37,893	\$	7,952
2049	503	\$ 76.84	\$ 38,651	\$	7,725
Totals			\$ 882,957	\$	364,050 NPV(2016\$, 5%)