Q. **Re: p. B-152** Produce the Cost Benefit Analysis referred to in the Project Justification of this explanation.

A. Attached are four economic analyses with varied assumptions on remaining life and cost of a chiller retrofit, as indicated by the equipment supplier.

1) Retrofit: 5 year remaining life; Capital Cost of Retrofit: $150,000:
Over the study period, results in a net benefit of $78,239.

2) Retrofit: 5 year remaining life; Capital Cost of Retrofit: $120,000:
Over the study period, results in a net benefit of $50,589.

3) Retrofit: 10 year remaining life; Capital Cost of Retrofit: $150,000:
Over the study period, results in a net benefit of $32,734.

4) Retrofit: 10 year remaining life; Capital Cost of Retrofit: $120,000:
Over the study period, results in a net benefit of $5,084.

1) Retrofit: 5 year remaining life; Capital Cost of Retrofit: $150,000

Hydro Place - Replacement of Chiller
Economic Analysis
Retrofit - 5 year remaining life; $150,000 Capital Cost

Year	Retrofit Alternative					Replacement Alternative			Net Value of Purchase Over Retrofit		
	CAPITAL ADDITIONS		O&M	TOTAL Retrofit $		CAPITAL ADDITIONS	TOTAL Purchase $				
	Retrofit	Purchase	Additional Energy(3)	$ For Year	CPW Jan-04	Purchase	$ For Year	CPW Jan-04	Net $ For Year	Net CPW Jan-04	CPW Jan-04
2004	0	0	0	0	0	0	0	0	0	0	0
2005	150,000	0	2,024	152,024	140,114	213,000	213,000	196,313	(60,976)	(56,199)	(56,199)
2006	0	0	2,024	2,024	141,834	0	0	196,313	2,024	1,719	(54,480)
2007	0	0	2,024	2,024	143,418	0	0	196,313	2,024	1,585	(52,895)
2008	0	0	2,024	2,024	144,879	0	0	196,313	2,024	1,460	(51,435)
2009	0	0	2,024	2,024	146,225	0	0	196,313	2,024	1,346	(50,089)
2010	0	231,959	0	231,959	288,403	0	0	196,313	231,959	142,178	92,089
2011	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2012	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2013	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2014	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2015	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2016	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2017	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2018	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2019	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2020	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2021	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2022	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2023	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2024	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2025	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2026	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2027	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2028	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2029	0	0	0	0	288,403	0	0	196,313	0	0	92,089
2030	0	0	0	0	288,403	294,954 (2)	294,954	231,679	(294,954)	(35,366)	56,724
2031	0	0	0	0	288,403	0	0	231,679	0	0	56,724
2032	0	0	0	0	288,403	0	0	231,679	0	0	56,724
2033	0	0	0	0	288,403	0	0	231,679	0	0	56,724
2034	0	0	0	0	288,403	0	0	231,679	0	0	56,724
2035	0	269,809 (2)	0	269,809	309,917	0	0	231,679	269,809	21,515	78,239
2036	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2037	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2038	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2039	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2040	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2041	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2042	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2043	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2044	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2045	0	0	0	0	309,917	0	0	231,679	0	0	78,239
2046	0	0	0	0	309,917	0	0	231,679	0	0	78,239
CPW 2004$	138,249	163,693	7,976	**309,917**		231,679	**231,679**		**78,239**		

Discount Rate = 8.5%

(1) Beginning-of-Year Dollars
(2) Final Purchases pro-rated for remaining life.
(3) The Retrofitted Chiller is less efficient than the Replacement Chiller

CPW Retrofit Cost - Jan 2004	**$309,917**
CPW Replacement Cost - Jan 2004	**$231,679**
Net Benefit of Replacement Alternative	**$78,239**

2) Retrofit: 5 year remaining life; Capital Cost of Retrofit: $120,000

Hydro Place - Replacement of Chiller
Economic Analysis
Retrofit - 5 year remaining life; $120,000 Capital Cost

Year	Retrofit Alternative					Replacement Alternative			Net Value of Purchase Over Retrofit		
	CAPITAL ADDITIONS		O&M	TOTAL Retrofit $		CAPITAL ADDITIONS	TOTAL Purchase $				
	Retrofit	Purchase	Additional Energy[3]	$ For Year	CPW Jan-04	Purchase	$ For Year	CPW Jan-04	Net $ For Year	Net CPW Jan-04	CPW Jan-04
2004	0	0	0	0	0	0	0	0	0	0	0
2005	120,000	0	2,024	122,024	112,465	213,000	213,000	196,313	(90,976)	(83,849)	(83,849)
2006	0	0	2,024	2,024	114,184	0	0	196,313	2,024	1,719	(82,130)
2007	0	0	2,024	2,024	115,768	0	0	196,313	2,024	1,585	(80,545)
2008	0	0	2,024	2,024	117,229	0	0	196,313	2,024	1,460	(79,084)
2009	0	0	2,024	2,024	118,575	0	0	196,313	2,024	1,346	(77,738)
2010	0	231,959	0	231,959	260,753	0	0	196,313	231,959	142,178	64,440
2011	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2012	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2013	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2014	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2015	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2016	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2017	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2018	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2019	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2020	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2021	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2022	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2023	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2024	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2025	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2026	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2027	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2028	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2029	0	0	0	0	260,753	0	0	196,313	0	0	64,440
2030	0	0	0	0	260,753	294,954 [2]	294,954	231,679	(294,954)	(35,366)	29,074
2031	0	0	0	0	260,753	0	0	231,679	0	0	29,074
2032	0	0	0	0	260,753	0	0	231,679	0	0	29,074
2033	0	0	0	0	260,753	0	0	231,679	0	0	29,074
2034	0	0	0	0	260,753	0	0	231,679	0	0	29,074
2035	0	269,809 [2]	0	269,809	282,268	0	0	231,679	269,809	21,515	50,589
2036	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2037	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2038	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2039	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2040	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2041	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2042	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2043	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2044	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2045	0	0	0	0	282,268	0	0	231,679	0	0	50,589
2046	0	0	0	0	282,268	0	0	231,679	0	0	50,589
CPW 2004$	110,599	163,693	7,976	**282,268**		231,679	**231,679**		**50,589**		

Discount Rate = 8.5%

(1) Beginning-of-Year Dollars

(2) Final Purchases pro-rated for remaining life.

(3) The Retrofitted Chiller is less efficient than the Replacement Chiller

CPW Retrofit Cost - Jan 2004	**$282,268**
CPW Replacement Cost - Jan 2004	**$231,679**
Net Benefit of Replacement Alternative	**$50,589**

3) Retrofit: 10 year remaining life; Capital Cost of Retrofit: $150,000

Hydro Place - Replacement of Chiller
Economic Analysis
Retrofit - 10 year remaining life; $150,000 Capital Cost

Year	Retrofit Alternative					Replacement Alternative			Net Value of Purchase Over Retrofit		
	CAPITAL ADDITIONS		O&M	TOTAL Retrofit $		CAPITAL ADDITIONS	TOTAL Purchase $				
	Retrofit	Purchase	Additional Energy[3]	$ For Year	CPW Jan-04	Purchase	$ For Year	CPW Jan-04	Net $ For Year	Net CPW Jan-04	CPW Jan-04
2004	0	0	0	0	0	0	0	0	0	0	0
2005	150,000	0	2,024	152,024	140,114	213,000	213,000	196,313	(60,976)	(56,199)	(56,199)
2006	0	0	2,024	2,024	141,834	0	0	196,313	2,024	1,719	(54,480)
2007	0	0	2,024	2,024	143,418	0	0	196,313	2,024	1,585	(52,895)
2008	0	0	2,024	2,024	144,879	0	0	196,313	2,024	1,460	(51,435)
2009	0	0	2,024	2,024	146,225	0	0	196,313	2,024	1,346	(50,089)
2010	0	0	2,024	2,024	147,465	0	0	196,313	2,024	1,241	(48,848)
2011	0	0	2,024	2,024	148,609	0	0	196,313	2,024	1,143	(47,705)
2012	0	0	2,024	2,024	149,663	0	0	196,313	2,024	1,054	(46,651)
2013	0	0	2,024	2,024	150,634	0	0	196,313	2,024	971	(45,680)
2014	0	0	2,024	2,024	151,529	0	0	196,313	2,024	895	(44,784)
2015	0	252,357	0	252,357	254,399	0	0	196,313	252,357	102,870	58,086
2016	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2017	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2018	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2019	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2020	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2021	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2022	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2023	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2024	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2025	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2026	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2027	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2028	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2029	0	0	0	0	254,399	0	0	196,313	0	0	58,086
2030	0	0	0	0	254,399	294,954 [2]	294,954	231,679	(294,954)	(35,366)	22,720
2031	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2032	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2033	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2034	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2035	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2036	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2037	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2038	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2039	0	0	0	0	254,399	0	0	231,679	0	0	22,720
2040	0	188,830 [2]	0	188,830	264,413	0	0	231,679	188,830	10,014	32,734
2041	0	0	0	0	264,413	0	0	231,679	0	0	32,734
2042	0	0	0	0	264,413	0	0	231,679	0	0	32,734
2043	0	0	0	0	264,413	0	0	231,679	0	0	32,734
2044	0	0	0	0	264,413	0	0	231,679	0	0	32,734
2045	0	0	0	0	264,413	0	0	231,679	0	0	32,734
2046	0	0	0	0	264,413	0	0	231,679	0	0	32,734
CPW 2004$	138,249	112,884	13,280	**264,413**		231,679	**231,679**		**32,734**		

Discount Rate = 8.5%

(1) Beginning-of-Year Dollars

(2) Final Purchases pro-rated for remaining life.

(3) The Retrofitted Chiller is less efficient than the Replacement Chiller

CPW Retrofit Cost - Jan 2004	**$264,413**
CPW Replacement Cost - Jan 2004	**$231,679**
Net Benefit of Replacement Alternative	**$32,734**

4) Retrofit: 10 year remaining life; Capital Cost of Retrofit: $120,000

Hydro Place - Replacement of Chiller
Economic Analysis
Retrofit - 10 year remaining life; $120,000 Capital Cost

Year	Retrofit Alternative					Replacement Alternative			Net Value of Purchase Over Retrofit		
	CAPITAL ADDITIONS		O&M	TOTAL Retrofit $		CAPITAL ADDITIONS	TOTAL Purchase $				
	Retrofit	Purchase	Additional Energy[3]	$ For Year	CPW Jan-04	Purchase	$ For Year	CPW Jan-04	Net $ For Year	Net CPW Jan-04	CPW Jan-04
2004	0	0	0	0	0	0	0	0	0	0	0
2005	120,000	0	2,024	122,024	112,465	213,000	213,000	196,313	(90,976)	(83,849)	(83,849)
2006	0	0	2,024	2,024	114,184	0	0	196,313	2,024	1,719	(82,130)
2007	0	0	2,024	2,024	115,768	0	0	196,313	2,024	1,585	(80,545)
2008	0	0	2,024	2,024	117,229	0	0	196,313	2,024	1,460	(79,084)
2009	0	0	2,024	2,024	118,575	0	0	196,313	2,024	1,346	(77,738)
2010	0	0	2,024	2,024	119,816	0	0	196,313	2,024	1,241	(76,498)
2011	0	0	2,024	2,024	120,959	0	0	196,313	2,024	1,143	(75,354)
2012	0	0	2,024	2,024	122,013	0	0	196,313	2,024	1,054	(74,301)
2013	0	0	2,024	2,024	122,984	0	0	196,313	2,024	971	(73,329)
2014	0	0	2,024	2,024	123,879	0	0	196,313	2,024	895	(72,434)
2015	0	252,357	0	252,357	226,749	0	0	196,313	252,357	102,870	30,436
2016	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2017	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2018	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2019	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2020	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2021	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2022	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2023	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2024	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2025	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2026	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2027	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2028	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2029	0	0	0	0	226,749	0	0	196,313	0	0	30,436
2030	0	0	0	0	226,749	294,954 [2]	294,954	231,679	(294,954)	(35,366)	(4,930)
2031	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2032	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2033	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2034	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2035	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2036	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2037	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2038	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2039	0	0	0	0	226,749	0	0	231,679	0	0	(4,930)
2040	0	188,830 [2]	0	188,830	236,763	0	0	231,679	188,830	10,014	5,084
2041	0	0	0	0	236,763	0	0	231,679	0	0	5,084
2042	0	0	0	0	236,763	0	0	231,679	0	0	5,084
2043	0	0	0	0	236,763	0	0	231,679	0	0	5,084
2044	0	0	0	0	236,763	0	0	231,679	0	0	5,084
2045	0	0	0	0	236,763	0	0	231,679	0	0	5,084
2046	0	0	0	0	236,763	0	0	231,679	0	0	5,084
CPW 2004$	110,599	112,884	13,280	**236,763**		231,679	**231,679**		**5,084**		

Discount Rate = 8.5%

(1) Beginning-of-Year Dollars

(2) Final Purchases pro-rated for remaining life.

(3) The Retrofitted Chiller is less efficient than the Replacement Chiller

CPW Retrofit Cost - Jan 2004	**$236,763**
CPW Replacement Cost - Jan 2004	**$231,679**
Net Benefit of Replacement Alternative	**$5,084**