

Exhibit Number: _____
Issue: Plant Capacities
Witness Name: James A. Merciel, Jr.
Type of Exhibit: Rebuttal Testimony
Sponsoring Party: MoPSC Staff
Case Number: WO-2005-0206
Date Testimony Prepared: June 10, 2005

MISSOURI PUBLIC SERVICE COMMISSION
UTILITY OPERATIONS DIVISION
WATER & SEWER DEPARTMENT

REBUTTAL TESTIMONY
OF
JAMES A. MERCIEL, JR.

CASE NO. WO-2005-0206

SILVERLEAF RESORTS, INC. AND ALGONQUIN
WATER RESOURCES OF MISSOURI, LLC

Jefferson City, Missouri
June 2005

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

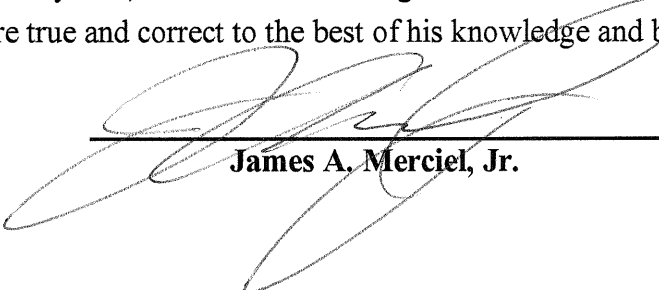
In the Matter of the Joint Application of)
Silverleaf Resorts, Inc. and Algonquin Water)
Resources of Missouri, LLC for Authority for)
Silverleaf Resorts, Inc. to Sell Certain Assets)
to Algonquin Water Resources of Missouri,)
LLC and, in Connection Therewith, Certain)
Other Related Transactions)

Case No. WO-2005-0206

AFFIDAVIT OF JAMES A. MERCIEL, JR.

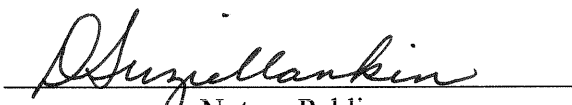
STATE OF MISSOURI)
) ss
COUNTY OF COLE)

James A. Merciel, Jr., of lawful age, on his oath states: that he has participated in the preparation of the following written rebuttal testimony in question and answer form, consisting of seven (7) pages and three (3) schedules, to be presented in this case; that the answers in the testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.



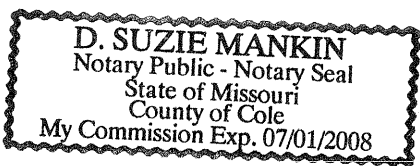
James A. Merciel, Jr.

Subscribed and sworn to before me this 10th day of June 2005.



Notary Public

My Commission Expires: 07/01/2008



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TESTIMONY OF JAMES A. MERCIEL, JR.**

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1 **REBUTTAL TESTIMONY**

2 **OF**

3 **JAMES A. MERCIEL, JR.**

4 **Case No. WO-2005-0206**

5 **INTRODUCTION**

6 Q. Please state your name and business address.

7 A. James A. Merciel, Jr., P. O. Box 360, Jefferson City, Missouri, 65102.

8 Q. By whom are you employed and in what capacity?

9 A. I am employed by the Missouri Public Service Commission ("Commission") as a
10 Utility Regulatory Engineering Supervisor, in the Water and Sewer Department ("W/S
11 Department").

12 Q. Please describe your education and work experience.

13 A. I graduated from the University of Missouri at Rolla in 1976 with a Bachelor of
14 Science degree in Civil Engineering. I am a Registered Professional Engineer in the State of
15 Missouri. I worked for a construction company in 1976 as an engineer and surveyor, and have
16 worked for the Commission in the W/S Department since 1977.

17 Q. What is the purpose of your testimony?

18 A. The purpose is to present testimony regarding plant capacity, and capacity used at
19 the three service areas that are presently owned and operated by Silverleaf Resorts, Inc.
20 (Silverleaf), and which are included in the water and sewer utility assets that Silverleaf is
21 proposing to sell to Algonquin Water Resources of Missouri, LLC (Algonquin).

1 **GENERAL DESCRIPTION OF FACILITIES**

2 Q. Would you please describe, generally, the systems that are involved?

3 A. Yes. Silverleaf owns and operates water and sewer systems at two locations, the
4 Ozark Mountain Resort development near Kimberling City in Stone County, and the Timber
5 Creek Resort development near De Soto in Jefferson County. Silverleaf also owns and operates
6 a third water system in the Holiday Hills Resort development near Branson in Taney County.
7 The service areas for each of these developments are generally comprised of residential-type
8 structures, mostly condominiums, and a few commercial customers that are, for the most part,
9 subdivision amenities. The sewer systems each consist of a collection system with a wastewater
10 treatment facility. The water systems consist of deep wells, storage tanks, pumps, distribution
11 piping, and customer service lines with meters.

12 **WATER SYSTEM CAPACITY EVALUATION – OVERVIEW**

13 Q. Would you briefly describe how the capacity of a water system is evaluated?

14 A. Yes. In larger systems, particularly those in municipalities, there are
15 considerations as to flow through the longer distances in the distribution system, and strategic
16 locations for storage tanks due to distribution flow, even if very large pipes are in place.
17 However, for purposes of this case I wish to focus on smaller, subdivision-size systems, where
18 distribution flow is not as critical as there are not great distances. For most small water systems,
19 the two major components that need to be studied are: (1) the source of supply, which might be
20 one or more wells, or one or more water treatment facilities; and (2) storage tank volume.

21 Q. What must be studied regarding the source of supply?

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1 A. On all water systems, the source needs to be of sufficient capacity to produce
2 enough water for the days where customers use the most water, referred to as “maximum day.”
3 “Average day” is the daily water usage that is determined by dividing the annual water
4 production by 365 days, and maximum day usage is typically about 1.5 times average day. If the
5 source consists of multiple facilities, such as two or more wells, then the system should still be
6 able to produce an adequate volume of water for maximum day with the largest facility out of
7 service.

8 Although larger municipal-size water treatment facilities usually run 24 hours per day
9 with the operator regulating flow anticipating the daily demand, most small systems, and all
10 single-well systems, only run while the water is being used by customers, and do not run
11 continuously. So beyond the need to meet maximum day, the source of supply for most small
12 systems also need to have sufficient capacity to meet the times of day when customers are using
13 the most water, called “peak hour.” In a community, these peaks occur at wake up time in the
14 morning, then again at supper time and into the evening. However, on many systems, storage is
15 also used to meet these peak hour times. Peak hour flow is typically approximately 2.5 times
16 average day flow.

17 Q. Would you please discuss storage capacity?

18 A. Yes. Storage volume on a small system is needed for four purposes. First, it
19 provides what is called “contact time” for chlorine to work as a disinfectant agent; second, it
20 supplements the source production during the peak hour times; third, it provides a reserve for
21 fire-fighting demand; and fourth, it is usable if the source is unavailable due to a failure or during

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1 a repair. This last point is most important on a single-well system. On single-well systems,
2 storage volume should be sufficient for the average day demand, because replacing a well pump
3 usually takes all day. In such an emergency situation, customers could also be asked to conserve
4 water by not doing things like laundry, washing cars, and sprinkling lawns, in order to leave
5 enough water for drinking, cooking and bathing.

6 Q. Is this the methodology you used to evaluate the Silverleaf systems?

7 A. Yes, but with some modifications. Most water systems serve communities or
8 residential subdivisions near communities where the customers live and work. But Silverleaf, as
9 well as a few other water and sewer utilities, provide service in what could be classified as
10 recreational developments. Some customers probably live in the areas full time, but many of the
11 homes and condominiums are second homes and rental units for vacations. Thus, these types of
12 subdivisions are the busiest during summer weekends and holidays, and not very busy during the
13 winter. This means, among perhaps other qualities, that peak day is much greater than the 1.5
14 multiplier applied to average day, but more importantly in my opinion, the system needs to be
15 able to meet peak day instead of average day during a source of supply failure. The reason for
16 this is that as a recreational development, the customers come to the area expecting normal use
17 of the utilities, but that normal use results in a peak day. Further, the peak day can easily occur
18 over a holiday weekend, and further yet, water systems can and do fail during holiday weekends
19 when emergency repair service availability is not as certain as during a normal work week or
20 even a normal weekend.

1 **EXCESS PLANT CAPACITY**

2 Q. Do you have an opinion regarding excess plant capacity at any of the Silverleaf
3 systems?

4 A. Yes, I believe all of the Silverleaf water systems have excess capacity, based on
5 current customer levels. I do not consider the sewer systems at Ozark Mountain and Timber
6 Creek to have excess capacity because they are operated at capacity and even over capacity for a
7 few days out of the year.

8 Q. What are the levels of excess plant capacity?

9 A. My calculations are shown on Attachments 1 through 3 for, respectively, Holiday
10 Hills, Timber Creek, and Ozark Mountain. The first page of each attachment shows maximum
11 day water usages for selected time periods, with this data being taken from Silverleaf's
12 operations records. The second page goes through an evaluation of well and storage capacity
13 used, which is as described above in this testimony. The percentages at the bottom of page 2 of
14 each attachment represent that portion of the existing water supply and storage plant components
15 that the Staff believes should currently be considered excess capacity. For Silverleaf's two-well
16 systems, the evaluations include studies of the systems as both single- and two-well systems,
17 because of the difference in storage requirements.

18 Q. How do you believe the excess capacity portion of plant should be treated for
19 ratemaking purposes?

20 A. Such excess capacity should be excluded from the calculation of the ratemaking
21 rate base used in determining the utility's overall cost of providing service. It should be noted,

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1 however, that if and when additional customers connect to these systems, then it would be
2 appropriate to include proportionately more plant in the calculation of the ratemaking rate base
3 used in determining the utility's overall cost of providing service.

4 Q. Why do you believe this proposed ratemaking treatment is appropriate?

5 A. Generally, Silverleaf, from an overall corporate viewpoint, constructed these
6 water systems as a developer for the purpose of its resort business, and to a great extent the
7 systems were sized for an anticipated level of development that has not yet occurred quite as
8 planned. As a risk that Silverleaf took as a developer, the Staff does not believe it is appropriate
9 for the ratepayers to pay for the excess capacity, even if Algonquin or any other utility assumes
10 ownership of these systems. In the case of Holiday Hills, Silverleaf recently placed the second
11 well into service. In my opinion, that system, when operated as a single well system, had
12 inadequate storage because it did not have a one day supply plus a needed fire reserve. The
13 choice would have been to construct additional storage, or place another well into service, as
14 either project would result in an adequate water system; however, Silverleaf did both.

15 Q. Does this issue directly affect the determination of whether the proposed sale of
16 Silverleaf's utility assets to Algonquin meets the applicable standard of not being detrimental to
17 the public interest?

18 A. No, it does not. However, I do believe that Algonquin, and the Commission,
19 should be fully aware of the excess capacity issue, and the position that the Staff would take on
20 that issue in a rate case.

1 **SUMMARY**

2
3 Q. Would you please summarize your testimony?

4 A. Yes. It is my opinion that there is currently excess capacity associated with the
5 involved water systems, the investment in which current customers should not bear the financial
6 burden. The specific quantifications of this excess capacity, as is shown on the attachments to
7 this testimony, are based on customer and investment levels at the time of review for this case,
8 and in the next rate case the Staff would take a similar position using the appropriate investment
9 and customer levels for that time. However, it is also my opinion that this issue does not directly
10 affect the determination of whether the proposed sale of Silverleaf's utility assets to Algonquin
11 meets the applicable standard of not being detrimental to the public interest.

12 Q. Does this conclude your prepared Rebuttal Testimony?

13 A. Yes.

Holiday Hills Peak Day
 WO-2005-0206

data taken from Silverleaf operations records

w = weekend

f = Friday

selected days - high use

	day pump kgal	ave gpm for day	est peak hr gpm
9/24/2003	214	149	238
9/14/2003	206 w	143	229
9/7/2003	216 w	150	240
9/1/2003	203 w	141	226
8/30/2003	223 f	155	248
8/27/2003	227	158	252
8/26/2003	214	149	238
8/25/2003	234 w	163	260
8/23/2003	263 f	183	292
8/20/2003	238	165	264
8/19/2003	238	165	264
8/18/2003	210 w	146	233
8/17/2003	212 w	147	236
8/16/2003	270 f	188	300
8/15/2003	201	140	223
8/14/2003	212	147	236
8/13/2003	223	155	248
8/12/2003	227	158	252
8/11/2003	227 w	158	252
8/10/2003	234 w	163	260
8/9/2003	260	181	289
8/5/2003	324	225	360
8/3/2003	203 w	141	226
8/2/2003	223 w	155	248
7/31/2003	235	163	261
7/28/2003	257 w	178	286
7/24/2003	208	144	231
7/22/2003	226	157	251
7/17/2003	243	169	270
7/16/2003	224	156	249
7/14/2003	280 w	194	311
7/12/2003	274 f	190	304

Silverleaf 6/8/2005 Holiday Hills
 WO-2005-0206 settlement proposal
 J. Merciel

water system capacities based on peak day
 gpm = gallons per minute
 kgpd = thousand gallons per day
 100,000 gallons per day = 69 gallons per minute

customers	466		
system in place:		capacity gpm	storage x1000
	Well #1	396	117 Ground plus hydro
	Well #2	705	117 Ground plus hydro
			234 kgal
usage:			
peak day	324 kgpd	8/5/03	695 gallons per customer pr day
est peak hr	518 kgpd =	360 gpm	

SOURCE CAPACITY	324 kgpd needed	1,101	Gallons per minute absolute available
Two well system			
Largest pump out	475 kgpd available	68.2% of Well 1	38.3% Well 2
20 hour basis run time			
Combined well capacity	1,321 kgpd	Combined 2-well capacity needed	49.0%
Single well system			
14 hr basis well run time=			97.4%
peak hr	360 gpm	well 1 capacity needed	90.9%

STORAGE	234,000 gallons current available	current storage inadequate for single well ops
Chlorine contact	30 min =	11,880 gal well 1
		21,150 gal well 2
fire	2 hr @ 250 gpm	30,000 gal
single well - 1 day storage needed		324,000 gal
fire		30,000
		354,000 needed
		increase to
		151.3%
two well system		
for one well out of service		
20 hour basis run time		
		68.2% of Well 1
		270 gpm
	estimated peak flow	360 gpm
	for	3 hours
	storage needed for peak hour	16,200 gallons
	chlorine contact	33,030
	fire reserve	30,000 gallons
	total storage needed	79,230 gallons
		33.9% capacity

summary - percentages of plant held for future use

for single well system	use all of Well 1 (or hold	2.6%)
	100% of well 2 held for future use	
	existing storage - INCREASE by	51.3%
for two well system	well 1	31.8%
	well 2	61.7%
	OR combine wells, hold	51.0%
	existing storage	66.1%

FROM A RELIABILITY STANDPOINT, the two well system is better

Timber Creek
WO-2005-0206

data taken from Silverleaf operations records

w = 3 day weekend usage (need to divide by 3)

w* = 4 day including weekend

selected days - high use
day pump
kgal

ave gpm for day

est peak hr gpm

7/6/04	132	w* 4day	22.99	36.78
7/7/04	36		24.79	39.67
7/8/04	21		14.58	23.33
7/9/04	38		26.25	42.00
7/12/04	115	w	26.64	42.63
7/13/04	38		26.25	42.00
7/14/04	38		26.32	42.11
7/19/04	139	w	32.11	51.37
7/21/04	58		40.28	64.44
7/22/04	81		56.39	90.22
7/23/04	36		25.28	40.44
7/26/04	109	w	25.28	40.44
7/28/04	37		25.97	41.56

Silverleaf 5/24/2005
 WO-2005-0206 settlement proposal
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Timber Creek

water system capacities based on peak day

gpm = gallons per minute
 kgpd = thousand gallons per day
 100,000 gallons per day = 69 gallons per minute

customers	194		
system in place:		capacity gpm	storage x1000
	Well #1	270	213 Ground plus hydro
	Well #2	370	Ground plus hydro
			213 kgal
usage:			
peak day	81 kgpd	7/19/04	418 gallons per customer
est peak hr	130 kgpd =	90 gpm	

SOURCE CAPACITY	81 gpd needed	640 Gallons per minute absolute available
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Two well system			
One pump out	324 gpd	25.0% of Well 1	18.2% Well 2
20 hour basis run time			
Combined well capacity		768 Combined 2-well capacity needed	21.1%
Single well system			
14 hr basis well run time=			35.7%
peak hr	90 gpm	well 1 capacity needed	33.3%

STORAGE	213,000 current available
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Chlorine contact	30 min =	8,100 gal well 1	
		11,100 gal well 2	
fire	2 hr @	250 gpm	30,000 gal
single well - 1 day storage needed			
fire	2 hr @	250 gpm	30,000 gal
		111,000 total needed	52.1% capacity
two well system			
for one well out of service			
20 hour basis run time			
		25.0% of Well 1	
		68 gpm	
		estimated peak flow	90 gpm
		for	3 hours
		storage needed for peak hour	4,050 gallons
		chlorine contact	19,200
		fire reserve	30,000 gallons
		total storage needed	53,250 gallons
			25.0% capacity

summary - percentages of plant held for future use

for single well system	well 1	64.3%
	100% of well 2 held for future use	
	storage	47.9%
for two well system	well 1	75.0%
	well 2	81.8%
	OR combine wells, hold	78.9%
	storage	75.0%

FROM A RELIABILITY STANDPOINT, the two well system is better

Ozark Mountain
WO-2005-0206

data taken from Silverleaf operations records

w = weekend
f = Friday

selected days - high use	day pump kgal	ave gpm for day	est peak hr gpm
3/16/2004	84	58.33	93.33
3/17/2004	83	57.64	92.22
3/18/2004	88	61.11	97.78
3/19/2004	92	63.89	102.22
3/20/2004	95	65.97	105.56
3/21/2004	98	68.06	108.89
3/22/2004	97	67.36	107.78
3/23/2004	96	66.67	106.67
3/24/2004	97	67.36	107.78
3/25/2004	95	65.97	105.56
3/26/2004	104	72.22	115.56
3/27/2004	112	77.78	124.44
3/28/2004	114	79.17	126.67
3/29/2004	106	73.61	117.78
3/30/2004	98	68.06	108.89

Silverleaf 5/24/2005
 WO-2005-0206 settlement proposal
 J. Merciel

Ozark Mountain

water system capacities based on peak day

gpm = gallons per minute
 kgpd = thousand gallons per day
 100,000 gallons per day = 69 gallons per minute

customers	249		
system in place:	Well #1	capacity gpm	storage x1000
		398	100 Ground plus hydro
			100 kgal
usage:			
peak day	114 kgpd	3/28/94	458 gallons per customer
est peak hr	182 kgpd =	127 gpm	

SOURCE CAPACITY	114 gpd needed	398 Gallons per minute absolute available
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Single well system
 14 hr basis well run time= 34.1%
 peak hr 127 gpm well 1 capacity needed 31.8%

STORAGE	100,000 current available	current storage inadequate for single well ops
Chlorine contact	30 min =	11,940 gal well 1
fire	2 hr @ 250 gpm	- gal well 2
		30,000 gal
single well - 1 day storage needed		114,000 gal
fire		30,000
		144,000 total - increase to 144.0%

summary - percentages of plant held for future use

for single well system	well 1	65.9%
	existing storage - INCREASE by	44.0%