

MEMORANDUM

Date: December 4, 2017
To: Shelley Keen
From: Michele Edl
Re: reconsideration of annual diversion volume for License 63-33245

A timely petition for reconsideration of License No. 63-33245 has prompted a second look at the volume recommendations.

In the petition, the petitioner SPF Water Engineering (SPF), requested that the volume authorized for diversion under right 63-33245 be 98.5 AF and that the combined volume authorized under rights 63-12342 and 63-33245 be limited to 223.6 AF.

In my first recommendations of volumes for License No. 63-33245, I had assumed that the system had some form of minimal controls and that the operation would vary depending on the heating or cooling demand. In fact, this system runs continuously without considering weather conditions. My original approach to the volume recommendations was based on operation efficiency and weather parameters and is not a good fit for a system like this one, that is uncontrolled.

The volumes requested by SPF in the petition, represent 275 days of continuous operation of the cool-water system at the peak flow rate without consideration of beneficial use. Idaho Code requires that a license represent the quantity of water beneficially used.

42-219. Issuance of license — Priority. (1) Upon receipt by the department of water resources of all the evidence in relation to such final proof, it shall be the duty of the department to carefully examine the same, and if the department is satisfied that the law has been fully complied with and that the water is being used at the place claimed and for the purpose for which it was originally intended, the department shall issue to such user or users a license confirming such use. Such license shall state the name and post-office address of such user, the purpose for which such water is used and the quantity of water which may be used, which in no case shall be an amount in excess of the amount that has been beneficially applied. ...

A volume recommendation based on continuous operation at the maximum rate, as proposed by SPF, does not address beneficial use. Only minimal information and no analysis of temperatures with respect to beneficial use was provided by SPF.

I examined and analyzed the temperature data for Boise. The volumes for each use and the total volume have been recalculated. Based on Beneficial Use Examination Rules 035.j., which states in part:

Annual diversion volumes for heating and cooling uses may be adjusted to account for documented weather conditions during any single heating or cooling season from among the fifty (50) years immediately prior to submitting proof of beneficial use for the permit.

My recommendations are now based on the one year, within the last fifty (50) years, that recorded the most Cooling Degree Days (CDD). That year was 2003 with a record total of 1276.0 CDDs as seen at the Boise Air Terminal, Idaho (co-op station #101022). The operator of the two systems which control climate in the Union Block building switches from the cool-water system to the LGT system in the fall when the outside temperatures are in the 20's. I assumed that the switch back to the cool water system

would occur in the spring when the outside temperatures are above the 20's.

I used a simple day count method to calculate the revised volume. A copy of my spreadsheet is attached to this memo. I based my analysis on daily historical weather data from 2003 for the Boise Airport, (station KBOI). The data was downloaded from the Weather Underground website <https://www.wunderground.com>. I assumed that the balance point temperature for the Union Block Building was at or near 65° F. Which meant that the 18 days of 2003 whose temperatures were at or near 65° F were excluded from the counts because no beneficial heating or cooling use of water would have occurred. A total of 271 days in 2003 would have required at least two degrees of cooling or heating from the cool-water system.

271 days of continuous operation at the max diversion rate yields 220.4 AF of water used ($0.41 \text{ cfs} \times 1.9835 \times 271 \text{ days} = 220.38 \text{ AF}$). And 220.4 AF of water would be needed to meet the supplemental heating and cooling requirements of this building in another year like 2003. 125 AF has already been authorized for this system through Water Right License 63-12342, leaving 95.38 AF to be covered by right 63-33245

The revised volume recommendations for License No. 63-33245 are:

Heating use volume = 95.4 AF

Cooling use volume = 95.4 AF

Total volume = 95.4 AF

Boise, ID

Boise Air Term

© 5:01 PM MST on November 30, 2017 (GMT -0700)

Weather History for KBOI - January, 2003

From:

January

1

2003

To:

December

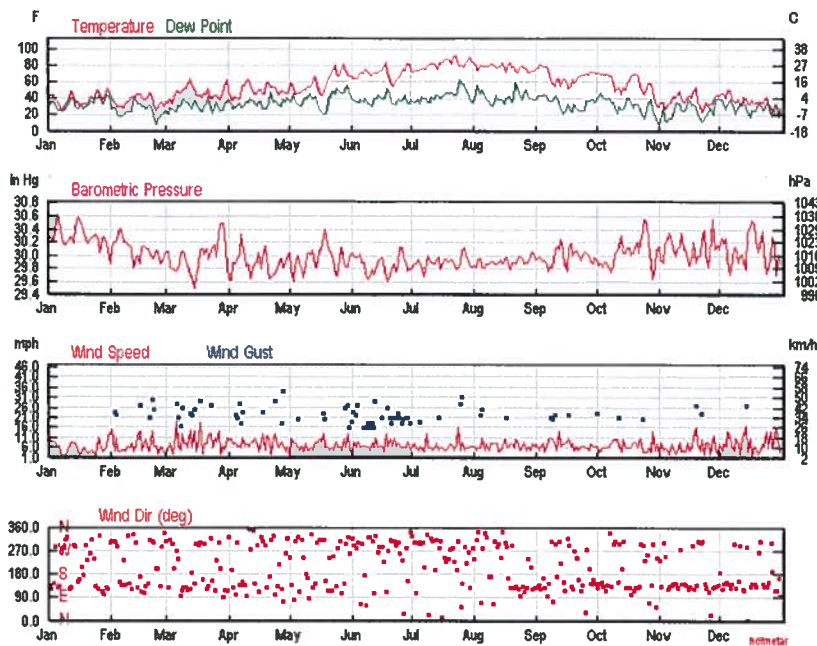
31

2003

Get History

Daily	Weekly	Monthly	Custom				
				Max	Avg	Min	Sum
Temperature							
Max Temperature				108 °F	66 °F	28 °F	
Mean Temperature				92 °F	55 °F	22 °F	
Min Temperature				77 °F	44 °F	17 °F	
Degree Days							
Heating Degree Days (base 65)				42	14	0	4995
Cooling Degree Days (base 65)				26	3	0	1256
Growing Degree Days (base 50)				42	10	0	3595
Dew Point							
Dew Point				66 °F	34 °F	-2 °F	
Precipitation							
Precipitation				0.68 in	0.03 in	0.00 in	9.28 in
Snowdepth							
Wind							
Wind				38 mph	7 mph	0 mph	
Gust Wind				48 mph	23 mph	16 mph	
Sea Level Pressure							
Sea Level Pressure				30.68 in	30.00 in	29.38 in	

Custom Weather History Graph



Search for Another Location

Airport or City:

KBOI

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

January

1

Submit

Weather History & Observations

2003	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Visibility (mi)			Wind (mph)			Precip. (in)	Events
	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
Jan	39	34	28	30	28	27	92	76	60	30.39	30.33	30.23	10	10	10	16	7	-	0.00	
	46	41	37	34	31	27	79	67	57	30.33	30.26	30.16	10	10	10	16	11	-	0.00	
	51	44	37	39	36	34	89	76	58	30.33	30.26	30.15	10	10	8	18	9	-	0.00	Rain
	51	43	35	39	36	34	100	79	61	30.27	30.20	30.13	10	9	2	17	9	16	0.00	
	45	38	30	36	32	27	100	83	60	30.62	30.40	30.21	10	7	0	20	8	-	0.00	Fog
	45	36	28	31	28	25	89	73	52	30.68	30.62	30.57	10	10	10	14	6	-	0.00	
	42	34	27	29	26	23	92	78	58	30.61	30.53	30.43	10	9	4	14	7	-	0.00	
	30	26	21	28	25	20	100	95	85	30.42	30.26	30.13	7	2	0	9	1	-	0.00	Fog, Snow
	30	26	23	27	24	21	100	92	85	30.27	30.18	30.12	7	3	0	7	2	-	0.00	Fog, Snow
	37	32	28	31	28	26	100	91	76	30.23	30.17	30.10	9	3	2	7	2	-	0.00	

	high greater than 65 cool cool		Weather History & Observations for KBOI					
high less than 65	low less than 30		2003	Temp. (°F)			Calc'd HDD65	Calc'd CDD65
cool heat	LTG only	actual ops	Jan	high	avg	low	=65-((high+low)/2)	=((high+low)/2)-65
* 								

		2003	Temp. (°F)					
		Feb	high	avg	low			
*		*	<u>1</u>	53	44	34	21.5	-21.5
*		*	<u>2</u>	46	40	33	25.5	-25.5
	*	*	<u>3</u>	42	35	28	30	-30
	*	*	<u>4</u>	39	34	27	32	-32
	*	*	<u>5</u>	37	30	23	35	-35
	*	*	<u>6</u>	37	30	23	35	-35
	*	*	<u>7</u>	37	30	23	35	-35
	*	*	<u>8</u>	37	29	21	36	-36
	*	*	<u>9</u>	45	33	21	32	-32
	*	*	<u>10</u>	46	36	26	29	-29
	*	*	<u>11</u>	48	37	26	28	-28
*		*	<u>12</u>	53	42	30	23.5	-23.5
*		*	<u>13</u>	43	40	37	25	-25
*		*	<u>14</u>	48	42	35	23.5	-23.5
*		*	<u>15</u>	55	45	35	20	-20
*		*	<u>16</u>	52	46	37	20.5	-20.5
*		*	<u>17</u>	48	42	37	22.5	-22.5
*		*	<u>18</u>	46	39	32	26	-26
*		*	<u>19</u>	48	39	30	26	-26
*		*	<u>20</u>	48	42	35	23.5	-23.5
*		*	<u>21</u>	52	47	42	18	-18
*		*	<u>22</u>	48	42	32	25	-25
	*	*	<u>23</u>	41	32	24	32.5	-32.5
	*	*	<u>24</u>	34	26	19	38.5	-38.5
	*	*	<u>25</u>	39	29	19	36	-36
	*	*	<u>26</u>	44	34	23	31.5	-31.5
	*	*	<u>27</u>	45	36	27	29	-29
	*	*	<u>28</u>	39	31	23	34	-34

		2003	Temp. (°F)				
		Mar	high	avg	low		
*	*	<u>1</u>	45	36	26	29.5	-29.5
	*	<u>2</u>	48	36	25	28.5	-28.5
*		<u>3</u>	46	39	32	26	-26
	*	<u>4</u>	41	34	28	30.5	-30.5
*	*	<u>5</u>	51	40	28	25.5	-25.5
		<u>6</u>	53	48	43	17	-17
*		<u>7</u>	53	48	42	17.5	-17.5
		<u>8</u>	55	47	39	18	-18
*		<u>9</u>	52	48	44	17	-17
		<u>10</u>	59	51	43	14	-14
*		<u>11</u>	61	52	42	13.5	-13.5
	*	<u>12</u>	66	56	46	9	-9
*	*	<u>13</u>	70	64	57	1.5	-1.5
		<u>14</u>	64	57	50	8	-8
*		<u>15</u>	59	52	44	13.5	-13.5
		<u>16</u>	54	46	37	19.5	-19.5
*		<u>17</u>	57	44	30	21.5	-21.5
		<u>18</u>	55	44	33	21	-21
*	*	<u>19</u>	57	42	28	22.5	-22.5
		<u>20</u>	55	47	39	18	-18
*		<u>21</u>	54	46	37	19.5	-19.5
		<u>22</u>	57	52	48	12.5	-12.5
*		<u>23</u>	48	41	34	24	-24
	*	<u>24</u>	52	40	28	25	-25
*		<u>25</u>	46	44	41	21.5	-21.5
		<u>26</u>	44	44	44	21	-21
*		<u>27</u>	46	40	34	25	-25
	*	<u>28</u>	50	38	27	26.5	-26.5
*		<u>29</u>	57	46	34	19.5	-19.5
	*	<u>30</u>	69	53	37	12	-12
	*	<u>31</u>	72	62	51	3.5	-3.5

			2003	Temp. (°F)				
			Apr	high	avg	low		
*			<u>1</u>	55	49	43	16	-16
*			<u>2</u>	46	40	35	24.5	-24.5
*			<u>3</u>	42	37	32	28	-28
*			<u>4</u>	50	42	33	23.5	-23.5
*			<u>5</u>	46	40	33	25.5	-25.5
*			<u>6</u>	44	38	32	27	-27
*			<u>7</u>	55	42	30	22.5	-22.5
	*		<u>8</u>	70	53	37	11.5	-11.5
	*		<u>9</u>	70	56	42	9	-9
	*		<u>10</u>	77	60	46	3.5	-3.5
	*		<u>11</u>	70	61	53	3.5	-3.5
	*		<u>12</u>	66	56	46	9	-9
*			<u>13</u>	59	51	45	13	-13
*			<u>14</u>	51	46	41	19	-19
*			<u>15</u>	57	46	35	19	-19
*			<u>16</u>	57	49	41	16	-16
*			<u>17</u>	60	50	41	14.5	-14.5
*			<u>18</u>	55	45	35	20	-20
*			<u>19</u>	61	45	30	19.5	-19.5
	*		<u>20</u>	73	58	44	6.5	-6.5
	*		<u>21</u>	66	58	51	6.5	-6.5
*			<u>22</u>	64	54	46	10	-10
*			<u>23</u>	64	54	45	10.5	-10.5
	*		<u>24</u>	69	54	43	9	-9
*			<u>25</u>	55	49	42	16.5	-16.5
*			<u>26</u>	50	44	39	20.5	-20.5
*			<u>27</u>	60	48	37	16.5	-16.5
*			<u>28</u>	59	48	39	16	-16
*			<u>29</u>	57	47	39	17	-17
*			<u>30</u>	52	46	42	18	-18

			2003	Temp. (°F)				
			May	high	avg	low		
*			<u>1</u>	63	50	39	14	-14
	*		<u>2</u>	70	58	46	7	-7
*			<u>3</u>	57	52	48	12.5	-12.5
*			<u>4</u>	53	46	42	17.5	-17.5
*			<u>5</u>	55	45	37	19	-19
*			<u>6</u>	59	47	37	17	-17
*			<u>7</u>	55	47	39	18	-18
*			<u>8</u>	60	48	37	16.5	-16.5
*			<u>9</u>	55	50	44	15.5	-15.5
*			<u>10</u>	63	51	39	14	-14
*			<u>11</u>	61	53	46	11.5	-11.5
*			<u>12</u>	62	54	48	10	-10
	*		<u>13</u>	71	56	42	8.5	-8.5
no BU	*		<u>14</u>	80	66	51	-0.5	0.5
	*		<u>15</u>	73	62	50	3.5	-3.5
*			<u>16</u>	60	50	39	15.5	-15.5
*			<u>17</u>	55	46	36	19.5	-19.5
*			<u>18</u>	55	44	33	21	-21
*			<u>19</u>	64	48	33	16.5	-16.5
	*		<u>20</u>	73	58	43	7	-7
	*		<u>21</u>	75	62	48	3.5	-3.5
	*		<u>22</u>	86	70	53	-4.5	4.5
	*		<u>23</u>	90	72	55	-7.5	7.5
	*		<u>24</u>	97	80	64	-15.5	15.5
	*		<u>25</u>	79	68	60	-4.5	4.5
	*		<u>26</u>	80	67	55	-2.5	2.5
	*		<u>27</u>	89	72	57	-8	8
	*		<u>28</u>	99	82	66	-17.5	17.5
	*		<u>29</u>	95	76	60	-12.5	12.5
	*		<u>30</u>	78	68	62	-5	5
no BU	*		<u>31</u>	78	66	54	-1	1

			2003	Temp. (°F)				
			Jun	high	avg	low		
no BU	*		<u>1</u>	80	66	52	-1	1
no BU	*		<u>2</u>	77	64	52	0.5	-0.5
no BU	*		<u>3</u>	80	64	48	1	-1
no BU	*		<u>4</u>	82	64	48	0	0
	*		<u>5</u>	84	69	54	-4	4
	*		<u>6</u>	88	72	57	-7.5	7.5
	*		<u>7</u>	84	70	57	-5.5	5.5
	*		<u>8</u>	93	75	59	-11	11
	*		<u>9</u>	87	72	57	-7	7
	*		<u>10</u>	84	70	55	-4.5	4.5
no BU	*		<u>11</u>	81	66	51	-1	1
	*		<u>12</u>	88	70	54	-6	6
	*		<u>13</u>	84	72	63	-8.5	8.5
	*		<u>14</u>	86	70	55	-5.5	5.5
	*		<u>15</u>	90	72	55	-7.5	7.5
	*		<u>16</u>	89	73	57	-8	8
	*		<u>17</u>	93	75	57	-10	10
	*		<u>18</u>	100	84	69	-19.5	19.5
	*		<u>19</u>	84	72	59	-6.5	6.5
	*		<u>20</u>	70	62	55	2.5	-2.5
	*		<u>21</u>	69	57	46	7.5	-7.5
	*		<u>22</u>	66	56	46	9	-9
	*		<u>23</u>	75	60	44	5.5	-5.5
no BU	*		<u>24</u>	82	63	46	1	-1
no BU	*		<u>25</u>	82	65	48	0	0
	*		<u>26</u>	86	70	55	-5.5	5.5
	*		<u>27</u>	91	75	59	-10	10
	*		<u>28</u>	91	74	59	-10	10
	*		<u>29</u>	100	81	62	-16	16
	*		<u>30</u>	91	81	71	-16	16

			2003	Temp. (°F)				
			Jul	high	avg	low		
*			<u>1</u>	89	74	59	-9	9
*			<u>2</u>	87	71	55	-6	6
*			<u>3</u>	90	74	57	-8.5	8.5
*			<u>4</u>	91	74	57	-9	9
*			<u>5</u>	91	74	57	-9	9
*			<u>6</u>	91	75	59	-10	10
*			<u>7</u>	96	77	59	-12.5	12.5
*			<u>8</u>	87	75	63	-10	10
*			<u>9</u>	97	79	62	-14.5	14.5
*			<u>10</u>	100	81	62	-16	16
*			<u>11</u>	102	82	64	-18	18
*			<u>12</u>	102	82	64	-18	18
*			<u>13</u>	91	78	66	-13.5	13.5
*			<u>14</u>	91	75	59	-10	10
*			<u>15</u>	100	83	66	-18	18
*			<u>16</u>	100	82	64	-17	17
*			<u>17</u>	102	83	66	-19	19
*			<u>18</u>	102	86	70	-21	21
*			<u>19</u>	102	86	70	-21	21
*			<u>20</u>	102	87	72	-22	22
*			<u>21</u>	100	82	64	-17	17
*			<u>22</u>	108	89	71	-24.5	24.5
*			<u>23</u>	107	92	77	-27	27
*			<u>24</u>	95	83	71	-18	18
*			<u>25</u>	91	78	66	-13.5	13.5
*			<u>26</u>	93	80	64	-13.5	13.5
*			<u>27</u>	91	76	61	-11	11
*			<u>28</u>	99	82	66	-17.5	17.5
*			<u>29</u>	102	85	68	-20	20
*			<u>30</u>	106	90	73	-24.5	24.5
*			<u>31</u>	100	84	68	-19	19

		2003	Temp. (°F)				
		Aug	high	avg	low		
*		<u>1</u>	100	84	68	-19	19
*		<u>2</u>	90	80	72	-16	16
*		<u>3</u>	82	74	66	-9	9
*		<u>4</u>	91	77	64	-12.5	12.5
*		<u>5</u>	98	80	63	-15.5	15.5
*		<u>6</u>	91	78	64	-12.5	12.5
*		<u>7</u>	91	78	64	-12.5	12.5
*		<u>8</u>	93	78	64	-13.5	13.5
*		<u>9</u>	98	80	64	-16	16
*		<u>10</u>	100	82	66	-18	18
*		<u>11</u>	95	80	66	-15.5	15.5
*		<u>12</u>	89	76	62	-10.5	10.5
*		<u>13</u>	93	76	62	-12.5	12.5
*		<u>14</u>	96	78	62	-14	14
*		<u>15</u>	97	84	72	-19.5	19.5
*		<u>16</u>	87	76	66	-11.5	11.5
*		<u>17</u>	87	72	57	-7	7
*		<u>18</u>	93	77	63	-13	13
*		<u>19</u>	102	84	68	-20	20
*		<u>20</u>	91	77	63	-12	12
*		<u>21</u>	89	78	66	-12.5	12.5
*		<u>22</u>	84	74	63	-8.5	8.5
*		<u>23</u>	84	72	59	-6.5	6.5
*		<u>24</u>	91	76	61	-11	11
*		<u>25</u>	98	80	64	-16	16
*		<u>26</u>	86	77	66	-11	11
*		<u>27</u>	89	76	62	-10.5	10.5
*		<u>28</u>	88	72	57	-7.5	7.5
*		<u>29</u>	84	72	60	-7	7
*		<u>30</u>	88	74	60	-9	9
*		<u>31</u>	89	74	61	-10	10

		2003	Temp. (°F)				
		Sep	high	avg	low		
	*	<u>1</u>	88	75	63	-10.5	10.5
	*	<u>2</u>	91	76	61	-11	11
	*	<u>3</u>	96	82	68	-17	17
	*	<u>4</u>	91	78	64	-12.5	12.5
	*	<u>5</u>	91	78	66	-13.5	13.5
	*	<u>6</u>	93	78	64	-13.5	13.5
	*	<u>7</u>	84	73	62	-8	8
	*	<u>8</u>	70	62	53	3.5	-3.5
	*	<u>9</u>	66	59	48	8	-8
	*	<u>10</u>	69	56	46	7.5	-7.5
no BU	*	<u>11</u>	77	63	51	1	-1
	*	<u>12</u>	70	64	57	1.5	-1.5
	*	<u>13</u>	71	56	41	9	-9
no BU	*	<u>14</u>	81	64	48	0.5	-0.5
no BU	*	<u>15</u>	79	64	51	0	0
	*	<u>16</u>	66	59	52	6	-6
*		<u>17</u>	62	52	42	13	-13
	*	<u>18</u>	70	56	43	8.5	-8.5
no BU	*	<u>19</u>	79	64	50	0.5	-0.5
	*	<u>20</u>	73	58	43	7	-7
	*	<u>21</u>	77	62	46	3.5	-3.5
no BU	*	<u>22</u>	82	65	48	0	0
no BU	*	<u>23</u>	82	67	50	-1	1
	*	<u>24</u>	84	68	53	-3.5	3.5
	*	<u>25</u>	84	68	52	-3	3
	*	<u>26</u>	88	70	53	-5.5	5.5
	*	<u>27</u>	84	69	54	-4	4
	*	<u>28</u>	87	72	59	-8	8
	*	<u>29</u>	87	72	57	-7	7
	*	<u>30</u>	87	72	57	-7	7

			2003	Temp. (°F)				
			Oct	high	avg	low		
	*		<u>1</u>	82	70	59	-5.5	5.5
	*		<u>2</u>	81	72	66	-8.5	8.5
	*		<u>3</u>	79	68	57	-3	3
	*		<u>4</u>	84	70	57	-5.5	5.5
	*		<u>5</u>	82	68	55	-3.5	3.5
	*		<u>6</u>	82	70	55	-3.5	3.5
no BU	*		<u>7</u>	73	66	60	-1.5	1.5
	*		<u>8</u>	82	68	54	-3	3
*			<u>9</u>	64	58	48	9	-9
*			<u>10</u>	63	48	39	14	-14
*			<u>11</u>	64	52	39	13.5	-13.5
*			<u>12</u>	61	54	48	10.5	-10.5
*			<u>13</u>	59	46	34	18.5	-18.5
*			<u>14</u>	63	54	43	12	-12
*			<u>15</u>	63	50	37	15	-15
	*		<u>16</u>	71	58	46	6.5	-6.5
	*		<u>17</u>	77	62	46	3.5	-3.5
no BU	*		<u>18</u>	82	66	50	-1	1
	*		<u>19</u>	81	68	55	-3	3
	*		<u>20</u>	84	70	55	-4.5	4.5
	*		<u>21</u>	84	68	53	-3.5	3.5
no BU	*		<u>22</u>	80	65	51	-0.5	0.5
*			<u>23</u>	63	54	43	12	-12
*			<u>24</u>	60	47	35	17.5	-17.5
*			<u>25</u>	60	46	33	18.5	-18.5
	*		<u>26</u>	70	53	37	11.5	-11.5
	*		<u>27</u>	73	58	44	6.5	-6.5
	*		<u>28</u>	71	58	46	6.5	-6.5
*			<u>29</u>	63	48	33	17	-17
	*		<u>30</u>	43	36	28	29.5	-29.5
	*		<u>31</u>	42	32	23	32.5	-32.5

		2003	Temp. (°F)				
		Nov	high	avg	low		
*	*	<u>1</u>	42	30	17	35.5	-35.5
	*	<u>2</u>	46	36	26	29	-29
*		<u>3</u>	39	36	32	29.5	-29.5
	*	<u>4</u>	37	28	19	37	-37
*	*	<u>5</u>	39	30	21	35	-35
	*	<u>6</u>	46	34	21	31.5	-31.5
*	*	<u>7</u>	46	36	27	28.5	-28.5
	*	<u>8</u>	55	42	28	23.5	-23.5
*		<u>9</u>	48	42	35	23.5	-23.5
	*	<u>10</u>	51	44	37	21	-21
*		<u>11</u>	57	48	37	18	-18
	*	<u>12</u>	52	40	28	25	-25
*	*	<u>13</u>	44	36	28	29	-29
	*	<u>14</u>	48	36	24	29	-29
*		<u>15</u>	48	42	37	22.5	-22.5
	*	<u>16</u>	48	44	41	20.5	-20.5
*		<u>17</u>	48	42	37	22.5	-22.5
	*	<u>18</u>	57	48	39	17	-17
*		<u>19</u>	62	54	44	12	-12
	*	<u>20</u>	42	36	30	29	-29
*	*	<u>21</u>	39	32	24	33.5	-33.5
	*	<u>22</u>	30	24	19	40.5	-40.5
*	*	<u>23</u>	37	29	21	36	-36
	*	<u>24</u>	42	35	28	30	-30
*	*	<u>25</u>	37	30	24	34.5	-34.5
	*	<u>26</u>	39	34	27	32	-32
*	*	<u>27</u>	42	33	24	32	-32
		<u>28</u>	48	40	33	24.5	-24.5
*		<u>29</u>	46	42	37	23.5	-23.5
	*	<u>30</u>	46	44	41	21.5	-21.5

			2003	Temp. (°F)				
			Dec	high	avg	low		
*		*	<u>1</u>	50	44	39	20.5	-20.5
*		*	<u>2</u>	55	47	39	18	-18
*		*	<u>3</u>	55	46	36	19.5	-19.5
	*	*	<u>4</u>	53	40	28	24.5	-24.5
*		*	<u>5</u>	57	51	45	14	-14
*		*	<u>6</u>	55	50	44	15.5	-15.5
*		*	<u>7</u>	45	40	34	25.5	-25.5
*		*	<u>8</u>	42	37	32	28	-28
*		*	<u>9</u>	41	36	32	28.5	-28.5
*		*	<u>10</u>	42	38	33	27.5	-27.5
	*	*	<u>11</u>	39	34	28	31.5	-31.5
*		*	<u>12</u>	39	34	30	30.5	-30.5
*		*	<u>13</u>	48	42	37	22.5	-22.5
	*	*	<u>14</u>	50	40	28	26	-26
*		*	<u>15</u>	39	34	30	30.5	-30.5
*		*	<u>16</u>	39	34	30	30.5	-30.5
*		*	<u>17</u>	44	38	32	27	-27
	*	*	<u>18</u>	41	34	28	30.5	-30.5
	*	*	<u>19</u>	44	36	28	29	-29
*		*	<u>20</u>	43	36	30	28.5	-28.5
*		*	<u>21</u>	44	37	30	28	-28
	*	*	<u>22</u>	44	36	28	29	-29
	*	*	<u>23</u>	44	36	27	29.5	-29.5
*		*	<u>24</u>	46	42	37	23.5	-23.5
*		*	<u>25</u>	41	36	30	29.5	-29.5
	*	*	<u>26</u>	33	29	24	36.5	-36.5
	*	*	<u>27</u>	32	25	18	40	-40
	*	*	<u>28</u>	35	30	26	34.5	-34.5
	*	*	<u>29</u>	37	34	28	32.5	-32.5
	*	*	<u>30</u>	28	22	17	42.5	-42.5
	*	*	<u>31</u>	34	29	24	36	-36
ct = 134			ct=64					
			ct = 155					
-52 days cool-water heating overlaps typical LGT operation								
-18 no BU; no heating or cooling needed								
134 heating day count cool-water system								
155 cooling day count cool-water system								
271 days								
1.9835 conversion factor								
0.41 cfs								
220.39 AF = 271 x 1.9835 x 0.41								
125 AF already licensed								
95.39 AF additional								
Calculations by Michele Edl on 11/29/2017								
for WR 63-33245								