

Los Alamos County Utilities

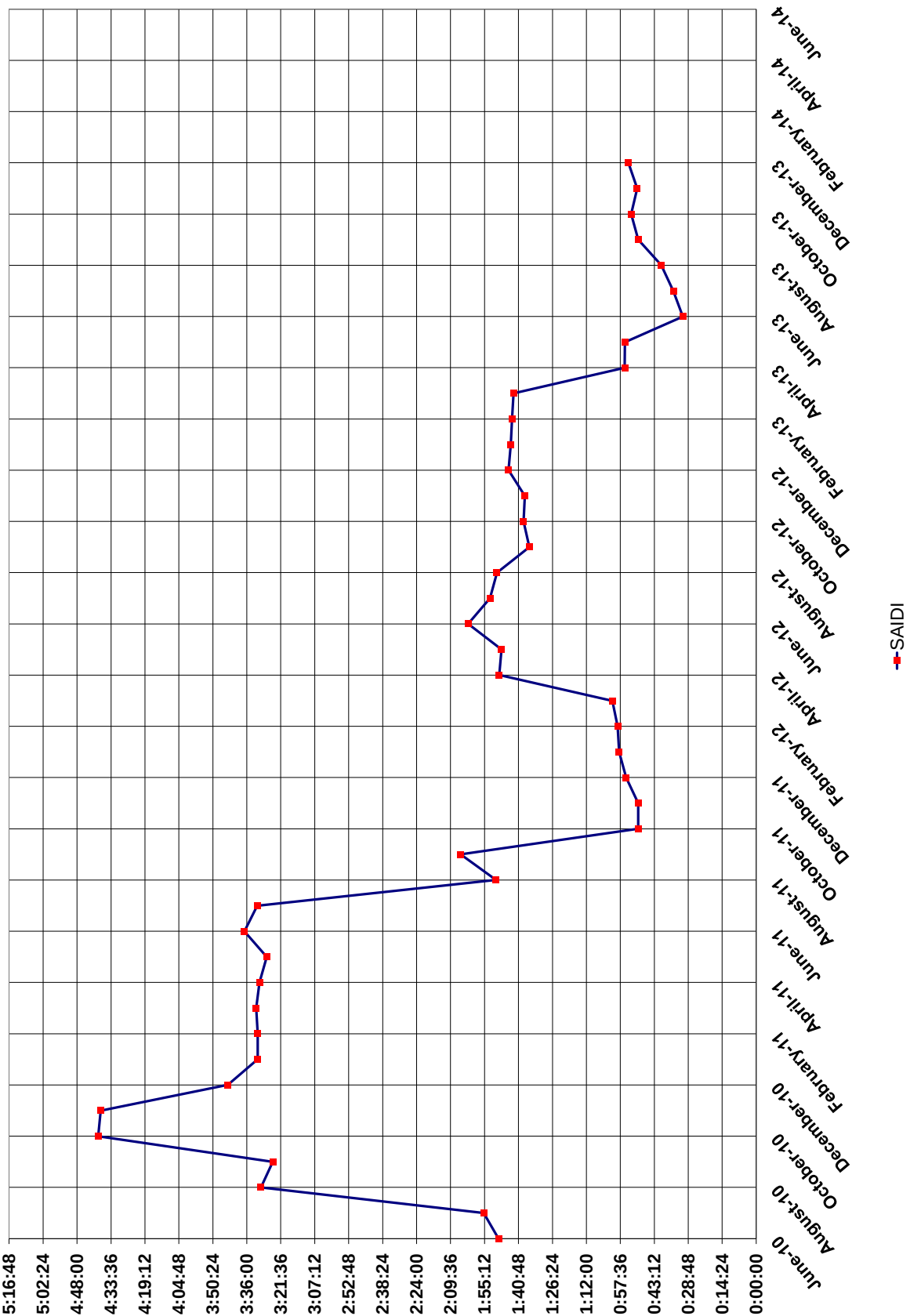


Electric Distribution Reliability

January 15, 2014

Stephen Marez
Project Engineer

EACH POINT IS A 12 MONTH SAIDI HISTORY
1:00:00 = APPA BENCHMARK SAIDI



Electric Distribution Reliability Study
Twelve Month Outage History

Prepared by Stephen Marez
Project Engineer L.A.C.U.

Date	Call Rcd.	Circuit	Cause	Start Time	End Time	Duration	Customers Affected (Meters)	Combined Customer Outage Durations	Total Outage H:M:S	Running SAIDI
1/24/2013	Utilities	16	URD Failure	18:30	21:00	2:30	120	300:00:00	300:00:00	0:02:02
2/8/2013	Utilities	16	HUMAN	13:50	14:12	0:22	33	12:06:00	312:06:00	0:02:07
3/5/2013	Dispatch	16	URD Failure	14:05	15:50	1:45	200	350:00:00	662:06:00	0:04:29
3/29/2013	Dispatch	13	Animal	23:00	1:00	2:00	15	30:00:00	692:06:00	0:04:42
4/2/2013	Utilities	16	HUMAN	16:00	19:30	3:30	36	126:00:00	818:06:00	0:05:33
4/15/2013	Dispatch	15	Animal	22:20	23:00	0:40	1	0:40:00	818:46:00	0:05:33
4/15/2013	Dispatch	15	Animal	22:20	23:00	0:40	1	0:40:00	819:26:00	0:05:33
5/25/2013	Dispatch	EA4	Vandalism	10:30	12:30	2:00	6	12:00:00	831:26:00	0:05:38
5/25/2013	Dispatch	WR2	URD Failure	7:00	16:30	9:30	3	28:30:00	859:56:00	0:05:50
6/7/2013	Dispatch	WR1	Weather	16:45	17:25	0:40	15	10:00:00	869:56:00	0:05:54
6/15/2013	Dispatch	WR1	OH Failure	15:40	17:10	1:30	6	9:00:00	878:56:00	0:05:58
6/24/2013	Utilities	14	HUMAN	14:20	15:05	0:45	95	71:15:00	950:11:00	0:06:27
6/24/2013	Utilities	14	HUMAN	14:20	15:59	1:39	5	8:15:00	958:26:00	0:06:30
6/25/2013	Utilities	13	TREE	18:30	21:30	3:00	5	15:00:00	973:26:00	0:06:36
6/25/2013	Utilities	WR1	UNKNOWN	0:30	2:00	1:30	4	6:00:00	979:26:00	0:06:38
7/12/2013	Dispatch	15	Weather	12:00	12:18	0:18	2140	642:00:00	1621:26:00	0:11:00
7/12/2013	Dispatch	15	Weather	12:00	12:30	0:30	50	25:00:00	1646:26:00	0:11:10
7/12/2013	Dispatch	13	Weather	12:00	13:30	1:30	50	75:00:00	1721:26:00	0:11:40
7/13/2013	Dispatch	13	Weather	8:00	10:00	2:00	2	4:00:00	1725:26:00	0:11:42
7/13/2013	Dispatch	13	Weather	10:00	11:45	1:45	1	1:45:00	1727:11:00	0:11:43
7/14/2013	Dispatch	13	Weather	11:00	12:45	1:45	2	3:30:00	1730:41:00	0:11:44
7/14/2013	Dispatch	WR2	Weather	17:00	20:00	3:00	40	120:00:00	1850:41:00	0:12:33
7/21/2013	Dispatch	16	URD Failure	23:00	23:30	0:30	100	50:00:00	1900:41:00	0:12:53
7/21/2013	Dispatch	16	URD Failure	23:00	8:00	9:00	10	90:00:00	1990:41:00	0:13:30
8/4/2013	Dispatch	WR1	Animal	6:40	7:40	1:00	20	20:00:00	2010:41:00	0:13:38
8/5/2013	Dispatch	115 KV	Weather	19:45	19:55	0:10	2535	422:30:00	2433:11:00	0:16:30
8/8/2013	Dispatch	13	URD Failure	23:30	1:30	2:00	50	100:00:00	2533:11:00	0:17:10
8/18/2013	Dispatch	WR1	TREE	15:20	16:40	1:20	17	22:40:00	2555:51:00	0:17:20
8/21/2013	Dispatch	13	Weather	16:10	16:46	0:36	425	255:00:00	2810:51:00	0:19:03
8/21/2013	Dispatch	13	Weather	16:10	18:10	2:00	200	400:00:00	3210:51:00	0:21:46
8/21/2013	Dispatch	13	Weather	16:10	19:20	3:10	75	237:30:00	3448:21:00	0:23:23
9/14/2013	Dispatch	Power Supplie	URD Failure	14:23	15:20	0:57	1804	1713:48:00	5162:09:00	0:35:00
9/22/2013	Dispatch	15	Weather	19:10	19:23	0:13	60	13:00:00	5175:09:00	0:35:05
9/22/2013	Dispatch	13	Weather	21:00	4:00	7:00	20	140:00:00	5315:09:00	0:36:02
9/22/2013	Dispatch	16	Weather	21:00	4:00	7:00	90	630:00:00	5945:09:00	0:40:18
10/4/2013	Dispatch	15	Animal	22:00	23:45	1:45	25	43:45:00	5988:54:00	0:40:36
10/12/2013	Dispatch	WR1	URD Failure	10:49	12:05	1:16	32	40:32:00	6029:26:00	0:40:53
11/14/2013	Dispatch	WR2	OH Failure	19:15	22:15	3:00	4	12:00:00	6041:26:00	0:40:58
11/16/2013	Dispatch	WR2	OH Failure	1:30	12:00	10:30	10	105:00:00	7446:26:00	0:50:29
11/16/2013	Dispatch	WR2	OH Failure	1:30	3:30	2:00	650	1300:00:00	7446:26:00	0:50:29
12/7/2013	Dispatch	Power Supplie	URD Failure	22:25	22:41	0:16	1804	481:04:00	7927:30:00	0:53:45
12/8/2013	Dispatch	EA4	Weather	2:45	5:30	2:45	10	27:30:00	7955:00:00	0:53:56
12/18/2013	Utilities	18	HUMAN	13:00	13:20	0:20	60	20:00:00	7975:00:00	0:54:04
12/18/2013	Utilities	18	HUMAN	13:00	17:15	4:15	3	12:45:00	7987:45:00	0:54:09

CIRCUIT SAIDI IS CALCULATED ACCORDING TO THE NUMBER OF CUSTOMERS IN EACH CIRCUIT RESPECTIVELY											
<u>Running SAIDI Circuit 13</u>	<u>Running SAIDI Circuit 14</u>	<u>Running SAIDI Circuit 15</u>	<u>Running SAIDI Circuit 16</u>	<u>Running SAIDI Circuit 17</u>	<u>Running SAIDI Circuit 18</u>	<u>SAIDI Circuit EA4 & Royal Crest</u>	<u>Running SAIDI Circuit WR1</u>	<u>Running SAIDI Circuit WR2</u>	<u>Monthly SAIDI</u>	<u>Monthly Customer Minutes out of service</u>	<u>WEATHER SAIDI</u>
			0:10:55 0:11:21 0:24:05						JANUARY 0:02:02 FEB 0:00:05	300:00:00 12:06:00	
0:01:13			0:28:39						MAR 0:02:35	380:00:00	
		0:00:01 0:00:02									
						0:04:08			MAY		
							0:00:19 0:00:36	0:02:35	MAY 0:01:08	167:50:00	
	0:05:55 0:06:36										
0:01:49											
		0:18:07 0:18:49					0:00:48		JUNE 0:00:49	119:30:00	0:04:21 0:00:10 0:00:31 0:00:02 0:00:01 0:00:01 0:00:49
0:04:52 0:05:02 0:05:06 0:05:14											
		0:30:29 0:33:45						0:13:30			
									JULY 0:06:51	1011:15:00	
0:09:18							0:01:26 0:14:58 0:15:41	0:27:01			0:02:52
											0:01:44 0:02:43 0:01:37
0:18:55			1:36:04	17:40:05	28:33:48				AUGUST 0:09:53	1457:40:00	
	0:19:11										0:00:05 0:00:57 0:04:16
0:05:41		0:20:25							SEPTEMBER 0:16:56	2496:48:00	
							0:01:18		OCTOBER 0:00:34	84:17:00	
								0:27:24 0:30:46			
								1:12:22	NOVEMBER 0:09:36	1417:00:00	
		1:53:34		6:33:38	36:34:52						0:00:11
					36:54:52 37:07:37	0:13:37			NOVEMBER 0:03:40		

Twelve Month History	JANUARY 2014	
Total # Accounts	8850	
Total # Interruptions	44	
Sum Customer Interruption Durations	7987:45:00	hours:min:sec
# Customers Interrupted	10834	
SAIFI(APPA AVG. = 1.0)	1.22	int./cust.
SAIDI (APPA AVG. = 1:00)	0:54	hours:min
CAIDI	:44	hours:min/INT
ASAI	99.9996%	% available

- **SAIFI - System Average Interruption Frequency Index**
A measure of interruptions per customer (Per Year)

$$\text{SAIFI} = \frac{(\text{Total number of customer interruptions})}{(\text{Total number of customers served})}$$

- **SAIDI – System Average Interruption Duration Index**
A measure of outage time per customer if all customers were out at the same time (hours per year)

$$\text{SAIDI} = \frac{(\text{Sum of all customer outage durations})}{(\text{Total number of customers served})}$$

- **CAIDI – Customer Average Interruption Duration Index**
A measure of the average outage duration per customer (hours per interruption)

$$\text{CAIDI} = \frac{(\text{Sum of all customer outage durations})}{(\text{Total number of customers interruptions})} = \frac{\text{SAIDI}}{\text{SAIFI}}$$

- **ASAI – Average System Availability Index**
A measure of the average service availability (Per unit)

$$\text{ASAI} = \frac{(\text{Service hours available})}{(\text{Customer demand hours})} = \frac{8760 - \text{SAIDI}}{8760}$$