Appendix A

PM_{10} Monitoring Data – All Sites 1987 through 2002

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
03-Jan-87	121						45								
09-Jan-87	6						16								
15-Jan-87	100						25								
21-Jan-87	13						28								
27-Jan-87	**672**						**178**								
02-Feb-87	**251**						140								
08-Feb-87	13						19								
09-Feb-87							19								
14-Feb-87							8								
18-Feb-87	22														
20-Feb-87	54						7								
26-Feb-87	39						8								
04-Mar-87	71						38								
10-Mar-87	**230**						17								
16-Mar-87	55														
22-Mar-87	**166**						13								
28-Mar-87	31						13								
03-Apr-87	33						18								
09-Apr-87	11						14								
15-Apr-87	23						25								
21-Apr-87	18						20								
27-Apr-87	38						19								
03-May-87	11						15								
09-May-87	8						9								
15-May-87	28						13								
21-May-87	9						11								
27-May-87	11						9								
02-Jun-87	13						17								
08-Jun-87	15														
12-Jun-87							21								
14-Jun-87	54						35								
20-Jun-87	17			18			21								
26-Jun-87	76						29								
02-Jul-87							24								
08-Jul-87	20			27			27								
14-Jul-87	22			26			20								
20-Jul-87	25			13			48								
26-Jul-87	24			14			26								
01-Aug-87	17			16			17								
07-Aug-87	22			25			27								
13-Aug-87	18			25			25								
19-Aug-87	19			23			23								
25-Aug-87	13			23			20								

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
31-Aug-87				16											
03-Sep-87	42														
06-Sep-87	17			26											
12-Sep-87	26			31											
18-Sep-87	21			28			23								
24-Sep-87	12			15			16								
30-Sep-87	12			23			16								
06-Oct-87	16			31			17								
12-Oct-87	53			15			28								
18-Oct-87	12			19			18								
24-Oct-87	7			10			8								
30-Oct-87	6			10			5								
05-Nov-87	5			5											
11-Nov-87	12			13			14								
14-Nov-87							12								
17-Nov-87	16			23			9								
23-Nov-87	10			10			14								
29-Nov-87	11			19			19								
05-Dec-87	3			5			6								
11-Dec-87	8			9			13								
17-Dec-87	8			9			6								
23-Dec-87	111			14			5								
29-Dec-87	5			6			12								
04-Jan-88	9			5			13								
10-Jan-88	9			12			17								
16-Jan-88	**394**			25			**172**								
22-Jan-88	11			11			23								
28-Jan-88	8			13			13								
03-Feb-88	10			12			19								
09-Feb-88	14			18											
15-Feb-88	10			21			29								
21-Feb-88	14			18			17								
27-Feb-88	12			13			8								
04-Mar-88	7			10			8								
09-Mar-88	115*						29								
15-Mar-88	69			18*			43								
22-Mar-88				13			12								
28-Mar-88	49			50			23								
03-Apr-88	21			23			36								
09-Apr-88	17			24			22								
15-Apr-88	3			3			6								
21-Apr-88	8			7			7								
27-Apr-88	18			16			18								

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
03-May-88	15			14			22								
05-May-88	56*			13*			50								
15-May-88	17			16			26								
21-May-88	13			18			18								
27-May-88	20			23			21								
02-Jun-88	12			17			19								
08-Jun-88	12			9			9								
13-Jun-88	12														
14-Jun-88				23			19								
20-Jun-88	30			15											
23-Jun-88							4								
26-Jun-88	20			18			7								
02-Jul-88	16			20			11								
08-Jul-88	21			22			20								
14-Jul-88	21			25			21								
20-Jul-88	20			29			19								
26-Jul-88	20			19			12								
01-Aug-88	70			23			20								
07-Aug-88	20			17			10								
13-Aug-88	20			15			12								
19-Aug-88	20			21			19								
25-Aug-88	12			12			8								
31-Aug-88	14			17			15								
06-Sep-88	26			29			31								
12-Sep-88	52						29								
18-Sep-88	38			40			43								
24-Sep-88	18			22			20								
30-Sep-88	4			14			12								
06-Oct-88	14			24			18								
12-Oct-88	15			20			15								
18-Oct-88	12			18			9								
24-Oct-88	19			29			21								
30-Oct-88	18			29			18								
05-Nov-88	13			18			14								
11-Nov-88	12			14			19								
17-Nov-88	123			55			19								
23-Nov-88	**324**			44			64								
29-Nov-88	11			10			5								
05-Dec-88	11			29			36								
11-Dec-88	8			13			19								
17-Dec-88	8			8			11								
23-Dec-88	7			5			10								
30-Dec-88	11			13			12								

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
04-Jan-89	9			12			16								
10-Jan-89	98			22			65								
16-Jan-89				13			15								
22-Jan-89				13			22								
28-Jan-89	12			107			14								
03-Feb-89	**1861**						126								
09-Feb-89	5						4								
15-Feb-89							14								
21-Feb-89	8						12								
24-Feb-89	32*						16								
05-Mar-89	12						17								
09-Mar-89	11*						78								
17-Mar-89	12						14								
23-Mar-89	44						29								
29-Mar-89	13			26			12								
04-Apr-89	9			20			8								
10-Apr-89	15			26			12								
16-Apr-89	15			17			20								
22-Apr-89	**326**			25			87								
28-Apr-89	10			14			8								
04-May-89	15			17			14								
10-May-89	44			20			85								
16-May-89	11			11			8								
22-May-89	**165**			19			34								
28-May-89	**587**			13			96								
03-Jun-89	97			19			10								
09-Jun-89	29			21			16								
15-Jun-89	24			36			18								
21-Jun-89	104			109			24								
27-Jun-89	84			21			27								
03-Jul-89	12			13			30								
09-Jul-89	43			32			13								
15-Jul-89	22			19			18								
21-Jul-89	20			25			21								
27-Jul-89	15			17			15								
02-Aug-89	15			17			18								
08-Aug-89	20			32			18								
14-Aug-89	10			38			9								
20-Aug-89	115			27			16								
26-Aug-89	16			19			13								
01-Sep-89	19			25			18								
07-Sep-89	21			38			18								
13-Sep-89	12			18			6								

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
19-Sep-89	59			13			3								
25-Sep-89	11			12			9								
01-Oct-89	16			12			5								
07-Oct-89	14			24			12								
13-Oct-89	13			20			12								
19-Oct-89	15			18			9								
25-Oct-89	23			63			7								
31-Oct-89				32			17								
06-Nov-89	10			16			17								
12-Nov-89	7			21			16								
18-Nov-89	6			19			10								
24-Nov-89	18			22			26								
30-Nov-89	11			16			16								
06-Dec-89	103			58			20								
12-Dec-89	9			36			26								
19-Dec-89	13			24			31								
24-Dec-89	11			16			22								
30-Dec-89	120			27			12								
05-Jan-90	4			11			19								
11-Jan-90	11			16			27								
17-Jan-90	4			2			10								
23-Jan-90	8			11			22								
29-Jan-90	7			10			19								
04-Feb-90	43			14			21								
10-Feb-90				9			4								
16-Feb-90				6			52								
22-Feb-90				7			10								
28-Feb-90				14			17								
06-Mar-90				12			15								
12-Mar-90				4			9								
18-Mar-90				0			9								
24-Mar-90				15			11								
30-Mar-90				9			18								
05-Apr-90				20			29								
11-Apr-90				21			15								
17-Apr-90				11			6								
23-Apr-90				**200**											
26-Apr-90							9								
29-Apr-90				44			28								
05-May-90				15			9								
11-May-90				16			13								
17-May-90				**200**			26								
23-May-90				65			27								

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PM10 values greater than 150 μg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
29-May-90				11			6								
04-Jun-90				17			13								
10-Jun-90				18			21								
16-Jun-90				14			15								
22-Jun-90				24			34								
28-Jun-90				24			15								
04-Jul-90				16			15								
10-Jul-90				19			20								
16-Jul-90				19			19								
22-Jul-90				15			15								
28-Jul-90				18			12								
03-Aug-90				25			25								
09-Aug-90				15			13								
15-Aug-90				58			68								
21-Aug-90				18			15								
27-Aug-90				8			11								
02-Sep-90				13			13								
08-Sep-90				18			17								
14-Sep-90				17			7								
20-Sep-90	4			7			5								
26-Sep-90	7			10			7								
02-Oct-90	13			14			12								
08-Oct-90	3			13			6								
11-Oct-90							26								
14-Oct-90	11			15			13								
20-Oct-90	4			8			6								
26-Oct-90	9			12			7								
01-Nov-90				10			13								
07-Nov-90				21											
13-Nov-90				11			2								
19-Nov-90				16			18								
25-Nov-90	**858**			40			59								
01-Dec-90	11			14			22								
07-Dec-90	14			17			23								
13-Dec-90	15			16			14								
19-Dec-90	**693**			59			18								
25-Dec-90	6						14								
28-Dec-90				13											
31-Dec-90	13			15			27								
06-Jan-91				10			15								
12-Jan-91				12			23								
18-Jan-91				7			18								
24-Jan-91				13			20								

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
30-Jan-91	40			32			51								
05-Feb-91	10			12			17								
11-Feb-91	18			17			23								
17-Feb-91	13			23			26								
23-Feb-91	35			14			13								
01-Mar-91	10						0								
07-Mar-91	14			5			8								
13-Mar-91	144			**181**			29								
15-Mar-91				12											
19-Mar-91	4			5			9								
25-Mar-91	134			6			5								
31-Mar-91	46			9			10								
06-Apr-91	**181**			25			17								
12-Apr-91	21			15			9								
18-Apr-91	10			10			10								
24-Apr-91	29			11											
30-Apr-91	49														
01-May-91							82								
06-May-91	12						30								
07-May-91				11											
12-May-91	10						11								
14-May-91				23											
18-May-91	68			17			14								
24-May-91	19			16			15								
30-May-91				49											
31-May-91							19								
05-Jun-91				24			30								
11-Jun-91	15			18			21								
17-Jun-91	18			12			12								
23-Jun-91	26			13			18								
29-Jun-91	9			10			9								
05-Jul-91	22			19			21								
11-Jul-91	16						20								
17-Jul-91				7			18								
23-Jul-91				13			15								
29-Jul-91				20			16								
31-Jul-91				18											
04-Aug-91				11			14								
10-Aug-91	12			14			15								
16-Aug-91	14			13			15								
22-Aug-91	16			15			19								
28-Aug-91	13			13			15								
03-Sep-91				18			15								

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
09-Sep-91				14			21								
15-Sep-91	13			13			17								
21-Sep-91	28			24			25								
27-Sep-91	17			12			17								
03-Oct-91				17			16								
09-Oct-91	10			16			14								
15-Oct-91	9			12			15								
21-Oct-91	10			10			13								
27-Oct-91	143			7			12								
02-Nov-91	10						13								
05-Nov-91				13											
08-Nov-91	14			12			16								
14-Nov-91	48			9			15								
20-Nov-91	9			10			17								
26-Nov-91	13			16			22								
02-Dec-91	12						12								
05-Dec-91				14											
08-Dec-91	46			6			7								
14-Dec-91	10			14			22								
20-Dec-91	142			61			9								
26-Dec-91	11			11			23								
01-Jan-92	7			10			11								
07-Jan-92	8			7			9								
13-Jan-92	14			10			19								
19-Jan-92	7			9			9								
25-Jan-92	11			10											
31-Jan-92	14			9			14								
06-Feb-92	6			6			9								
12-Feb-92	5			5			5								
18-Feb-92	6			8			12								
24-Feb-92	10			8			6								
01-Mar-92	15			10			21								
07-Mar-92	6			8			4								
13-Mar-92				18											
19-Mar-92	20			13			21								
25-Mar-92	6			6			9								
31-Mar-92	7			6			3								
06-Apr-92	15			14			14								
12-Apr-92	62			13			32								
18-Apr-92	**151**			**366**			31								
24-Apr-92	17			19			21								
30-Apr-92	**350**			19			63								
06-May-92	5			10			6								

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
12-May-92	19			20			17								
18-May-92	18			18			22								
24-May-92	13			17			13								
30-May-92	22			20			20								
05-Jun-92	25			21			22								
11-Jun-92	26			21			28								
17-Jun-92	13			12			11								
23-Jun-92	13			14			24								
29-Jun-92	**526**			13			61								
05-Jul-92	18			11			10								
11-Jul-92	19			17			19								
17-Jul-92				10			16								
23-Jul-92	16			17			16								
29-Jul-92	15			19			17								
04-Aug-92	20			19											
10-Aug-92	12			14			15								
16-Aug-92	11			14			9								
22-Aug-92	39			19			23								
28-Aug-92	19			33			18								
03-Sep-92	**242**			22			23								
09-Sep-92	14			17			14								
15-Sep-92	15			14			13								
21-Sep-92	13			15			12								
27-Sep-92	14			16			15								
03-Oct-92	10			10			8								
09-Oct-92	19			21			21								
15-Oct-92	35			24			20								
21-Oct-92	13			12			13								
28-Oct-92	5			5			8								
02-Nov-92	16			6			6								
08-Nov-92	16			12			15								
14-Nov-92	11			12			15								
20-Nov-92	100			39			21								
26-Nov-92	7			10			17								
02-Dec-92	48			13			31								
08-Dec-92	7			6			13								
13-Dec-92				365*											
14-Dec-92	18														
20-Dec-92	7			5			16								
26-Dec-92	11			4			25								
01-Jan-93	**781**			4			13								
07-Jan-93	6			2			5								
13-Jan-93	2			1			3								

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
19-Jan-93	9			5			7								
25-Jan-93	8			6			11								
31-Jan-93	7			6			3								
06-Feb-93	11			8			18								
12-Feb-93	6			5			14								
18-Feb-93	8			5			6								
24-Feb-93	11			4			2								
02-Mar-93	5			7			10								
08-Mar-93	9						8								
11-Mar-93				37*											
12-Mar-93			8												
13-Mar-93			12												
14-Mar-93	10		13				10								
15-Mar-93			18												
16-Mar-93			46												
17-Mar-93			**513**												
18-Mar-93			8												
19-Mar-93			61												
20-Mar-93	5		9				9								
21-Mar-93			9												
22-Mar-93			35												
23-Mar-93			**276**												
24-Mar-93			**257**												
25-Mar-93			24												
26-Mar-93	3		5	1			7								
27-Mar-93			7												
28-Mar-93			5												
29-Mar-93			6												
30-Mar-93			7												
31-Mar-93			13												
01-Apr-93	19		19	14											
02-Apr-93			10												
03-Apr-93			10												
04-Apr-93			**225**												
05-Apr-93			49	14											
06-Apr-93			15												
07-Apr-93	14		15	13			16								
08-Apr-93			40												
09-Apr-93			23												
10-Apr-93			22												
11-Apr-93			22												
12-Apr-93			121												
13-Apr-93	10		11				10								

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
14-Apr-93			13												
15-Apr-93			18												
16-Apr-93			19												
17-Apr-93			**578**												
18-Apr-93			21												
19-Apr-93	12		11				9								
20-Apr-93			36	14											
21-Apr-93			**479**												
22-Apr-93			**172**												
23-Apr-93			**155**												
24-Apr-93			5												
25-Apr-93	13		11	10			9								
26-Apr-93			11												
27-Apr-93			19												
28-Apr-93			19												
29-Apr-93			18												
30-Apr-93			35												
01-May-93	46		57	**153**			31								
02-May-93			32												
03-May-93			**412**												
04-May-93			**231**												
05-May-93			18												
06-May-93			23												
07-May-93	17		17	18			16								
08-May-93			30												
09-May-93			25												
10-May-93			32												
11-May-93			43												
12-May-93			64												
13-May-93	48		65	15			28								
14-May-93			19												
15-May-93			68												
16-May-93			24												
17-May-93			14												
18-May-93			24												
19-May-93	18		23	17			17								
20-May-93			20												
21-May-93			22												
22-May-93			18												
23-May-93			25												
24-May-93			43												
25-May-93	16		20	17			33								
26-May-93			24												

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
27-May-93			22												
28-May-93			17												
29-May-93			18												
30-May-93			24												
31-May-93	80		127	18			18								
01-Jun-93			15												
02-Jun-93			72												
03-Jun-93			13												
04-Jun-93			**285**												
05-Jun-93			27												
06-Jun-93	8		9	8			5								
07-Jun-93			7												
08-Jun-93			10												
09-Jun-93			10												
10-Jun-93			55												
11-Jun-93			14												
12-Jun-93	41		45	10			43								
13-Jun-93			25												
14-Jun-93			24												
15-Jun-93			20												
16-Jun-93			92												
17-Jun-93			34												
18-Jun-93	9		12				12								
19-Jun-93			14												
20-Jun-93			28												
21-Jun-93			36												
22-Jun-93			18												
23-Jun-93			17												
24-Jun-93	13		19				15								
25-Jun-93			14												
26-Jun-93			23												
27-Jun-93			18												
28-Jun-93			25												
29-Jun-93			20												
30-Jun-93	16		21				16								
01-Jul-93			24												
02-Jul-93			38												
03-Jul-93			25												
04-Jul-93			24												
05-Jul-93			22												
06-Jul-93	27		30				23								
07-Jul-93			30												
08-Jul-93			21												

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
09-Jul-93			22												
10-Jul-93			23												
11-Jul-93			30												
12-Jul-93	27		32				21								
13-Jul-93			33												
14-Jul-93			41												
15-Jul-93			46												
16-Jul-93			32												
17-Jul-93			22												
18-Jul-93	19		22				18								
19-Jul-93			22												
20-Jul-93			26												
21-Jul-93			20												
22-Jul-93			21												
23-Jul-93			40												
24-Jul-93	27		26				13								
25-Jul-93			31												
26-Jul-93			27												
27-Jul-93			22												
28-Jul-93			24												
29-Jul-93			26												
30-Jul-93	18		18				12								
31-Jul-93			13												
01-Aug-93			14												
02-Aug-93			26												
03-Aug-93			31												
04-Aug-93			20												
05-Aug-93	13		16				13								
06-Aug-93			14												
07-Aug-93			16												
08-Aug-93			18												
09-Aug-93			16												
10-Aug-93			15												
11-Aug-93	17		27				8								
12-Aug-93			19												
13-Aug-93			22												
14-Aug-93			27												
15-Aug-93			74												
16-Aug-93			15												
17-Aug-93	11		14				11								
18-Aug-93			24												
21-Aug-93			14												
22-Aug-93			14												

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
23-Aug-93	18		22				17								
24-Aug-93			21												
25-Aug-93			20												
26-Aug-93			18												
27-Aug-93			16												
28-Aug-93			42												
29-Aug-93	15		16				15								
30-Aug-93			20												
31-Aug-93			15												
01-Sep-93			15												
02-Sep-93			19												
03-Sep-93			17												
04-Sep-93			15				11								
05-Sep-93			18												
06-Sep-93			17												
07-Sep-93			17												
08-Sep-93			14												
09-Sep-93			14												
10-Sep-93	18		17				16								
11-Sep-93			25												
12-Sep-93			87												
13-Sep-93			77												
14-Sep-93			30												
15-Sep-93			28												
16-Sep-93	26		28				15								
17-Sep-93			38												
18-Sep-93			13												
19-Sep-93			17												
20-Sep-93			22												
21-Sep-93			22												
22-Sep-93	32		33				16								
23-Sep-93			16												
24-Sep-93			11												
25-Sep-93			10												
26-Sep-93			10												
27-Sep-93			13												
28-Sep-93			16												
29-Sep-93	13		16				15								
30-Sep-93			19												
01-Oct-93			16												
02-Oct-93			15												
03-Oct-93			17												
04-Oct-93	41		52				24								

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
05-Oct-93			22												
06-Oct-93			15												
07-Oct-93			14												
08-Oct-93			15												
09-Oct-93			18												
10-Oct-93	22		26	18			20								
11-Oct-93			10												
12-Oct-93			7												
13-Oct-93			70												
14-Oct-93			12												
15-Oct-93			10												
16-Oct-93	9		9	8			7								
17-Oct-93			8												
18-Oct-93			6												
19-Oct-93			5												
20-Oct-93			8												
21-Oct-93			9						13						
22-Oct-93	9		10	15			13		15						
23-Oct-93			9						12						
24-Oct-93			8						13						
25-Oct-93			15						13						
26-Oct-93			112	346*											
27-Oct-93			10												
28-Oct-93	9		10	22			16								
29-Oct-93			11												
30-Oct-93			9						10						
31-Oct-93			10						19						
01-Nov-93			35	32*					20						
02-Nov-93			16						17						
03-Nov-93	12		11	14			18		18						
04-Nov-93			12						17						
05-Nov-93			11						18						
06-Nov-93			11						16						
07-Nov-93			11						17						
08-Nov-93			12						18						
09-Nov-93	19		16	17			44		23						
10-Nov-93			34						53						
11-Nov-93			37						16						
12-Nov-93			98	15*			21*		26						
13-Nov-93			98						85						
14-Nov-93			**390**						62						
15-Nov-93	67		101						20						
16-Nov-93			17						21						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
17-Nov-93			22						17						
18-Nov-93			17						20						
19-Nov-93			14						19						
20-Nov-93			14						17						
21-Nov-93	16		14	7			29		24						
22-Nov-93			15						19						
23-Nov-93			40						44						
24-Nov-93			114				43*		88						
25-Nov-93			23						27						
26-Nov-93			16						18						
27-Nov-93	23		16	15					22						
28-Nov-93			**168**						48						
29-Nov-93			30						65						
30-Nov-93			78						13						
01-Dec-93			40						16						
02-Dec-93			41						13						
03-Dec-93	9		8	7			18		18						
04-Dec-93			8						22						
05-Dec-93			11						16						
06-Dec-93			21						27						
07-Dec-93			15						27						
08-Dec-93			24						25						
09-Dec-93			39	18			33		36						
10-Dec-93			13						17						
11-Dec-93			**293**						113						
12-Dec-93									9						
13-Dec-93			15						15						
14-Dec-93			**259**						**170**						
15-Dec-93			54	10*					15						
16-Dec-93			35						15						
17-Dec-93			7						16						
18-Dec-93			9						19						
19-Dec-93			9						15						
20-Dec-93			16						16						
21-Dec-93	12		17	68			17		19						
22-Dec-93			20						17						
23-Dec-93			**412**	185*			34*		58						
24-Dec-93			13						15						
25-Dec-93			9						15						
26-Dec-93			41						29						
27-Dec-93	13		14						24						
28-Dec-93			20						16						
29-Dec-93			8						18						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
30-Dec-93			8						21						
31-Dec-93			11						24						
01-Jan-94			10						21						
02-Jan-94	12		12	9			26		24						
03-Jan-94			13						23						
04-Jan-94			18						21						
05-Jan-94			**199**	365*			51*		76						
06-Jan-94			20						24						
07-Jan-94			12						19						
08-Jan-94	14		13						22						
09-Jan-94			16						32						
10-Jan-94			16						15						
11-Jan-94			24						20						
12-Jan-94			17						19						
13-Jan-94									23						
14-Jan-94	14			11			21		19						
15-Jan-94									18						
16-Jan-94									16						
17-Jan-94									16						
18-Jan-94									17						
19-Jan-94			22						20						
20-Jan-94	12		11	16			21		21						
21-Jan-94			10						22						
22-Jan-94			15						20						
23-Jan-94			**259**						**307**						
24-Jan-94			**247**						82						
25-Jan-94			9						9						
26-Jan-94	7		11	6			12		12						
27-Jan-94			24						7						
28-Jan-94			11	32*			7*		10						
29-Jan-94			23						10						
30-Jan-94			14						11						
31-Jan-94			16						16						
01-Feb-94	11		14	6			19		17						
02-Feb-94			10						15						
03-Feb-94			82						17						
04-Feb-94			7						12						
05-Feb-94			7						11						
06-Feb-94			50						15						
07-Feb-94	3		6	3			4		4						
08-Feb-94			6						5						
09-Feb-94			13						13						
10-Feb-94			**284**						6						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
11-Feb-94			**345**	70*			11*		22						
12-Feb-94			6						11						
13-Feb-94	8		6						10						
14-Feb-94			7						14						
15-Feb-94			14						13						
16-Feb-94			**292**						122						
17-Feb-94			**1381**						85						
18-Feb-94			119						9						
19-Feb-94	22		30	8			4		9						
20-Feb-94			6						5						
21-Feb-94			4						5						
22-Feb-94			13						9						
23-Feb-94			13						14						
24-Feb-94			13						12						
25-Feb-94	8		12	9			8		10						
26-Feb-94			11						12						
27-Feb-94			7						12						
28-Feb-94			36	13*					12						
01-Mar-94			9						10						
02-Mar-94			7						9						
03-Mar-94	7		9	6			12		13						
04-Mar-94			10						12						
05-Mar-94			146						46						
06-Mar-94			103						9						
07-Mar-94			25	10*			5*		8						
08-Mar-94			13						9						
09-Mar-94	8		12						10						
10-Mar-94			6						13						
11-Mar-94			56	48*			18*		30						
12-Mar-94			**183**						23						
13-Mar-94			10						10						
14-Mar-94			7						11						
15-Mar-94	117		**164**						13						
16-Mar-94			75						92						
17-Mar-94			20						30						
18-Mar-94			**1226**						**499**						
19-Mar-94			7						95						
20-Mar-94			14						13						
21-Mar-94	12		4	11			19		21						
22-Mar-94			**961**						91						
23-Mar-94			25						30						
24-Mar-94			74						27						
25-Mar-94			5						5						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
26-Mar-94			54	9*			4*		8						
27-Mar-94	8		8						10						
28-Mar-94			85						13						
29-Mar-94			12						12						
30-Mar-94			22						15						
31-Mar-94			13						13						
01-Apr-94			10						18						
02-Apr-94	14		17	8					11						
03-Apr-94			94						25						
04-Apr-94			34						11						
05-Apr-94			14						12						
06-Apr-94			14						11						
07-Apr-94			14						12						
08-Apr-94	14		20						10						
09-Apr-94			33	19*					12						
10-Apr-94			27						9						
11-Apr-94			8						10						
12-Apr-94			9						12						
13-Apr-94			18						15						
14-Apr-94	33		27	23					36						
15-Apr-94			27						26						
16-Apr-94			32						32						
17-Apr-94			20						24						
18-Apr-94			28						19						
19-Apr-94			17						23						
20-Apr-94	21		20	18					24						
21-Apr-94			134						**180**						
22-Apr-94			70						25						
23-Apr-94			**572**						93						
24-Apr-94			12						24						
25-Apr-94			**205**						28						
26-Apr-94	8		9	3					13						
27-Apr-94			8						12						
28-Apr-94			4						6						
29-Apr-94			11						13						
30-Apr-94			14						16						
01-May-94			11						14						
02-May-94	20		21	17			16		22						
03-May-94			18						19						
04-May-94			20						19						
05-May-94			13						20						
06-May-94			19						16						
07-May-94			8						12						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
08-May-94	28		33	7			2		8						
09-May-94			35						12						
10-May-94			15						17						
11-May-94			20						20						
12-May-94			30						29						
13-May-94			21						18						
14-May-94	23		21	21			21		30						
15-May-94			**387**						25						
16-May-94			**151**						18						
17-May-94			23						16						
18-May-94			5						7						
19-May-94			4						7						
20-May-94	7		5	6			3		6						
21-May-94			10						16						
22-May-94			15						18						
23-May-94			13						17						
24-May-94			16						21						
25-May-94			26						19						
26-May-94	16		20	15			13								
27-May-94			20												
28-May-94															
29-May-94			8												
30-May-94			51												
31-May-94			11												
01-Jun-94	14		12	13			9		14						
02-Jun-94			14						22						
03-Jun-94			13						16						
04-Jun-94			7						12						
05-Jun-94			19						34						
06-Jun-94			33						20						
07-Jun-94	10		10				6		13						
08-Jun-94			9	10					16						
09-Jun-94			10						18						
10-Jun-94			21						23						
11-Jun-94			32						24						
12-Jun-94			21						22						
13-Jun-94			20	55			20		28						
14-Jun-94			46						31						
15-Jun-94			64						25						
16-Jun-94			27						25						
17-Jun-94			26						39						
18-Jun-94			14						16						
19-Jun-94			13	13			13		18						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
20-Jun-94			18						23						
21-Jun-94			11						19						
22-Jun-94			20						25						
23-Jun-94			11						16						
24-Jun-94			16						22						
25-Jun-94			27	16			12		15						
26-Jun-94			27						12						
27-Jun-94			17						16						
28-Jun-94			31						21						
29-Jun-94			13						17						
30-Jun-94			21						19						
01-Jul-94			24				16		21						
02-Jul-94			25						14						
03-Jul-94			15						18						
04-Jul-94			19						17						
05-Jul-94			21						24						
06-Jul-94			28						30						
07-Jul-94			12				11		15						
08-Jul-94			20						21						
09-Jul-94			23						26						
10-Jul-94			22						24						
11-Jul-94			20						24						
12-Jul-94			17						21						
13-Jul-94			19	19					22						
14-Jul-94									27						
15-Jul-94							20		23						
16-Jul-94									28						
17-Jul-94									17						
18-Jul-94									19						
19-Jul-94				23			27		32						
20-Jul-94									58						
21-Jul-94									29						
22-Jul-94									19						
23-Jul-94									20						
24-Jul-94									15						
25-Jul-94				11			10		14						
26-Jul-94									14						
27-Jul-94									15						
28-Jul-94									21						
29-Jul-94									26						
30-Jul-94									23						
31-Jul-94	11						10		14						
01-Aug-94									15						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
02-Aug-94				12					15						
03-Aug-94									14						
04-Aug-94									20						
05-Aug-94									19						
06-Aug-94				12			10		16						
07-Aug-94									14						
08-Aug-94									18						
09-Aug-94									18						
10-Aug-94									19						
11-Aug-94									15						
12-Aug-94				11			12		16						
13-Aug-94									18						
14-Aug-94									20						
15-Aug-94									22						
16-Aug-94									18						
17-Aug-94									58						
18-Aug-94	29			24			26		31						
19-Aug-94									24						
20-Aug-94									23						
21-Aug-94									23						
22-Aug-94									18						
23-Aug-94									21						
24-Aug-94	12			10			7		14						
25-Aug-94									23						
26-Aug-94									17						
27-Aug-94	15								20						
28-Aug-94									20						
29-Aug-94									15						
30-Aug-94	15			12			14		17						
31-Aug-94									19						
01-Sep-94									25						
02-Sep-94									26						
03-Sep-94									17						
04-Sep-94									17						
05-Sep-94	12			11			7		15						
06-Sep-94									12						
07-Sep-94									13						
08-Sep-94									16						
09-Sep-94									21						
10-Sep-94									17						
11-Sep-94	15			14			10		45						
12-Sep-94									31						
14-Sep-94			18												

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
15-Sep-94			20												
16-Sep-94			12												
17-Sep-94	11		21	21			9								
18-Sep-94			12												
19-Sep-94			77												
20-Sep-94			11												
21-Sep-94			14												
22-Sep-94			14						14						
23-Sep-94			20	12			16		23						
24-Sep-94			11						9						
25-Sep-94			9						12						
26-Sep-94			11						12						
27-Sep-94			10						15						
28-Sep-94			103						18						
29-Sep-94	10		12	5			9		4						
30-Sep-94			7						7						
01-Oct-94			7						11						
02-Oct-94			9						11						
03-Oct-94			57	16*			42*		50						
04-Oct-94			**193**						69						
05-Oct-94	6		7						8						
06-Oct-94			10						8						
07-Oct-94			11						10						
08-Oct-94			7						12						
09-Oct-94			11						11						
10-Oct-94			16						18						
11-Oct-94			13				13		16						
12-Oct-94	14		24						31						
13-Oct-94			124	31*					16						
14-Oct-94			36						19						
15-Oct-94			17	1*					13						
16-Oct-94			11						6						
17-Oct-94	6		7						10						
18-Oct-94			10						13						
19-Oct-94			16						17						
20-Oct-94			16						19						
21-Oct-94			18						19						
22-Oct-94			14						17						
23-Oct-94	13		15	4			13		16						
24-Oct-94			18						19						
25-Oct-94			19						20						
26-Oct-94			19						18						
27-Oct-94			19						21						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
28-Oct-94			19						19						
29-Oct-94	14		19	7			15		18						
30-Oct-94			12						13						
31-Oct-94			12						19						
01-Nov-94			27						21						
02-Nov-94			53						32						
03-Nov-94			29	16*			14*		13						
04-Nov-94	10		9						13						
05-Nov-94			10						16						
06-Nov-94			53						27						
07-Nov-94			17						19						
08-Nov-94			8			5			9						
09-Nov-94			74			21			95						
10-Nov-94	13		24	2		5	9		14						
11-Nov-94			8			3			9						
12-Nov-94			6			5			13						
13-Nov-94			5			14			10						
14-Nov-94			6			5			14						
15-Nov-94			72			13			49						
16-Nov-94	23		31			8	24		24						
17-Nov-94			**402**			33			10						
18-Nov-94			32			57	19*		20						
19-Nov-94			36			71			18						
20-Nov-94			9			9			18						
21-Nov-94			12			10			16						
22-Nov-94	9		9	5		8			14						
23-Nov-94			10			9			17						
24-Nov-94			10			8			17						
25-Nov-94			**421**			93			55						
26-Nov-94			130	6*		11	8*		12						
27-Nov-94			3			5			8						
28-Nov-94			7			8			13						
29-Nov-94			10			11			15						
30-Nov-94			13			11			15						
01-Dec-94			10			9			14						
02-Dec-94			9			14			15						
03-Dec-94			28			22			40						
04-Dec-94	**158**		**208**	3		7	32		40						
05-Dec-94			11			10			18						
06-Dec-94			14			10			15						
07-Dec-94			13			10			17						
08-Dec-94			24			**262**			26						
09-Dec-94			13			11			19						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
10-Dec-94	14		16	6		16	11		13						
11-Dec-94			13			13			15						
12-Dec-94			**680**			29			61						
13-Dec-94			65			9			23						
14-Dec-94			8			9			11						
15-Dec-94			12			9			16						
16-Dec-94	10		12	7		10			21						
17-Dec-94			14			18			21						
18-Dec-94			18			16			16						
19-Dec-94			14			14			22						
20-Dec-94			11			11			24						
21-Dec-94			17			17			23						
22-Dec-94	14		16	21		27	23		21						
23-Dec-94			12			11			12						
24-Dec-94			87			10			19						
25-Dec-94			97	10*		44	3*		9						
26-Dec-94			9			12			9						
27-Dec-94			6			7			9						
28-Dec-94			39			25			38						
29-Dec-94			6			4			6						
30-Dec-94			7			5			9						
31-Dec-94			8			7			13						
01-Jan-95			8			6			10						
02-Jan-95			9			7			13						
03-Jan-95			7			6			7						
04-Jan-95			3			2			4						
05-Jan-95			4			2			7						
06-Jan-95			8			9			13						
07-Jan-95			6			6			6						
08-Jan-95			6			6			8						
09-Jan-95	4		3	2		3	6		8						
10-Jan-95			4			3			4						
11-Jan-95			3			2			8						
12-Jan-95			7	5		7	11		11						
13-Jan-95			6			6			13						
14-Jan-95			8			4			7						
15-Jan-95	3		4	1		1	1		4						
16-Jan-95			5			4			8						
17-Jan-95			4			4			10						
18-Jan-95			7			6			12						
19-Jan-95			7			6			14						
20-Jan-95			11			6			19						
21-Jan-95	5		10	4		6	6		8						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
22-Jan-95			9			6			8						
23-Jan-95			4			3			5						
24-Jan-95			4			3			4						
25-Jan-95			4			3			4						
26-Jan-95			4			4			10						
27-Jan-95	7		6	4		6	15		12						
28-Jan-95			9			6			11						
29-Jan-95			7			6			12						
30-Jan-95			7			6			7						
31-Jan-95			7			6			12						
01-Feb-95			5			6			9						
02-Feb-95	7		5	5		4	8		8						
03-Feb-95			7			7			9						
04-Feb-95			8			8			11						
05-Feb-95			8			6			10						
06-Feb-95			7			6			11						
07-Feb-95			17			10			68						
08-Feb-95	5		9	5		9	11		11						
09-Feb-95			8			4			5						
10-Feb-95			6			5			8						
11-Feb-95			9			6			9						
12-Feb-95			15			6			14						
13-Feb-95			**3883**			19			**228**						
14-Feb-95				2			2								
17-Feb-95			9			7			9						
18-Feb-95			6			6			6						
19-Feb-95			8			6			9						
20-Feb-95	6		8			5	7		9						
21-Feb-95			8			7			10						
22-Feb-95			10			9			12						
23-Feb-95	5		8			8			12						
24-Feb-95			**168**			10			61						
25-Feb-95			19			15			30						
26-Feb-95	17		22			11	10		13						
27-Feb-95			13			10			12						
28-Feb-95			12			11			15						
01-Mar-95			9			8			10						
02-Mar-95			9			7			9						
03-Mar-95			**665**			6			**228**						
04-Mar-95	8		8	6		10			18						
05-Mar-95			66			45			23						
06-Mar-95			55			**170**			28						
07-Mar-95			21			11			14						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
08-Mar-95			90			18			137						
09-Mar-95			**323**			26			**392**						
10-Mar-95	4		5	3		4	3		4						
11-Mar-95			1			2									
12-Mar-95			6			5			6						
13-Mar-95			7			8			9						
14-Mar-95			9			8			9						
15-Mar-95			7			5			9						
16-Mar-95	8		9	6		6	27		36						
17-Mar-95			9			9			10						
18-Mar-95			11			9			10						
19-Mar-95			10			7			8						
20-Mar-95			**408**			36			**153**						
21-Mar-95			**2204**			21			94						
22-Mar-95	**238**		**327**	5		8	138		**174**						
23-Mar-95			75	7*		4	39*		21						
24-Mar-95			28			16			26						
25-Mar-95			8			24			6						
26-Mar-95			7			8			6						
27-Mar-95			16						9						
28-Mar-95	30		44				6		10						
29-Mar-95			11			28			9						
30-Mar-95			13			21			13						
31-Mar-95			16			11			15						
01-Apr-95			65			**558**			20						
02-Apr-95			65			112	10*		15						
03-Apr-95	7		9			41			12						
04-Apr-95			58	7		10			45						
05-Apr-95			22			13	14		13						
06-Apr-95			23			14			17						
07-Apr-95			120			18			33						
08-Apr-95			**158**			128	59*		107						
09-Apr-95	**222**		**331**			**2252**			52						
10-Apr-95			37			39			20						
11-Apr-95			46	13		23			18						
12-Apr-95	2668*		**338**			32			149						
13-Apr-95	477*		**3929**			62			117						
14-Apr-95						21			13						
15-Apr-95	52		69	16		23	121		148						
16-Apr-95			22			18			36						
17-Apr-95			41			9			13						
18-Apr-95			17			10			10						
19-Apr-95			5			13			9						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
20-Apr-95			94			39			21						
21-Apr-95	31		51	55		119	19		16						
22-Apr-95			12			81			12						
23-Apr-95			11			18			12						
24-Apr-95			20			12			16						
25-Apr-95			9			39			14						
26-Apr-95			**307**			14			42						
27-Apr-95	**316**		**454**			18	54		54						
28-Apr-95			62			45			42						
29-Apr-95			**373**			52			89						
30-Apr-95			**154**			30			106						
01-May-95			**208**			45			82						
02-May-95						12			5						
03-May-95	17		22			11	12		14						
04-May-95			83			42			22						
05-May-95			**157**			**169**			48						
06-May-95			13			14			17						
07-May-95			5			5			5						
08-May-95			11			11			11						
09-May-95	10		14			14	12		15						
10-May-95			12			14			17						
11-May-95			95			21			21						
12-May-95			76			9			14						
13-May-95			23			13			14						
14-May-95			13			8			7						
15-May-95	6		7			7	7		7						
16-May-95			12			7			9						
17-May-95			9			10			10						
18-May-95			13			11			13						
19-May-95			14			14			17						
20-May-95			18			18			19						
21-May-95			24			21			23						
22-May-95			91			11			15						
23-May-95	17		24	9		11	8		10						
24-May-95			27			8			12						
25-May-95			66			10			13						
26-May-95			17			23			20						
27-May-95	14		18	14		19	12		17						
28-May-95			11			18			11						
29-May-95			11			25			13						
30-May-95			18			16			17						
31-May-95			19			17			20						
01-Jun-95			**218**			23			27						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
02-Jun-95	11		13	9		11	10		13						
03-Jun-95			18			19			16						
04-Jun-95			20			23			21						
05-Jun-95			**440**			126			24						
06-Jun-95	93*		**818**						42						
07-Jun-95			15						10						
08-Jun-95			10				7		11						
09-Jun-95			15						14						
10-Jun-95			20						18						
11-Jun-95			19						19						
12-Jun-95			12						13						
13-Jun-95			26						16						
14-Jun-95			72				49		70						
15-Jun-95			**192**						29						
16-Jun-95			16						8						
17-Jun-95			8						9						
18-Jun-95			11						22						
19-Jun-95			15						13						
20-Jun-95			23				9		14						
21-Jun-95			113						14						
22-Jun-95			11						16						
23-Jun-95			11						15						
24-Jun-95			12						14						
25-Jun-95			15						16						
26-Jun-95	12		23				11		16						
27-Jun-95			17						18						
28-Jun-95			22						23						
29-Jun-95									26						
30-Jun-95									17						
01-Jul-95			18						15						
02-Jul-95			16				11		15						
03-Jul-95			16						13						
04-Jul-95			19						23						
05-Jul-95			31						20						
06-Jul-95			31						29						
07-Jul-95			33						27						
08-Jul-95			28				19		25						
09-Jul-95			14						17						
10-Jul-95			34						16						
11-Jul-95			77						18						
12-Jul-95			19						28						
13-Jul-95			20						22						
14-Jul-95							15		17						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
15-Jul-95									22						
16-Jul-95									27						
17-Jul-95									12						
18-Jul-95			8						10						
19-Jul-95	11								13						
20-Jul-95							14		18						
21-Jul-95									21						
22-Jul-95									15						
23-Jul-95									16						
24-Jul-95									14						
25-Jul-95									15						
26-Jul-95							9		13						
27-Jul-95	7								20						
28-Jul-95			20						23						
29-Jul-95			37						22						
30-Jul-95			18						19						
31-Jul-95			23						27						
01-Aug-95			34				20		25						
02-Aug-95			22						22						
03-Aug-95			22						21						
04-Aug-95			20						23						
05-Aug-95			17						19						
06-Aug-95			11						13						
07-Aug-95			56				12		19						
08-Aug-95			17						18						
09-Aug-95			19						16						
10-Aug-95			59						16						
11-Aug-95			20						18						
12-Aug-95			14						14						
13-Aug-95			14				12		16						
14-Aug-95			22						20						
15-Aug-95			28						20						
16-Aug-95			31						27						
17-Aug-95			52						20						
18-Aug-95			19						42						
19-Aug-95			21				14		19						
20-Aug-95			26						31						
21-Aug-95			27						19						
22-Aug-95			20						15						
23-Aug-95			19						15						
24-Aug-95			22						23						
25-Aug-95	16		18	13			13		16						
26-Aug-95			24						15						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
27-Aug-95			14						13						
28-Aug-95			38						13						
29-Aug-95			10						15						
30-Aug-95			24						19						
31-Aug-95	12		17	11			14		18						
01-Sep-95			28						23						
02-Sep-95			23						22						
03-Sep-95			17						16						
04-Sep-95			13						11						
05-Sep-95			15						14						
06-Sep-95	11		17	9					14						
07-Sep-95			17						17						
08-Sep-95			22						22						
09-Sep-95			20						18						
10-Sep-95			13						16						
11-Sep-95			17						15						
12-Sep-95			17	11			15		18						
13-Sep-95	13		19						19						
14-Sep-95			19						17						
15-Sep-95			31						24						
16-Sep-95			26						20						
17-Sep-95			14						17						
18-Sep-95			17	6			14		20						
19-Sep-95			33						24						
20-Sep-95			24						26						
21-Sep-95			27						21						
22-Sep-95			27						24						
23-Sep-95			20						19						
24-Sep-95			24	14			16		19						
25-Sep-95			26						22						
26-Sep-95			35						18						
27-Sep-95			29						22						
28-Sep-95			24						25						
29-Sep-95			28						40						
30-Sep-95			9	7					12						
01-Oct-95			12						14						
02-Oct-95			15						16						
03-Oct-95			20				20		23						
04-Oct-95	20*		94						90						
05-Oct-95			14						14						
06-Oct-95			18	14			16		18						
07-Oct-95			26						25						
08-Oct-95			36						29						

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 μg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
09-Oct-95			27						21						
10-Oct-95			24						20						
11-Oct-95			43						32						
12-Oct-95			29	17			23		29						
13-Oct-95			27						20						
14-Oct-95			12						14						
15-Oct-95			111						35						
16-Oct-95			33						25						
17-Oct-95			27						23						
18-Oct-95			23	14			18		21						
19-Oct-95	14								20						
20-Oct-95									22						
21-Oct-95	99*								46						
22-Oct-95									60						
23-Oct-95									13						
24-Oct-95				10			13		15						
25-Oct-95									17						
26-Oct-95									20						
27-Oct-95									17						
28-Oct-95									16						
29-Oct-95									20						
30-Oct-95	14			13			15		17						
31-Oct-95									23						
01-Nov-95									22						
02-Nov-95									21						
03-Nov-95									19						
04-Nov-95									18						
05-Nov-95	17			13			17		19						
06-Nov-95									23						
07-Nov-95									22						
08-Nov-95									20						
09-Nov-95									16						
10-Nov-95									16						
11-Nov-95	11			8			13		14						
12-Nov-95									17						
13-Nov-95									18						
14-Nov-95									15						
15-Nov-95									18						
16-Nov-95									17						
17-Nov-95	12			13			18		18						
18-Nov-95									17						
19-Nov-95			20						22						
20-Nov-95			22						22						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
21-Nov-95			21			37			22						
22-Nov-95			20			21			24						
23-Nov-95	13		15	24		28	19		20						
24-Nov-95			19			21			28						
25-Nov-95			21			19			24						
26-Nov-95			**320**						84						
27-Nov-95			9			10			19						
28-Nov-95			14			11			18						
29-Nov-95	6		9	6		10	16		15						
30-Nov-95			15			12			18						
01-Dec-95			13			13			17						
02-Dec-95			16			11			19						
03-Dec-95			14			12			18						
04-Dec-95			14			14			23						
05-Dec-95	11		14	12		20	19		17						
06-Dec-95			13			14			20						
07-Dec-95			16			12			34						
08-Dec-95	14*		22			14			26						
09-Dec-95			11			13			23						
10-Dec-95			12			22			19						
11-Dec-95			22	12		30	24		22						
12-Dec-95	106*		**1100**			46			125						
13-Dec-95						3			8						
14-Dec-95						4			10						
15-Dec-95	10*					4			5						
16-Dec-95				13*		48	2*		10						
17-Dec-95						6			8						
18-Dec-95						6			10						
19-Dec-95			7			7			10						
20-Dec-95			8			6			6						
21-Dec-95			9			5			11						
22-Dec-95			10			8			6						
23-Dec-95	9		5	7		4			7						
24-Dec-95			9			7			13						
25-Dec-95			10			9			16						
26-Dec-95			11			10			15						
27-Dec-95			10			8			15						
28-Dec-95			8			6			9						
29-Dec-95	7		7	3		5			12						
30-Dec-95			9			6			11						
31-Dec-95			20			39			18						
01-Jan-96			16			47			2						
02-Jan-96			6			13			7						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
03-Jan-96			5			5			8						
04-Jan-96			7	5		9	16		14						
05-Jan-96			11			8			10						
06-Jan-96			8			4			13						
07-Jan-96			6			4			9						
08-Jan-96			8			9			12						
09-Jan-96			8			7			11						
10-Jan-96	11		17	106		**178**	7		14						
11-Jan-96			9			7			11						
12-Jan-96			11			6			11						
13-Jan-96			9			7			12						
14-Jan-96			11			9			12						
15-Jan-96			12			9			13						
16-Jan-96	25		40			11	10		10						
17-Jan-96			8			5			7						
18-Jan-96			16			10			17						
19-Jan-96			39			2			12						
20-Jan-96			7			6			9						
21-Jan-96	6*		31			4			5						
22-Jan-96			8			4			8						
23-Jan-96			7			5			12						
24-Jan-96			9			8			11						
25-Jan-96	48*		107	5		18	15		23						
26-Jan-96			14			11			16						
27-Jan-96	174*		**303**			11			11						
28-Jan-96			2	2		5			9						
29-Jan-96			10			6			8						
30-Jan-96			12			6			5						
31-Jan-96			12			9			8						
01-Feb-96			6			4			10						
02-Feb-96			7			3			11						
03-Feb-96	6		10	6		6	7		9						
04-Feb-96			11			7			10						
05-Feb-96			9			5			8						
06-Feb-96			7			5			9						
07-Feb-96			8			5			10						
08-Feb-96			10			5			10						
09-Feb-96	8		9	4		7	7		9						
10-Feb-96			11			9			12						
11-Feb-96			9			8			9						
12-Feb-96			9			8			9						
13-Feb-96			17			15			13						
14-Feb-96	7*					9			14						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
15-Feb-96				4		8	9		10						
16-Feb-96						9			13						
17-Feb-96			11			8			10						
18-Feb-96			13			9			11						
19-Feb-96	29*		73			6			14						
20-Feb-96			5			3			3						
21-Feb-96			7	1		4	4		7						
22-Feb-96	17*		40			5			5						
23-Feb-96			8			5			8						
24-Feb-96	82*		**158**			11			61						
25-Feb-96			15			3			6						
26-Feb-96			6			5			7						
27-Feb-96			8	2		6	9		9						
28-Feb-96			6			5			6						
29-Feb-96			7			6			8						
01-Mar-96			7			6			11						
02-Mar-96			7			5			10						
03-Mar-96	79*		37			7			40						
04-Mar-96			120	3		11	42		49						
05-Mar-96			**243**			39			9						
06-Mar-96			12			88			8						
07-Mar-96			8			7			9						
08-Mar-96			9			7			10						
09-Mar-96			12			7			10						
10-Mar-96	6		10	6		8	7		9						
11-Mar-96			13			11			9						
12-Mar-96			9			7			9						
13-Mar-96			5			4			4						
14-Mar-96			6			6			6						
15-Mar-96			8			5			6						
16-Mar-96	29		43	18		35	6		11						
17-Mar-96			9			8			7						
18-Mar-96			9			8			9						
19-Mar-96			11			9			11						
20-Mar-96			11			11			15						
21-Mar-96			12			12			14						
22-Mar-96	**491**		**734**	31		89			20						
23-Mar-96			107			30			11						
24-Mar-96			8			9			10						
25-Mar-96			**203**	44*		**319**			67						
26-Mar-96			42			63			11						
27-Mar-96			16			23			15						
28-Mar-96	422*		**862**	23		58	38		50						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
29-Mar-96						27			11						
30-Mar-96						13			12						
31-Mar-96						12			16						
01-Apr-96	132*					15			119						
02-Apr-96						7			7						
03-Apr-96				6		9	7		12						
04-Apr-96						**230**			18						
05-Apr-96						78			13						
06-Apr-96									13						
07-Apr-96						15			17						
08-Apr-96						18			20						
09-Apr-96	29			12		20	22		30						
10-Apr-96						17			15						
11-Apr-96						51			16						
12-Apr-96						54			29						
13-Apr-96						12			16						
14-Apr-96						11			11						
15-Apr-96				9		19	32		41						
16-Apr-96						32			95						
17-Apr-96						7			10						
18-Apr-96				3*		8	3*		8						
19-Apr-96						7			16						
20-Apr-96			27			97			17						
21-Apr-96			11			33			13						
22-Apr-96			18			20			17						
23-Apr-96			24			22			29						
24-Apr-96			34			19			17						
25-Apr-96			20			13			13						
26-Apr-96			14			13			17						
27-Apr-96	48		65	**397**		**657**	20		28						
28-Apr-96			57			**2383**			34						
29-Apr-96			12			7			15						
30-Apr-96			17			20			17						
01-May-96			15			17			15						
02-May-96			26			44			13						
03-May-96	11		16	9		15	8		13						
04-May-96			10			15			11						
05-May-96			12			17			14						
06-May-96			14			16			12						
07-May-96			16			18			17						
08-May-96	33*		61	16*		21	10*		19						
09-May-96			15			20			17						
10-May-96			22			19			20						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
11-May-96			18			23			20						
12-May-96			18			19			21						
13-May-96			26			33			25						
14-May-96			19			21			22						
15-May-96			**564**	17		53	63		85						
16-May-96			**521**			55			**166**						
17-May-96			88			49			30						
18-May-96			40			56			17						
19-May-96			24			50			16						
20-May-96			20			48			16						
21-May-96	49		73	16		30	17		20						
22-May-96	135*		**212**			22			30						
23-May-96			**259**	75*		42	9*		34						
24-May-96	15*		86			**263**			17						
25-May-96			15			21			13						
26-May-96			15			16			16						
27-May-96			102			17			21						
28-May-96			11			12			14						
29-May-96			20			17			18						
30-May-96			21			46			20						
31-May-96			21			27			21						
01-Jun-96			17			16			17						
02-Jun-96	12		16	15		18	14		18						
03-Jun-96			20			20			22						
04-Jun-96			27			24			21						
05-Jun-96						23			22						
06-Jun-96						22			20						
07-Jun-96						36			35						
08-Jun-96	24			19		30	28		32						
09-Jun-96						31			22						
10-Jun-96						17			12						
11-Jun-96						17			18						
12-Jun-96						27			23						
13-Jun-96			34			31			27						
14-Jun-96	24		32	24		29	29		34						
15-Jun-96			22			25			26						
16-Jun-96	27*		68			26			25						
17-Jun-96			19			23			19						
18-Jun-96			24			23			22						
19-Jun-96			34			21			26						
20-Jun-96	14		19	12		24	20		26						
21-Jun-96			30			22			30						
22-Jun-96			27			41			27						

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PM10 values greater than 150 μg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
23-Jun-96	127*		41			31			27						
24-Jun-96			**261**			21			19						
25-Jun-96	8*		25			13			16						
26-Jun-96			19	6		11	14		23						
27-Jun-96			16			16			16						
28-Jun-96			11			11			14						
29-Jun-96			8			18			13						
30-Jun-96			10			13			13						
01-Jul-96			18			23			20						
02-Jul-96	19		33	14		22	21		26						
03-Jul-96			21			20			30						
04-Jul-96			20			16			38						
05-Jul-96			20			22			18						
06-Jul-96			13			19			18						
07-Jul-96			19			24			20						
08-Jul-96	16		22	14		24			29						
09-Jul-96			23			25			23						
10-Jul-96			29			32			29						
11-Jul-96			**216**			94	30		52						
12-Jul-96			12			14			9						
13-Jul-96			13			15			14						
14-Jul-96				13		16	9		12						
15-Jul-96						35			26						
16-Jul-96						34			28						
17-Jul-96						30			20						
18-Jul-96			20			22			16						
19-Jul-96			17			17			15						
20-Jul-96	11		12	13		16			13						
21-Jul-96			15			17			15						
22-Jul-96			20			22			18						
23-Jul-96			25			29			21						
24-Jul-96			23			24			20						
25-Jul-96			21			20			20						
26-Jul-96	22		29	19		24	19		20						
27-Jul-96			47			35			38						
28-Jul-96			19			19			14						
29-Jul-96			21			18			15						
30-Jul-96			16			16			18						
31-Jul-96			17			16			27						
01-Aug-96	20		26	21		27	21		25						
02-Aug-96			31			26			20						
03-Aug-96			23			25			18						
04-Aug-96			13			19			15						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
05-Aug-96			26			23			24						
06-Aug-96			28			28			23						
07-Aug-96			20	16		19	17		20						
08-Aug-96			16			20			19						
09-Aug-96			16			19			19						
10-Aug-96			25			26			25						
11-Aug-96	136*		**308**			28			34						
12-Aug-96			29			23			24						
13-Aug-96			17	12		13	11		15						
14-Aug-96	34*		58			20			21						
15-Aug-96			45			33									
16-Aug-96			26			25									
17-Aug-96			19			18									
18-Aug-96			25			21									
19-Aug-96	16		32			33	25								
20-Aug-96			34			44									
21-Aug-96			28			31									
22-Aug-96			21			21			23						
23-Aug-96	14*		40			24			20						
24-Aug-96			14			15			16						
25-Aug-96			13	13		15	11		16						
26-Aug-96			20			18			16						
27-Aug-96			15			16			17						
28-Aug-96			19			22			22						
29-Aug-96			16			19			22						
30-Aug-96			24			25			31						
31-Aug-96	28		31	28		34	27		33						
01-Sep-96			21			15			15						
02-Sep-96			12			11			18						
03-Sep-96			24			20			20						
04-Sep-96	53*		103			22			21						
05-Sep-96			13			21			20						
06-Sep-96			16			20	11		17						
07-Sep-96			19			20			18						
08-Sep-96			13			20			16						
09-Sep-96			17			16			16						
10-Sep-96			16			18			14						
11-Sep-96			16			17			19						
12-Sep-96	15		34	18		38	22		35						
13-Sep-96	25*		55			19			21						
14-Sep-96			9			11			12						
15-Sep-96			17			19			15						
16-Sep-96			21			16			19						

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PM10 values greater than 150 μg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
17-Sep-96			11			18			13						
18-Sep-96	26		39	9		21	21		32						
19-Sep-96			21			24			20						
20-Sep-96			16			23			18						
21-Sep-96	18*		29			29			27						
22-Sep-96			21			24			21						
23-Sep-96			20			21			19						
24-Sep-96	10		16	11		20	12		14						
25-Sep-96			19			20			20						
26-Sep-96			29			106			21						
27-Sep-96			14			21			16						
28-Sep-96			10			14			13						
29-Sep-96			10			14			11						
30-Sep-96	15		36			29	17		25						
01-Oct-96			27			31			23						
02-Oct-96			16			13			16						
03-Oct-96			17			16			18						
04-Oct-96			17			18			20						
05-Oct-96			13			16			18						
06-Oct-96	10		12			15	11		13						
07-Oct-96			13			17			20						
08-Oct-96			16			13			19						
09-Oct-96			19			23			20						
10-Oct-96			26			28			24						
11-Oct-96			23			26			27						
12-Oct-96	11		15	13		19	14		18						
13-Oct-96			12			23			17						
14-Oct-96			17			16			20						
15-Oct-96			16			18									
16-Oct-96			30			25									
17-Oct-96			23			16									
18-Oct-96	23		39	18		36	18								
19-Oct-96			139			60									
20-Oct-96			17			86									
21-Oct-96			9			19									
22-Oct-96						10									
23-Oct-96						10									
24-Oct-96						17	13								
25-Oct-96						69									
26-Oct-96						41									
27-Oct-96	96*					59									
28-Oct-96				4		9									
29-Oct-96						14									

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
30-Oct-96				2		7	5								
31-Oct-96	8					6									
01-Nov-96						10									
02-Nov-96						7									
03-Nov-96						8									
04-Nov-96						12									
05-Nov-96	27		38	47		72	11								
06-Nov-96			10												
07-Nov-96			13			10			12						
08-Nov-96			16			7									
09-Nov-96			19			7									
10-Nov-96			10			8									
11-Nov-96			10	4		9	12		13						
12-Nov-96			11			9			18						
13-Nov-96			13			10			14						
14-Nov-96			17			13			20						
15-Nov-96			19			10			19						
16-Nov-96			9			11			12						
17-Nov-96	9		15	8		11	8		10						
18-Nov-96			9			6			10						
19-Nov-96	23*		67			13			31						
20-Nov-96						11									
21-Nov-96	3*					6			3						
22-Nov-96						2			3						
23-Nov-96	3			7		4	6		7						
24-Nov-96						4			6						
25-Nov-96						5			8						
26-Nov-96			27			54			6						
27-Nov-96			24			113			7						
28-Nov-96			8			28			24						
29-Nov-96	71		103			**710**	4								
30-Nov-96			7			6									
01-Dec-96			63			29			13						
02-Dec-96			14						15						
03-Dec-96			13						16						
04-Dec-96			12						18						
05-Dec-96	9		13				15		17						
06-Dec-96			28						20						
07-Dec-96			10						14						
08-Dec-96	221*		**243**						59						
09-Dec-96			62						93						
10-Dec-96			9						8						
11-Dec-96	4		6				3		6						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
12-Dec-96			12						12						
13-Dec-96			12			11			13						
14-Dec-96			24			**181**			16						
15-Dec-96			6			5			7						
16-Dec-96			17			8			7						
17-Dec-96	18		20			73	5		9						
18-Dec-96			12			9			13						
19-Dec-96			9			7			15						
20-Dec-96			9			7			11						
21-Dec-96	162*		**247**			87			29						
22-Dec-96			24			6			6						
23-Dec-96			10			8	6		10						
24-Dec-96			7			6			10						
25-Dec-96			7			7			8						
26-Dec-96			9			6			13						
27-Dec-96			8			60			10						
28-Dec-96			6			5			10						
29-Dec-96	14		17			14	9		12						
30-Dec-96			12			10			11						
31-Dec-96			6			6			8						
01-Jan-97			15			8			16						
02-Jan-97			9			10			10						
03-Jan-97			3						2						
04-Jan-97	3		6	1		5	7		8						
05-Jan-97			19			22			5						
06-Jan-97	66*		104			150			22						
07-Jan-97			27			91			11						
08-Jan-97			9			28			11						
09-Jan-97						8			15						
10-Jan-97	5			3			8		9						
11-Jan-97									9						
12-Jan-97									10						
13-Jan-97									9						
14-Jan-97									15						
15-Jan-97									14						
16-Jan-97	9			5		10	18		18						
17-Jan-97						10			15						
18-Jan-97						5			11						
19-Jan-97						4			8						
20-Jan-97	15*		32			5			23						
21-Jan-97			7			8			8						
22-Jan-97			146	4		14	92		123						
23-Jan-97			6			3			7						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
24-Jan-97			5			6			8						
25-Jan-97			6			5			6						
26-Jan-97			4			3			7						
27-Jan-97			6			5			10						
28-Jan-97			6	1		8	6		8						
29-Jan-97			10			4			6						
30-Jan-97			6			5			11						
31-Jan-97			7			7			10						
01-Feb-97			6			8			10						
02-Feb-97			16			4			10						
03-Feb-97			8	3		11	8		12						
04-Feb-97			10			8			13						
05-Feb-97	18*		67			18			7						
06-Feb-97			6			6			10						
07-Feb-97			7			10			10						
08-Feb-97			8			7			8						
09-Feb-97	5		8	4		8	6		9						
10-Feb-97			9			13			13						
11-Feb-97			14			15			19						
12-Feb-97	91*		56			**520**			51						
13-Feb-97			114			**766**			19						
14-Feb-97			8			9			9						
15-Feb-97	4		7	4		6	10		14						
16-Feb-97			12			16			36						
17-Feb-97			53			26			27						
18-Feb-97			16			**253**			7						
19-Feb-97			7			9			11						
20-Feb-97	7*		21			30			14						
21-Feb-97			7			14	15								
22-Feb-97	14*		25			18									
23-Feb-97			26			54									
24-Feb-97			26			24									
25-Feb-97			**288**			**274**									
26-Feb-97			16			11									
27-Feb-97			30	34		64	7		12						
28-Feb-97			9			24			13						
01-Mar-97			9			9			11						
02-Mar-97			13			53			15						
03-Mar-97	42*		101			**152**			42						
04-Mar-97			20			33			13						
05-Mar-97			10	15		15	8		11						
06-Mar-97			11			11			13						
07-Mar-97			12			13			13						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
08-Mar-97			11			16			14						
09-Mar-97			9			11			12						
10-Mar-97			9			12			12						
11-Mar-97			9	7		12	9		13						
12-Mar-97	8		13			11			14						
13-Mar-97			12			14			17						
14-Mar-97			11			18			15						
15-Mar-97			10			13			15						
16-Mar-97			34			12			15						
17-Mar-97			11	8		21	10		14						
18-Mar-97			10			15			16						
19-Mar-97			13			17			15						
20-Mar-97	9		12			33			16						
21-Mar-97			12			16			19						
22-Mar-97			18			23			24						
23-Mar-97	18		27			17	13		19						
24-Mar-97			12			10			12						
25-Mar-97			16			14			16						
26-Mar-97			15			20			17						
27-Mar-97			15			15			13						
28-Mar-97	14*		48			98			37						
29-Mar-97			14	13		49	8		12						
30-Mar-97			19			27			28						
31-Mar-97	116*		**428**			126			52						
01-Apr-97			46			144			20						
02-Apr-97			53			**168**			22						
03-Apr-97			38			23			13						
04-Apr-97			33	8		21	18		25						
05-Apr-97			28			31			24						
06-Apr-97			14			16			19						
07-Apr-97			20			37			20						
08-Apr-97			30			21			17						
09-Apr-97	43*		93			73			28						
10-Apr-97			13	5		13	6		9						
11-Apr-97			19			13			15						
12-Apr-97			15			27			18						
13-Apr-97			15			21			17						
14-Apr-97			16			20			18						
15-Apr-97			16			16			17						
16-Apr-97	13		20	10		22	16		21						
17-Apr-97			17			21			22						
18-Apr-97			28			28			21						
19-Apr-97			19			17			15						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
20-Apr-97			9			9			9						
21-Apr-97	26*		49			13			19						
22-Apr-97			14	9		19	10		16						
23-Apr-97	61*		47			29			21						
24-Apr-97			**170**			137			33						
25-Apr-97	33*		67			90			15						
26-Apr-97			10			15			15						
27-Apr-97			21			23			20						
28-Apr-97			21	8		18	14		20						
29-Apr-97	13		18			19			15						
30-Apr-97	17*		28			20			20						
01-May-97			22			13			21						
02-May-97			24			28			25						
03-May-97			12			14			16						
04-May-97	8		14	9		11	11		14						
05-May-97			17			18			19						
06-May-97	159*		32			15			25						
07-May-97			**254**			18			22						
08-May-97	21*		54			20			22						
09-May-97			15			20			21						
10-May-97			20	10		19	16		19						
11-May-97			18			19			19						
12-May-97			15			18			17						
13-May-97			14			19			21						
14-May-97			18			22			21						
15-May-97			18			20			20						
16-May-97	14		14	14		15	15		19						
17-May-97			54			22			30						
18-May-97			138			12			17						
19-May-97			33			17			18						
20-May-97			14			19			17						
21-May-97			16			21			20						
22-May-97	22		25	23		28	25		29						
23-May-97	23*		57			31			23						
24-May-97			11			11			10						
25-May-97			6			11			13						
26-May-97			14			21			18						
27-May-97			14			19			18						
28-May-97	15		17	1		20	20		21						
29-May-97			18			20			20						
30-May-97			15			17			20						
31-May-97			22			18			20						
01-Jun-97			12			14			15						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
02-Jun-97			16			15			17						
03-Jun-97	17		21	15		25	29		32						
04-Jun-97	44*		77			16			37						
05-Jun-97			20			10			11						
06-Jun-97			31			9			9						
07-Jun-97	25*		47			15			15						
08-Jun-97			19			17			23						
09-Jun-97			17	10		16	16		19						
10-Jun-97			13			20			19						
11-Jun-97			19			24			21						
12-Jun-97	53*		50			16			12						
13-Jun-97			46			44			24						
14-Jun-97			5			7			7						
15-Jun-97	5		4	7		8	6		6						
16-Jun-97			6			9			9						
17-Jun-97			11			13			13						
18-Jun-97			16			19			20						
19-Jun-97			17			19			23						
20-Jun-97			18			18			18						
21-Jun-97	14		14	12		15	17		20						
22-Jun-97			16			17			19						
23-Jun-97			18			18			16						
24-Jun-97			12			22			15						
25-Jun-97			13			19			17						
26-Jun-97			17			18			22						
27-Jun-97	12		13	13		16	16		18						
28-Jun-97			21			14			14						
29-Jun-97			13			12			15						
30-Jun-97	256*		**385**			25			31						
01-Jul-97			11			11			12						
02-Jul-97			9			11			15						
03-Jul-97			11	11		13	11		13						
04-Jul-97			14			14			16						
05-Jul-97			22			12			11						
06-Jul-97			12			13			15						
07-Jul-97			15			17			15						
08-Jul-97			16			23			18						
09-Jul-97	17		23	12		24	20		23						
10-Jul-97			21			25			21						
11-Jul-97			16			21			20						
12-Jul-97			19			24			25						
13-Jul-97			15			17			16						
14-Jul-97			12			20			19						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
15-Jul-97	16		16	11		18	17		20						
16-Jul-97			14			19			19						
17-Jul-97			27			18			18						
18-Jul-97			14			17			16						
19-Jul-97			12			15			14						
20-Jul-97			13			16			16						
21-Jul-97	22		32			27	22		31						
22-Jul-97			20			21			23						
23-Jul-97			11			9			8						
24-Jul-97			4			6			5						
25-Jul-97			8			13			10						
26-Jul-97			7			13			10						
27-Jul-97	12		16	18		47	8		17						
28-Jul-97			18			18			17						
29-Jul-97			17			10			12						
30-Jul-97			13			19			16						
31-Jul-97			14			29			17						
01-Aug-97			11			21			20						
02-Aug-97	8		10	10		14	10		18						
03-Aug-97			26			19			22						
04-Aug-97			17			27			17						
05-Aug-97			15			22			20						
06-Aug-97			15			18			22						
07-Aug-97			24			22			24						
08-Aug-97			15	17		26	16		19						
09-Aug-97			24			34			29						
10-Aug-97			28			35			29						
11-Aug-97			38			35			34						
12-Aug-97	13		13			21			20						
13-Aug-97			13			21			19						
14-Aug-97	13		14	16		21	16		22						
15-Aug-97			19			24			24						
16-Aug-97			17			24			22						
17-Aug-97			19			28			25						
18-Aug-97			12			25			18						
19-Aug-97			22			29			24						
20-Aug-97	9		5			21	10		13						
21-Aug-97			10			16			13						
22-Aug-97			11			15			16						
23-Aug-97			12			17			15						
24-Aug-97			5			18			17						
25-Aug-97			12			16			14						
26-Aug-97	11		12			18			18						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
27-Aug-97			13			24	11		16						
28-Aug-97			17			21			22						
29-Aug-97			15			22			19						
30-Aug-97			14			15			14						
31-Aug-97			9			13			12						
01-Sep-97	15		15	11		19	13		20						
02-Sep-97			14			18			14						
03-Sep-97			11			12			10						
04-Sep-97			10			11			9						
05-Sep-97			17			17			15						
06-Sep-97			14			17			15						
07-Sep-97	10		8	8		10	6		11						
08-Sep-97			10			12			12						
09-Sep-97			13			14			14						
10-Sep-97			8			18			8						
11-Sep-97			12			16			16						
12-Sep-97			18			21			18						
13-Sep-97	25		31	18		30	19		26						
14-Sep-97			66			21			22						
15-Sep-97	21*		54			24			25						
16-Sep-97			21			20			18						
17-Sep-97			25			27			39						
18-Sep-97			20			17			16						
19-Sep-97	47		66	7		11	8		13						
20-Sep-97			112			14			10						
21-Sep-97			15			12			11						
22-Sep-97			12			14			14						
23-Sep-97			11			14			12						
24-Sep-97			12			21			17						
25-Sep-97	19		12	7		9	5		12						
26-Sep-97			8			8			11						
27-Sep-97			7			8			8						
28-Sep-97			9			9			11						
29-Sep-97			11			13			12						
30-Sep-97	18*		13			16			16						
01-Oct-97			29	14		20	13		18						
02-Oct-97	26		30			13			28						
03-Oct-97			10			13			14						
04-Oct-97			12			13			15						
05-Oct-97			15			18			17						
06-Oct-97	246*		**318**			29			86						
07-Oct-97			26	16		24	15		22						
08-Oct-97			20			22			19						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
09-Oct-97	76		96			12			39						
10-Oct-97	121*		122			17			60						
11-Oct-97			100			34			18						
12-Oct-97			14			30			8						
13-Oct-97			7	6		9	9		13						
14-Oct-97			8			9			11						
15-Oct-97			7			10			11						
16-Oct-97			7			12			12						
17-Oct-97			11			13			14						
18-Oct-97			12			15			16						
19-Oct-97	14		15	16		21	16		18						
20-Oct-97	72*		56						29						
21-Oct-97			75						22						
22-Oct-97			13						20						
23-Oct-97			15						21						
24-Oct-97	91*		142						52						
25-Oct-97			16	21			9		11						
26-Oct-97			8						10						
27-Oct-97			9						15						
28-Oct-97	8		10						17						
29-Oct-97			8						17						
30-Oct-97			10						21						
31-Oct-97	10		9	9		4	14		15						
01-Nov-97			7			4			13						
02-Nov-97			9			3			9						
03-Nov-97			11			4			19						
04-Nov-97			11			5			20						
05-Nov-97			8			4			16						
06-Nov-97	8		11	14		7	22		23						
07-Nov-97			21			8			30						
08-Nov-97			18			5			18						
09-Nov-97			9			3			12						
10-Nov-97			8			4			15						
11-Nov-97			6			4			10						
12-Nov-97			6	6		4			10						
13-Nov-97	7		7			4			8						
14-Nov-97			6			3			11						
15-Nov-97			10			5			15						
16-Nov-97			7			4			11						
17-Nov-97			9			5			15						
18-Nov-97	10		11	6		5	12		13						
19-Nov-97	129*		**186**			19			16						
20-Nov-97			11			5			16						

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
21-Nov-97			11			5			20						
22-Nov-97			9			4			12						
23-Nov-97			15			5			15						
24-Nov-97	51		75	7		5	49		62						
25-Nov-97			46			6			22						
26-Nov-97	71*		**284**			3			9						
27-Nov-97			12			4			6						
28-Nov-97	6*		16			3			10						
29-Nov-97			7			4			8						
30-Nov-97			16	11		6	19		13						
01-Dec-97	22*		100			4			11						
02-Dec-97			4			7			13						
03-Dec-97			8			8			9						
04-Dec-97	7		10			11			15						
05-Dec-97			10			8			13						
06-Dec-97	5		7	5			4		5						
07-Dec-97			5			5			6						
08-Dec-97			4			4			5						
09-Dec-97	189*		**167**			45			7						
10-Dec-97			**372**			**204**			7						
11-Dec-97			87			**217**			8						
12-Dec-97	5		8	4		7	7		9						
13-Dec-97			8			6			11						
14-Dec-97	11*		31			10			22						
15-Dec-97			13			10			14						
16-Dec-97			7			8			12						
17-Dec-97			7			9			12						
18-Dec-97	98		**153**	33		51	15		25						
19-Dec-97	312*		**835**			**2229**			43						
20-Dec-97			12			13			10						
21-Dec-97						**212**			17						
22-Dec-97						**1262**			74						
23-Dec-97	68*					101			18						
24-Dec-97			88	25		53	5		8						
25-Dec-97			51			39			15						
26-Dec-97			9			10			10						
27-Dec-97	24		37			14			9						
28-Dec-97			16			81			9						
29-Dec-97			6			11			13						
30-Dec-97	6		7			11	12		10						
31-Dec-97			9			11			15						
01-Jan-98			14			9			72						
02-Jan-98	230*		**381**			13			**472**						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
03-Jan-98			6			6			12						
04-Jan-98			**190**			14			**153**						
05-Jan-98			2			3			10						
06-Jan-98	6		7	5		5	13		14						
07-Jan-98			10			9			19						
08-Jan-98			12			13			27						
09-Jan-98			11			12			14						
10-Jan-98			7			5			8						
11-Jan-98	6		7	4		5	9		10						
12-Jan-98	3*		22			5			12						
13-Jan-98			4			4			8						
14-Jan-98			5			5			10						
15-Jan-98			8			5			11						
16-Jan-98			8			7			10						
17-Jan-98	6		8			6	11		10						
18-Jan-98			24			7			14						
19-Jan-98			13			3			3						
20-Jan-98			6			5			6						
21-Jan-98			5			5			10						
22-Jan-98			8			7			14						
23-Jan-98	7		10	6		7	9		11						
24-Jan-98			9			7			12						
25-Jan-98			7			7			10						
26-Jan-98			15			8			28						
27-Jan-98			12			8			26						
28-Jan-98			9			9			13						
29-Jan-98	43		70	6		10	55		81						
30-Jan-98			4			7			11						
31-Jan-98			8			7			11						
01-Feb-98			14			9			10						
02-Feb-98			5						4						
03-Feb-98			7						6						
04-Feb-98	4		6	3			7		8						
05-Feb-98			8						7						
06-Feb-98			5						6						
07-Feb-98			5						7						
08-Feb-98			3						5						
09-Feb-98			4						4						
10-Feb-98	3		5	2		4	6		7						
11-Feb-98			6			5			8						
12-Feb-98			5			6			15						
13-Feb-98			6			5			5						
14-Feb-98			6			4			7						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
15-Feb-98	21*		60			5			5						
16-Feb-98			7	2		6	8		14						
17-Feb-98			6			4			7						
18-Feb-98			5			5			7						
19-Feb-98	3		5			6			8						
20-Feb-98	82*		**158**			16			9						
21-Feb-98			109			15			13						
22-Feb-98			91			4	17		27						
23-Feb-98			7			3			7						
24-Feb-98			11			4			5						
25-Feb-98			6			5			6						
26-Feb-98	3		5	3		5			6						
27-Feb-98			6			6			8						
28-Feb-98	3		7	3		6	6		8						
01-Mar-98			6			6			8						
02-Mar-98			7			7			9						
03-Mar-98			10			10			10						
04-Mar-98			13			13			13						
05-Mar-98	255*		**214**			13			66						
06-Mar-98			**305**	18		33	26		42						
07-Mar-98			50			60			9						
08-Mar-98			13			10									
09-Mar-98			8			9									
10-Mar-98	4		6			6									
11-Mar-98			6			9									
12-Mar-98	12		23	6		9	111								
13-Mar-98			18			13									
14-Mar-98	10*		23			34									
15-Mar-98			11			16									
16-Mar-98			14			12									
17-Mar-98			9			10									
18-Mar-98	32		46	**173**		**228**	21								
19-Mar-98	75*		23			24									
20-Mar-98			131			16									
21-Mar-98			13			16			15						
22-Mar-98			13			12			15						
23-Mar-98	133*		**237**			14			119						
24-Mar-98			88	7		14	**275**		**391**						
25-Mar-98			10			6			71						
26-Mar-98			12			10			5						
27-Mar-98	10*		37			6			3						
28-Mar-98			6			4									
29-Mar-98			5			6			9						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
30-Mar-98			6	4		10	4		9						
31-Mar-98	2*		25			9			26						
01-Apr-98			5			5			7						
02-Apr-98			6			7			10						
03-Apr-98	5*		26			8			36						
04-Apr-98			6			6			8						
05-Apr-98			8			9			11						
06-Apr-98	5*		22			10			10						
07-Apr-98			6	3		7	6		9						
08-Apr-98			6			7			9						
09-Apr-98	9		12			10			11						
10-Apr-98			12			14			21						
11-Apr-98	17		25	6		10	16		24						
12-Apr-98			7			8			8						
13-Apr-98	465*					11			27						
14-Apr-98						8			11						
15-Apr-98			26			17			14						
16-Apr-98			32			18			13						
17-Apr-98	6		8	7		11	9		13						
18-Apr-98			10			14			13						
19-Apr-98			12			17			14						
20-Apr-98			19			24			25						
21-Apr-98			21			23			23						
22-Apr-98			27			21			34						
23-Apr-98	109		**182**	13		21	117		134						
24-Apr-98			13			14			15						
25-Apr-98	91*		**175**			149			53						
26-Apr-98			71			**208**			56						
27-Apr-98			45			53			58						
28-Apr-98			38			44			49						
29-Apr-98	25		32	56		87	28		36						
30-Apr-98	24*		44			33			42						
01-May-98			44			33			46						
02-May-98			33			17			38						
03-May-98	14*		63			7			20						
04-May-98			29			10			43						
05-May-98			69	3		5	27		35						
06-May-98			8			17			8						
07-May-98	2		6			8			7						
08-May-98			5			6			6						
09-May-98	279*		**597**			7			36						
10-May-98			5			15			13						
11-May-98			18	12		17	23		30						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
12-May-98	13		20			9			11						
13-May-98			7			4			7						
14-May-98			5			9			9						
15-May-98			10			11			12						
16-May-98	843*		**1464**			13			**185**						
17-May-98			14	16		21	12		13						
18-May-98			10			12			21						
19-May-98	26		38			18			42						
20-May-98			27			11									
21-May-98	65*		61			19									
22-May-98			70			87									
23-May-98			17	16		18	14								
24-May-98			23			15									
25-May-98			79			21									
26-May-98			**249**			13									
27-May-98			14			17									
28-May-98	43*		100			18			107						
29-May-98			12	9		11	27		32						
30-May-98			12			20			11						
31-May-98			13			14			15						
01-Jun-98			25			33			20						
02-Jun-98			15			18			22						
03-Jun-98	20*		47			27			16						
04-Jun-98			8	10		12	12		12						
05-Jun-98			15			16			17						
06-Jun-98	18*		38			24			39						
07-Jun-98			17			17			16						
08-Jun-98			10			20			13						
09-Jun-98			8			8			9						
10-Jun-98	7		6	7		7	7		9						
11-Jun-98			10			11			13						
12-Jun-98						8			7						
13-Jun-98			8			7			8						
14-Jun-98			8			9			9						
15-Jun-98			13			14			13						
16-Jun-98	112		**197**	37		46	**171**		**243**						
17-Jun-98			77			73			13						
18-Jun-98			18			22			21						
19-Jun-98			20			23			23						
20-Jun-98			20			24			23						
21-Jun-98			14			17			18						
22-Jun-98	10		13	13		16	14		16						
23-Jun-98			17			21			24						

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PM10 values greater than 150 $\mu g/m≥$ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
24-Jun-98			21			25			23						
25-Jun-98			17			20			21						
26-Jun-98			13			18			16						
27-Jun-98			16			15			17						
28-Jun-98			16	12		15	14		15						
29-Jun-98			11			16			15						
30-Jun-98			15			21			18						
01-Jul-98			15			21			22						
02-Jul-98			24			28			34						
03-Jul-98			19			25			25						
04-Jul-98	17		19	16		23	21		26						
05-Jul-98			15			23			24						
06-Jul-98			16			23			18						
07-Jul-98			20			23			27						
08-Jul-98			18			28			22						
09-Jul-98			18			21			26						
10-Jul-98	11		10	12		18	17		18						
11-Jul-98			12			17			20						
12-Jul-98			14			17			17						
13-Jul-98			18			27			20						
14-Jul-98			19			26			22						
15-Jul-98			15			19			22						
16-Jul-98	11		15	14		21	20		24						
17-Jul-98			15			16			20						
18-Jul-98			13			18			20						
19-Jul-98			26			28			28						
20-Jul-98			35			35			40						
21-Jul-98			16			21			16						
22-Jul-98			18	14		22	18		23						
23-Jul-98	23		29			23			20						
24-Jul-98			25			19			23						
25-Jul-98			6			9			11						
26-Jul-98			10			19			13						
27-Jul-98			11			12			15						
28-Jul-98	20		28	13		19	16		19						
29-Jul-98			12			16			15						
30-Jul-98			23			16			17						
31-Jul-98			13			17			18						
01-Aug-98			22			25			27						
02-Aug-98			16			19			20						
03-Aug-98	9		11	12		18	13		19						
04-Aug-98			10			17			18						
05-Aug-98			15			21			24						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
06-Aug-98			17			23			26						
07-Aug-98			14			19			24						
08-Aug-98			12			13			17						
09-Aug-98	9		12	11		18	12		17						
10-Aug-98			19			27			23						
11-Aug-98			17			18			22						
12-Aug-98			13			19			21						
13-Aug-98			15			21			22						
14-Aug-98			18			22			22						
15-Aug-98	17		20	15		21	19		21						
16-Aug-98						14			15						
17-Aug-98						17			15						
18-Aug-98						21			23						
19-Aug-98			13			20			21						
20-Aug-98			14			40			20						
21-Aug-98	7		7	10		15	14		17						
22-Aug-98			8			14			15						
23-Aug-98			7			9			13						
24-Aug-98			12			17			17						
25-Aug-98			12			17			19						
26-Aug-98			9			13			21						
27-Aug-98	9		12	12		17	20		21						
28-Aug-98			18			17			19						
29-Aug-98			14			27			21						
30-Aug-98	55*		48			29			56						
31-Aug-98			69			57			68						
01-Sep-98			20			20			20						
02-Sep-98			10	8		11	11		13						
03-Sep-98	10		14			16			18						
04-Sep-98			12			14			12						
05-Sep-98			9			11			10						
06-Sep-98			12			12			14						
07-Sep-98			9			11			11						
08-Sep-98	13		15	13		18	13		15						
09-Sep-98			16			24			18						
10-Sep-98			11			17			14						
11-Sep-98			13			18			19						
12-Sep-98						11			12						
13-Sep-98						10			12						
14-Sep-98	7			10		14			12						
15-Sep-98						21			16						
16-Sep-98						25			20						
17-Sep-98			17			21			20						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
18-Sep-98			15			16			19						
19-Sep-98			14			17			18						
20-Sep-98	14		21	12		19			15						
21-Sep-98			20			29			23						
22-Sep-98			23			27			27						
23-Sep-98			18			20			20						
24-Sep-98			17			26			18						
25-Sep-98			19			31			20						
26-Sep-98	46		86	17		32			47						
27-Sep-98			11			12			12						
28-Sep-98			9			19			11						
29-Sep-98	9*		35			14			9						
30-Sep-98			9			13			8						
01-Oct-98			10			15			9						
02-Oct-98	12		20	15		23			18						
03-Oct-98			54			20			22						
04-Oct-98			41			18			14						
05-Oct-98			10			32			14						
06-Oct-98			5			12			9						
07-Oct-98			15			34			26						
08-Oct-98	12		16	17		22			24						
09-Oct-98			16			28			24						
10-Oct-98			14			19			17						
11-Oct-98			15			19			21						
12-Oct-98			15			23			21						
13-Oct-98			14			24			19						
14-Oct-98	11		15	17		28			21						
15-Oct-98	26*		41			20			30						
16-Oct-98			32			31			25						
17-Oct-98			27			12			13						
18-Oct-98			9			13			13						
19-Oct-98			13			15			17						
20-Oct-98	9		16	9		14			17						
21-Oct-98			10			14			18						
22-Oct-98			11			15			22						
23-Oct-98			12			17			19						
24-Oct-98	40*		95			22			35						
25-Oct-98			10			9			17						
26-Oct-98			8	7		11	8		12						
27-Oct-98	6		9			12			13						
28-Oct-98			10			12			14						
29-Oct-98			15			17			15						
30-Oct-98			18			19			8						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
31-Oct-98			6			8			8						
01-Nov-98			9	6		10	5		8						
02-Nov-98			7			12			10						
03-Nov-98			9			12			12						
04-Nov-98	6		9			15			14						
05-Nov-98			15			16			16						
06-Nov-98			20			13			14						
07-Nov-98	80		137	8		15	13		15						
08-Nov-98			27			21			10						
09-Nov-98			6			7			15						
10-Nov-98			8			12			12						
11-Nov-98			8			8			10						
12-Nov-98			6			12			14						
13-Nov-98	7		7	10		17	15		14						
14-Nov-98			8			11			14						
15-Nov-98			8			11			15						
16-Nov-98			8			22			15						
17-Nov-98			**470**			20			61						
18-Nov-98			7			10			13						
19-Nov-98			8	6		12	14		14						
20-Nov-98			9			12			17						
21-Nov-98	6		8			10			15						
22-Nov-98			11			19			16						
23-Nov-98	27*		53			21			38						
24-Nov-98			14			19			21						
25-Nov-98	9		11	9		14	14		17						
26-Nov-98			11			13			14						
27-Nov-98			16			13			16						
28-Nov-98			15			10			11						
29-Nov-98			9			8			11						
30-Nov-98			8			12			11						
01-Dec-98	6		9	5		7	8		8						
02-Dec-98			7			8			13						
03-Dec-98	387*		**693**			16			27						
04-Dec-98						9			14						
05-Dec-98	19*		50			17			18						
06-Dec-98			91			20			48						
07-Dec-98			8	4		9	16		15						
08-Dec-98			15			34			37						
09-Dec-98	58*		114			**244**			30						
10-Dec-98			10			11			14						
11-Dec-98			13			14			21						
12-Dec-98			10			13			20						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
13-Dec-98	10		19	8		14	32		35						
14-Dec-98	117*		144			**225**			59						
15-Dec-98			**152**			**327**			20						
16-Dec-98			10			35			12						
17-Dec-98			6			8			12						
18-Dec-98			9			12			17						
19-Dec-98	109		**168**	32		72	25		30						
20-Dec-98			**306**			27			63						
21-Dec-98			39			34			16						
22-Dec-98			18			13			21						
23-Dec-98			8			9			17						
24-Dec-98			8			11			21						
25-Dec-98	6		8	6		9	17		15						
26-Dec-98			10			11			23						
27-Dec-98			9			10			16						
28-Dec-98			9			15			21						
29-Dec-98			10			13			19						
30-Dec-98			8			14			23						
31-Dec-98	48		68	45		73	36		59						
01-Jan-99			34			20			17						
02-Jan-99			10			13			17						
03-Jan-99			7			14			17						
04-Jan-99			9			19			18						
05-Jan-99			9			16			23						
06-Jan-99	10		15	10		15	20		20						
07-Jan-99			14			20			33						
08-Jan-99			36			**201**			50						
09-Jan-99			7			11			14						
10-Jan-99			7			12			15						
11-Jan-99			11			18			23						
12-Jan-99	8		12	6		12	17		21						
13-Jan-99			10			16			17						
14-Jan-99			8			13			21						
15-Jan-99			11			18			18						
16-Jan-99			15			19			15						
17-Jan-99			8			10			17						
18-Jan-99			121	12		25	10		13						
19-Jan-99			5			10			18						
20-Jan-99			10			4			8						
21-Jan-99			18			8			25						
22-Jan-99			10			12			14						
23-Jan-99			43			14			15						
24-Jan-99			10	2		5	4		11						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
25-Jan-99			3			3			4						
26-Jan-99			7			6			6						
27-Jan-99			6						5						
28-Jan-99			4						10						
29-Jan-99			7						16						
30-Jan-99			6	4			8		9						
31-Jan-99			6						9						
01-Feb-99			5						15						
02-Feb-99			5						12						
03-Feb-99			6						13						
04-Feb-99			8						12						
05-Feb-99			12	11		12	18		17						
06-Feb-99			10			10			15						
07-Feb-99			7			7			10						
08-Feb-99			5			6			9						
09-Feb-99			148			7			13						
10-Feb-99			140			11			8						
11-Feb-99			7	3		6	7		9						
12-Feb-99			9			9			11						
13-Feb-99			26			9			27						
14-Feb-99			18			10			23						
15-Feb-99			9			10			11						
16-Feb-99			12			21			13						
17-Feb-99			11	14		21	12		14						
18-Feb-99			25			58			33						
19-Feb-99			50			**353**			17						
20-Feb-99			15			18			41						
21-Feb-99			**333**			**294**			78						
22-Feb-99			9			9			9						
23-Feb-99			12	6		11	10		11						
24-Feb-99			29			20			23						
25-Feb-99			**1910**			33			**325**						
26-Feb-99			11			18			14						
27-Feb-99			17			19			15						
28-Feb-99			15			12			17						
01-Mar-99			14	8		13	12		14						
02-Mar-99			68			19			67						
03-Mar-99			**166**			42			42						
04-Mar-99			41			25			25						
05-Mar-99			13			12			26						
06-Mar-99			82			21			62						
07-Mar-99			19	13		20	17		23						
08-Mar-99			**235**			19			142						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
09-Mar-99			**1390**			28			95						
10-Mar-99			12			12			14						
11-Mar-99			**151**			31			26						
12-Mar-99			29			63			22						
13-Mar-99			38	10		16	15		19						
14-Mar-99			75			20			114						
15-Mar-99			**188**			14			17						
16-Mar-99			4			8			10						
17-Mar-99			11			12			15						
18-Mar-99			102			16			42						
19-Mar-99			23	13		19	13		19						
20-Mar-99			22			6			17						
21-Mar-99			4			5			9						
22-Mar-99			19			9			13						
23-Mar-99			87			9			67						
24-Mar-99			20			11			25						
25-Mar-99			8	3		7	5		9						
26-Mar-99			6			6			9						
27-Mar-99			8			8			10						
28-Mar-99			25			26			31						
29-Mar-99			30			18			23						
30-Mar-99			48			20			32						
31-Mar-99			**183**	11		20	21		26						
01-Apr-99			7			6			8						
02-Apr-99			50			13			12						
03-Apr-99			**226**			40			**176**						
04-Apr-99			**282**			125			28						
05-Apr-99			**2569**			20			144						
06-Apr-99				5		10	12		18						
07-Apr-99						5			7						
08-Apr-99			**336**			7			26						
09-Apr-99			23			10			10						
10-Apr-99			11			11			13						
11-Apr-99			30			13			16						
12-Apr-99			8			11	8		10						
13-Apr-99			14			11			14						
14-Apr-99			12			71			20						
15-Apr-99			12			13			14						
16-Apr-99			16			15			18						
17-Apr-99			20			16			19						
18-Apr-99			15	12		15	13		17						
19-Apr-99			10			11			14						
20-Apr-99			14			14			16						

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
21-Apr-99			87			25			19						
22-Apr-99			**727**			**285**			**172**						
23-Apr-99			43			20			18						
24-Apr-99			9	4		8	7		14						
25-Apr-99			9			10			21						
26-Apr-99			58			11			13						
27-Apr-99			**187**			13			32						
28-Apr-99			21			40			47						
29-Apr-99		29*	65			24			18						
30-Apr-99			8	3		6	4		9						
01-May-99			10			12			13						
02-May-99			15			13			15						
03-May-99		130*	121			27			62						
04-May-99		18*	18			21			24						
05-May-99		16*	19			22			21						
06-May-99		13*	17	15		18	18		22						
07-May-99		24*	19			23			22						
08-May-99			25			24			26						
09-May-99			30			25			23						
10-May-99		15*	17			20			19						
11-May-99			15			15			16						
12-May-99		18*	21	17		22	16		18						
13-May-99		95*	94			16			26						
14-May-99		38*	20			18			19						
15-May-99			45			31			22						
16-May-99			12			19			14						
17-May-99		17*	18			23			19						
18-May-99		39*	19	17		23	19		21						
19-May-99		19*	43			24			23						
20-May-99		24*	22			29			29						
21-May-99			20			25			22						
22-May-99			60			28			37						
23-May-99			19			21			18						
24-May-99		20*	26	12		16	9		12						
25-May-99		15*	13			14			13						
26-May-99		95*	72			15			25						
27-May-99		24*	29			18			14						
28-May-99		131*	17			23			18						
29-May-99			99			22			27						
30-May-99			14	13		18	16		18						
31-May-99			19			22			19						
01-Jun-99		25*	28			27			30						
02-Jun-99		514*	**442**			23			34						

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
03-Jun-99		17*	19			11			16						
04-Jun-99		9*	9			9			10						
05-Jun-99			10	10		15	10		14						
06-Jun-99			15			18			16						
07-Jun-99		13*	13			14			14						
08-Jun-99		11*	12			19									
09-Jun-99		15*	14			17									
10-Jun-99		13*	15			18									
11-Jun-99		18*	16	13		18	16								
12-Jun-99			20			21									
13-Jun-99			18			20									
14-Jun-99		22*	21			23									
15-Jun-99		28*	32			23									
16-Jun-99		14*	16			23			23						
17-Jun-99		16*	18	16		21	16		19						
18-Jun-99		19*	17			21			20						
19-Jun-99			22			21			20						
20-Jun-99			17			16			17						
21-Jun-99		33*	32			22			23						
22-Jun-99		22*	24			26			23						
23-Jun-99		29*	26	21		28	19		25						
24-Jun-99		35*	38			36			36						
25-Jun-99		32*	37			22			19		19				
26-Jun-99			15			20			17		14				
27-Jun-99			19			24			19		17				
28-Jun-99		26*	39			26			24		21				
29-Jun-99		19*	28	15		21	19		21		16				
30-Jun-99			19			24			21		16				
01-Jul-99			24			32			23	23	24				
02-Jul-99			34			37			20	70	66				
03-Jul-99			30			20			16	60	61				
04-Jul-99			15			17			33	13	16				
05-Jul-99			12	44		17	13		14	8	10				
06-Jul-99			17			20			22	14	17				
07-Jul-99			32			40			36		40				
08-Jul-99			36			37			34		33				
09-Jul-99			26			26			32	19	25				
10-Jul-99			43			9			10	96	97				
11-Jul-99			20	10		11	9		11	14	16				
12-Jul-99			10			15			12	11	11				
13-Jul-99			12			12			14		11				
14-Jul-99			16			26			15		19				
15-Jul-99			22			28			27		24				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
16-Jul-99			12			16			16		23				
17-Jul-99			9	9		11	11		13		11				
18-Jul-99			9			12			15		14				
19-Jul-99			14			15			18		17				
20-Jul-99			19			20			18	21	25				
21-Jul-99			13			20			17	13	16				
22-Jul-99			19			22			17	12	15				
23-Jul-99			20	21		26	25		26	31	33				
24-Jul-99			27			31			30	25	26				
25-Jul-99			12			15			14	9	11				
26-Jul-99			13			18			15		13				
27-Jul-99			15			17			17	14	17				
28-Jul-99			17			25			18	16	19				
29-Jul-99			23	22		32	22		26	18	21				
30-Jul-99			17			21			21	27	29				
31-Jul-99			16			17			16	12	13				
01-Aug-99			16			16			16	10	14				
02-Aug-99			16			17			16	13	15				
03-Aug-99			13						16	11	14				
04-Aug-99			35	13			17		18	13	15				
05-Aug-99			29			24			22	23	25				
06-Aug-99			45			33			36	40	44				
07-Aug-99			13			15			13	12	13				
08-Aug-99			11			15			13	10	11				
09-Aug-99			12			16			14	10	12				
10-Aug-99			43	22		31	19		25	145	150				
11-Aug-99			15			17			16		15				
12-Aug-99			18			22			18		18				
13-Aug-99			23			28			24	27	26				
14-Aug-99			11			17			16	18	23				
15-Aug-99			10			14			15	8	12				
16-Aug-99		10	12		11	15	15		16	10	12				
17-Aug-99			15			18			18	12	16				
18-Aug-99			28			21			23	17	19				
19-Aug-99			23			21			19	19	16				
20-Aug-99			25			26			25	20	23				
21-Aug-99			25			24			25	20	23				
22-Aug-99		20	20		17	19	17		18		17				
23-Aug-99			22			19			18		13				
24-Aug-99			20			21			20		16				
25-Aug-99			25			27			24		22				
26-Aug-99			28			18			17		25				
27-Aug-99			10			13			9		29				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
28-Aug-99			9		14	16	11		12	6	10				
29-Aug-99			14			17			15	11	15				
30-Aug-99			32			30			33	31	38				
31-Aug-99			26			30			26	31	33				
01-Sep-99			25			32			20	22	26				
02-Sep-99			23			23			19	15	18				
03-Sep-99		3	22		29	26	21		24	19	23				
04-Sep-99			17			16			20	13	17				
05-Sep-99			13			15			16	11	13				
06-Sep-99			11			16			16	10	13				
07-Sep-99			15			20			20	13	15				
08-Sep-99			15			23			18	13	16				
09-Sep-99		33	29		21	24	17		21	15	20				
10-Sep-99			23			20			17	14	16				
11-Sep-99			12			14			18	7	10				
12-Sep-99			9			12			13	5	10				
13-Sep-99			12			11			10	11	12				
14-Sep-99			14			15			18	8	13				
15-Sep-99		14	15		16	18	17		20						
16-Sep-99			15			21			17	9	13				
17-Sep-99			37			26			22	20	25				
18-Sep-99			13			10			9	8	9				
19-Sep-99			20			23			22	19	22				
20-Sep-99			26			27			27						
21-Sep-99		17	19		20	24	19		23						
22-Sep-99			**467**			12			10						
23-Sep-99			12			15			12	6	8				
24-Sep-99			14			14			13	7	9				
25-Sep-99			11			17			15	10	13				
26-Sep-99			12			14			11						
27-Sep-99		18	16		17	20	17		21	13	15				
28-Sep-99			24			21			20	57	15				
29-Sep-99			15			14			16	7	10				
30-Sep-99			12			26			15	8	12				
01-Oct-99			15			31			19	12	16				
02-Oct-99			22			25			30	18	21				
03-Oct-99		23	26		22	24	23		26	20	23				
04-Oct-99			19			18			20	13	14				
05-Oct-99			16			17			20	15	15				
06-Oct-99			125			47			39	**565**	**625**				
07-Oct-99			79			50			21	106	113				
08-Oct-99			13			11			11	5	6				
09-Oct-99		9	15		7	9	12		13	4	7				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
10-Oct-99			12			18			17	10	14				
11-Oct-99			25			27			24	17	21				
12-Oct-99			19			20			20	12	14				
13-Oct-99			14			22			17		10				
14-Oct-99			21			21			16	11	12				
15-Oct-99		33	35		28	31	25		31	**153**	**166**				
16-Oct-99			45			76			33	**867**	**996**				
17-Oct-99			11			13			17	9	12				
18-Oct-99			12			16			14	6	10				
19-Oct-99			19			13			14	6	11				
20-Oct-99			13			14			13	4	8				
21-Oct-99		9	10		12	14	13		12	4	8				
22-Oct-99			14			15			14		7				
23-Oct-99			12			16			14		13				
24-Oct-99			14			15			16		13				
25-Oct-99			15			21			17		14				
26-Oct-99			16			32			18		16				
27-Oct-99		22	23		25	26	20		18		21				
28-Oct-99			24			19			16		22				
29-Oct-99			22			17			18		14				
30-Oct-99			10			9			11		7				
31-Oct-99			10			10			14		7				
01-Nov-99			11			12			17		8				
02-Nov-99		9	11		12	14			11		8				
03-Nov-99			17			14	19		14		9				
04-Nov-99			14			16			12		10				
05-Nov-99			17			21			15	13	16				
06-Nov-99			25			25			16		20				
07-Nov-99			52			36			34		53				
08-Nov-99		23	24		11	10	20		14		32				
09-Nov-99			9			14			9	6	8				
10-Nov-99			17			15			9	6	8				
11-Nov-99			13			14				8	10				
12-Nov-99			15			16				7	7				
13-Nov-99			19			17				7	8				
14-Nov-99		12	14		12	15	13			9	11				
15-Nov-99			20			20				50	62				
16-Nov-99			24			35				62	75				
17-Nov-99			**159**			34					45				
18-Nov-99			22			21				7	7				
19-Nov-99			26			33				40	47				
20-Nov-99		12	15		12	13	9		10	11	12				
21-Nov-99			49			66			32	**2901**	**2182**				

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
22-Nov-99			14			11			11	12	9				
23-Nov-99			12			13			12	5	7				
24-Nov-99			12			12			14	8	6				
25-Nov-99			8			8			16	6	6				
26-Nov-99		10	11		10	11	23		18	5	6				
27-Nov-99			16			15			16	8	10				
28-Nov-99			13			18			23	13	14				
29-Nov-99			39			16			20	29	34				
30-Nov-99			62			27			74		114				
01-Dec-99			53			27			23	92	91				
02-Dec-99		**377**	**373**		103	94	45		55	**529**	**515**				
03-Dec-99			79			**256**			46	149	**169**				
04-Dec-99			8			9			16	5	6				
05-Dec-99			9			9			15		6				
06-Dec-99			14			18			18		9				
07-Dec-99			**259**			81			107	**544**	**644**				
08-Dec-99		79	93		35	35	12		11	50	54				
09-Dec-99			39			26			39	117	**162**				
10-Dec-99			97			23			18	**262**	**303**				
11-Dec-99			43			32			14	22	30				
12-Dec-99			6			9			12	4	5				
13-Dec-99			28			28			21	**237**	**301**				
14-Dec-99		16	17		16	17			18	9	10				
15-Dec-99			11			22	25		22	10	13				
16-Dec-99			11			16			17	8	9				
17-Dec-99			15			14			20	6	8				
18-Dec-99			9			10			18	6	8				
19-Dec-99			27			46			29	23	33				
20-Dec-99	23	22	24		9	10	11	13	14	7	6				
21-Dec-99			55			91			44	56	71				
22-Dec-99			12			10			11	5	3				
23-Dec-99			10			13			14	4	7				
24-Dec-99			7			10			10	4	6				
25-Dec-99			7			8			11	4	6				
26-Dec-99		6	9		6	9	10	10	13	3	8				
27-Dec-99	7		7			16			10	4	5				
28-Dec-99			9			15			15		7				
29-Dec-99			9			25			14	7	6				
30-Dec-99			9			15			21	8	7				
31-Dec-99			9			15			15		13				
01-Jan-00	18	21	19		38	39	20	23	22		62				
02-Jan-00			11			10			15		8				
03-Jan-00			10			11			20		11				

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
04-Jan-00			11			17			16		9				
05-Jan-00			50			31			43		37				
06-Jan-00			13			10			24		10				
07-Jan-00	13	12	15		9	11	19	14	16		10				
08-Jan-00			11			12			20		8				
09-Jan-00			10			12			27		8				
10-Jan-00			21			18			23		13				
11-Jan-00			25			72			35	142	**172**				
12-Jan-00			12			11			15	11	10				
13-Jan-00	15	15	19		25	18	25	30	31	34	40				
14-Jan-00			16			15			18	12	14				
15-Jan-00			45			12			22	23	30				
16-Jan-00			**161**			10			44	21	28				
17-Jan-00			12			11			12	12	16				
18-Jan-00			12			7			12	14	16				
19-Jan-00	8	5	7		9	9	10	9	9	4	6				
20-Jan-00			7			10			11	7	8				
21-Jan-00			11			10			11		6				
22-Jan-00			6			9			13		5				
23-Jan-00			8			9			11		7				
24-Jan-00			40			13			12		17				
25-Jan-00			6			7			6		5				
26-Jan-00	54		78			9	4		6		**436**				
27-Jan-00			10			13			12		7				
28-Jan-00			9			10			11	5	7				
29-Jan-00			7			8			10	4	5				
30-Jan-00			9			9			9	5	8				
31-Jan-00	5	5	7		3	5		6	7		5				
01-Feb-00			9			6			10	4	6				
02-Feb-00			9			6			7	4	5				
03-Feb-00			34			9			68	36	47				
04-Feb-00			30			13			55	25	29				
05-Feb-00			6			6			6	5	6				
06-Feb-00	9	6	9		8	10			9	4	5				
07-Feb-00			10			10			11	4	7				
08-Feb-00			16			17	12		13	9	12				
09-Feb-00			16			8			10	20	11				
10-Feb-00			48			6			14		11				
11-Feb-00			16			5			8		27				
12-Feb-00	8	4	4		3	4		5	6	16	10				
13-Feb-00			8			10			9	21	20				
14-Feb-00			**528**			17			29	**267**	**273**				
15-Feb-00			4			9			7	7	9				

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
16-Feb-00			16			5			10	20	18				
17-Feb-00			6			5			6	3	5				
18-Feb-00	5	4	6		5	7	12	10	11	3	4				
19-Feb-00			7			7			5	3	4				
20-Feb-00			5			6			7		8				
21-Feb-00			5			4			4	3	3				
22-Feb-00			7			5			6	7	8				
23-Feb-00			4			2			4		6				
24-Feb-00	3	2	5		3	5	2	3	5	3	6				
25-Feb-00			6			5			7	4	5				
26-Feb-00			7			9			12	8	9				
27-Feb-00			32			6			12	36	34				
28-Feb-00			10			6			4	3	4				
29-Feb-00			15			11			6	16	18				
01-Mar-00	17	20	24		13	12	9	9	10	**174**	**169**				
02-Mar-00			11			9			7	4	7				
03-Mar-00			15			11			6	10	13				
04-Mar-00			6			7			7	5	6				
05-Mar-00			7			5			5	5	6				
06-Mar-00			6			7			6	4	7				
07-Mar-00	4	4	6		4	6	6	6	7	6	8				
08-Mar-00			7			4			6	4	6				
09-Mar-00			6			5			9	3	5				
10-Mar-00			6			9			7	2	5				
11-Mar-00			11			7			7	3	6				
12-Mar-00			8			8			8	5	7				
13-Mar-00	8	7	9		8	9	9	8	10	6	8				
14-Mar-00			9			11			10	7	9				
15-Mar-00			10			15			13	56	9				
16-Mar-00			121			18			26	108	**154**				
17-Mar-00			72			81			24		120				
18-Mar-00			10			11			10		9				
19-Mar-00	**181**	**233**	**239**		20	19		39	44		**209**				
20-Mar-00			**996**			**417**			120		**10549**				
21-Mar-00			**640**			**153**			46		**3169**				
22-Mar-00			10			13			10		9				
23-Mar-00			17			20			16		35				
24-Mar-00			14			16			15	14	16				
25-Mar-00	18	18	22		15	14		17	16	15	17				
26-Mar-00			14			15			14	12	14				
27-Mar-00			19			18			18	33	31				
28-Mar-00			12			15			12	9	11				
29-Mar-00			15			21			12	8	11				

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
30-Mar-00			**277**			149			46	**1923**	**1810**				
31-Mar-00	44	71	63		**176**	**168**	26	28	37	**1491**	**1607**				
01-Apr-00			39			53			31	**276**	**284**				
02-Apr-00			19			12			15	15	14				
03-Apr-00			15			18			15	15	14				
04-Apr-00			16			16			18	33	36				
05-Apr-00			21			16			16	16	15				
06-Apr-00	15	10	26		19	21		12	11	8	10				
07-Apr-00			15			18			17	12	14				
08-Apr-00			**514**			17			41	105	122				
09-Apr-00			30			24			19	**189**	**225**				
10-Apr-00			62			33			20	**406**	**437**				
11-Apr-00			10			13			15	10	8				
12-Apr-00	18	17	24		15	17		16	16	15	18				
13-Apr-00			**189**			19			17	**288**	**321**				
14-Apr-00			8			9			10	9	10				
15-Apr-00			38			13			17	31	36				
16-Apr-00			18			11			15	13	14				
17-Apr-00			90			9			13	8	10				
18-Apr-00	3	3	6		3	5		7	10	10	14				
19-Apr-00			11			8			8	4	6				
20-Apr-00			8			9			9	5	5				
21-Apr-00			19			14			14	15	17				
22-Apr-00			16			14			14	11	12				
23-Apr-00			16			16			15	13	14				
24-Apr-00	17	16	19		22	22		16	19	15	17				
25-Apr-00			19			20			20	16	19				
26-Apr-00			36			33			28	27	31				
27-Apr-00			45			37			39	109	114				
28-Apr-00			**154**			30			46	**832**	**1350**				
29-Apr-00			123			114			20	**2023**	**2524**				
30-Apr-00		13	11		13	14		12	14	16	11				
01-May-00			23			20			17	24	22				
02-May-00			22			20			20	16	17				
03-May-00			22			22			19	18	19				
04-May-00			**178**			23			24	68	91				
05-May-00			65			18			50	79	102				
06-May-00		38	40		17	17		52	23	90	107				
07-May-00			14			29			15	28	31				
08-May-00			13			13			11		9				
09-May-00			15			16			15	38	42				
10-May-00			**433**			82			**151**	**1409**	**1349**				
11-May-00			**156**			101			17	**2638**	**3078**				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
12-May-00	9	8	10		16	13		11	11	18	18				
13-May-00			32			18			20	41	42				
14-May-00			46			18			32	78	83				
15-May-00			125			21			24	130	143				
16-May-00			44			7			11	45	53				
17-May-00			23			22			17	27	32				
18-May-00	16	16	19		14	15		16	17	27	29				
19-May-00			15			20			18	12	14				
20-May-00			14			16			16	12	13				
21-May-00			10			15			15	10	11				
22-May-00			17			27			18	13	15				
23-May-00			36			24			26	82	84				
24-May-00	37	36	35		23	20		23	24	64	76				
25-May-00			28			24			26	75	66				
26-May-00			14			15			13		37				
27-May-00			25			23			25		34				
28-May-00			24			13			12	12	13				
29-May-00			25			12			13	70	82				
30-May-00	58	60	62		16	16		18	18	44	50				
31-May-00			18			16			19	19	21				
01-Jun-00			20			21			19	17	18				
02-Jun-00			28			24			22	22	23				
03-Jun-00			20			22			19	25	18				
04-Jun-00			31			23			23	19	22				
05-Jun-00	37	18	21		20	20		25	24	16	18				
06-Jun-00			31			26			27	24	26				
07-Jun-00			53			37			43	106	113				
08-Jun-00			**553**			30			77	**930**	**977**				
09-Jun-00			11			14			11	12	15				
10-Jun-00			19			13			18	23	22				
11-Jun-00	17	15	17		17	17		15	16	15	18				
12-Jun-00			15			16			18	15	14				
13-Jun-00			18			31			26	**198**	**216**				
14-Jun-00			17			40			18	**225**	**259**				
15-Jun-00			14			17			17	8	16				
16-Jun-00			24			34			21	**285**	**298**				
17-Jun-00	22	22	26		24	30		22	29	33	40				
18-Jun-00			41			29			34	54	58				
19-Jun-00			22			22			21	17	23				
20-Jun-00			13			19			14	30	30				
21-Jun-00			44			21			17	107	122				
22-Jun-00			25			20			19	23	30				
23-Jun-00	33	27	36		21	23		28	29	36	38				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
24-Jun-00			18			17			20	15	19				
25-Jun-00			50			20			24	**174**	**193**				
26-Jun-00			20			14			19	19	24				
27-Jun-00			16			17			17	9	18				
28-Jun-00			19			24			18	21	22				
29-Jun-00	20	16	22		21	23		12	19	14	19				
30-Jun-00			20			27			24		29				
01-Jul-00			20			23			21	21	17				
02-Jul-00			25			15			21	24	26				
03-Jul-00			18			14			15	12	13				
04-Jul-00			17			17			23	16	19				
05-Jul-00	74	70	78		18	17		39	39	40	43				
06-Jul-00			29			16			21	25	27				
07-Jul-00			45			21			35	45	50				
08-Jul-00			41			20			22	28	32				
09-Jul-00			30			20			22	18	23				
10-Jul-00			24			27			25	22	25				
11-Jul-00	24	23	22		20	18		22	20	16	14				
12-Jul-00			28			20			21	17	19				
13-Jul-00			19			18			18	16	18				
14-Jul-00			15			20			18	14	14				
15-Jul-00			18			19			21	22	18				
16-Jul-00			21			17			21	18	19				
17-Jul-00	18	18	19		12	12		13	11	18	14				
18-Jul-00			17			10			11	28	28				
19-Jul-00			11			11			16	9	9				
20-Jul-00			15			17			15	12	13				
21-Jul-00			17			17			18	14	15				
22-Jul-00			14			13			13	16	12				
23-Jul-00	27	22	25		19	21		19	22	18	20				
24-Jul-00			21			21			22	21	20				
25-Jul-00			28			26			26	27	23				
26-Jul-00			33			34			29	38	32				
27-Jul-00			62			43			28	51	50				
28-Jul-00			49			41			38	43	44				
29-Jul-00	71	65	68		70	67		51	57	86	92				
30-Jul-00			99			75			68	91	86				
31-Jul-00			37			42			36	38	37				
01-Aug-00			33			33			34	32	31				
02-Aug-00			42			38			24	27	29				
03-Aug-00			26			32			23	25	27				
04-Aug-00	23	19	20		20	18		21	21	17	17				
05-Aug-00			20			27			23	24	25				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
06-Aug-00			26			33			28	29	29				
07-Aug-00			23			26			26	21	22				
08-Aug-00			22			23			24	20	21				
09-Aug-00			17			17			15	30	28				
10-Aug-00	81	83	90		11	11			12	14	15				
11-Aug-00			14			14			17	13	14				
12-Aug-00			15			17			17	15	16				
13-Aug-00			14			15			15	13	14				
14-Aug-00			22			19			19	16	18				
15-Aug-00			34			18			18	14	16				
16-Aug-00	18	14	17		19	18		14	19	15	16				
17-Aug-00			25			22			23	27	27				
18-Aug-00			15			16			14	19	20				
19-Aug-00			25			13			16	22	25				
20-Aug-00			14			17			15	11	12				
21-Aug-00			28			19			16	11	14				
22-Aug-00	28	25	29		23	22		24	23	17	21				
23-Aug-00			46			37			37	33	35				
24-Aug-00			29			27			24	21	24				
25-Aug-00			28			23			25	20	21				
26-Aug-00			13			17			16		14				
27-Aug-00			14			15			15	14	12				
28-Aug-00			23			21		17	20		23				
29-Aug-00			9			9			9	8	8				
30-Aug-00			10			14			11	13	10				
31-Aug-00			22			19			14		16				
01-Sep-00			16			16			15		43				
02-Sep-00			9			10			11		10				
03-Sep-00	17	13	17		11	12		24	26		25				
04-Sep-00			21			10			16		47				
05-Sep-00			82			19			22		57				
06-Sep-00			15			19			14		47				
07-Sep-00			13			16			12		10				
08-Sep-00			13			15			17		17				
09-Sep-00	18	15	16		16	16		15	17		16				
10-Sep-00			15			16			17		17				
11-Sep-00			16			18			17		14				
12-Sep-00			19			18			17	11	13				
13-Sep-00			15			14			14	10	12				
14-Sep-00			45			19			23	18	21				
15-Sep-00	47	44	38		18	17		20	19	32	32				
16-Sep-00			30			16			18	24	26				
17-Sep-00			22			17			20	31	35				

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
18-Sep-00						17			14	23	24				
19-Sep-00			16			13			14		10				
20-Sep-00			24			12			15		13				
21-Sep-00	51	47	51		23	23		18	19		74				
22-Sep-00			45			31			47		52				
23-Sep-00			13			12			13		34				
24-Sep-00			14			17			13		10				
25-Sep-00			15			16			12		8				
26-Sep-00			10			15			12		8				
27-Sep-00	16	13	17		25	16		17	14		12				
28-Sep-00			25			19			18		15				
29-Sep-00			22			20			19	13	16				
30-Sep-00			13			15			17	13	16				
01-Oct-00			12			14			14	10	13				
02-Oct-00			22			22			17	17	19				
03-Oct-00	18	16	19		17	15		15	17	9	12				
04-Oct-00			17			17			19		14				
05-Oct-00			19			20			20		14				
06-Oct-00			15			20			17		11				
07-Oct-00			11			14			16	8	9				
08-Oct-00			15			15			16	9	12				
09-Oct-00	133	148	**170**		27	26		43	36	72	94				
10-Oct-00			**244**			6			8	30	35				
11-Oct-00			8			8			8		6				
12-Oct-00			10			15			12		6				
13-Oct-00			11			10			16	5	7				
14-Oct-00			12			13			16	7	10				
15-Oct-00	9	9	10		12	13		14	16	7	9				
16-Oct-00			15			12			20	6	8				
17-Oct-00			14			15			14	6	8				
18-Oct-00			15			14			21	8	11				
19-Oct-00			15			15			21	8	9				
20-Oct-00			27			15			14	35	37				
21-Oct-00	**572**	**715**	**735**		56	45		42	51	**3454**	**2751**				
22-Oct-00			**652**			92			53	**10842**	**6230**				
23-Oct-00			51			14			14	120	111				
24-Oct-00			13			22			12	25	7				
25-Oct-00			68			34			55	**367**	**384**				
26-Oct-00			22			18			18	39	16				
27-Oct-00	7	5	7		6	7		9	10	5	5				
28-Oct-00			9			12			9	13	14				
29-Oct-00			24			11			37	117	123				
30-Oct-00			6			7			7	7	6				

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
31-Oct-00			38			11			8	**401**	**424**				
01-Nov-00			9			9				5	7				
02-Nov-00	28	27	27		10	9		9							
03-Nov-00			10			13					14				
04-Nov-00			11			5				6	8				
05-Nov-00			9			6				7	9				
06-Nov-00			29			29				**762**	**844**				
07-Nov-00			58			**240**				**1266**	**931**				
08-Nov-00	12	15	13		24	9		14		12	13				
09-Nov-00			32			18			16	**470**	**473**				
10-Nov-00			14			4			8	16	16				
11-Nov-00			12			4			8	10	14				
12-Nov-00			8			4			7	4	5				
13-Nov-00			145			11			27	82	120				
14-Nov-00	13	11	6		15	11		10	10	18	20				
15-Nov-00			12			4			9	5	6				
16-Nov-00			11			4			9	5	7				
17-Nov-00			59			4			10	5	7				
18-Nov-00			7			5			13	3	5				
19-Nov-00			10			3			12	3	6				
20-Nov-00	11	8	10		9	5		20	17	4	7				
21-Nov-00			13			5			19	12	16				
22-Nov-00			39			16			16	94	113				
23-Nov-00			15			4			11	9	9				
24-Nov-00			19			3			13		7				
25-Nov-00			18			4			12		8				
26-Nov-00		8	11		10	6		16	12		9				
27-Nov-00			21			6			15		10				
28-Nov-00			13			14			11	8	11				
29-Nov-00			**1101**			48			**180**	**505**	**627**				
30-Nov-00			26			19			26	16	18				
01-Dec-00			25			20			21	13	15				
02-Dec-00	19	18	21		15	16		20	20	12	14				
03-Dec-00			18			14			17	7	10				
04-Dec-00			17			13			20	8	10				
05-Dec-00			17			14			23	8	11				
06-Dec-00			22			17			22	7	10				
07-Dec-00			27			17			22	7	10				
08-Dec-00	19	17	20		12	13		21	19		7				
09-Dec-00			14			11			17		12				
10-Dec-00			14			11			17		9				
11-Dec-00			16			16			17		14				
12-Dec-00			29			14			24	45	50				

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
13-Dec-00			13			14			14	9	14				
14-Dec-00	12	10	13		12	14		17	17	7	10				
15-Dec-00			12			14			16	5	8				
16-Dec-00			7			11			13	3	4				
17-Dec-00			15			18			27	12	15				
18-Dec-00			28			20			26	16	18				
19-Dec-00			15			16			18	8	10				
20-Dec-00			18		14			18	17	8	10				
21-Dec-00			17						20	25	33				
22-Dec-00			17			15			23	14	14				
23-Dec-00			16			14			19	13	12				
24-Dec-00			34			89			39	**614**	**797**				
25-Dec-00			37			**158**			18	**462**	**548**				
26-Dec-00	17	14	15		11	13		14	17	7	6				
27-Dec-00			13			17			16		4				
28-Dec-00			12			17			21	5	6				
29-Dec-00			13			25			17	5	7				
30-Dec-00			13			14			20	6	8				
31-Dec-00			11			20			19	6	8				
01-Jan-01	12	8	10		10	13		16	16	5	8				
02-Jan-01			20			12			22	4	8				
03-Jan-01			25			14			19	5	8				
04-Jan-01			14			15			23	8	10				
05-Jan-01			24			25			29	7	9				
06-Jan-01			10			18			16	6	8				
07-Jan-01	8	7	9		20	18		19	18	8	10				
08-Jan-01			117			17			41	29	29				
09-Jan-01			7			7			7	6	6				4
10-Jan-01			8			7			6	12	7		4		4
11-Jan-01			3			2			4	2	4		3		3
12-Jan-01			6			4			9	2	5		4		4
13-Jan-01	5	4	5		3	5		8	8		5		4		4
14-Jan-01			5			5			6		5		4		4
15-Jan-01			22			4			4		21		6		3
16-Jan-01			110			65			14	**1579**	**2044**		90		12
17-Jan-01			31			48			8	123	134	37	38	13	14
18-Jan-01			7			7			10	4	4	4	5	2	5
19-Jan-01	5	5	7		8	9		5	7	3	5	2	5		5
20-Jan-01			6			6			11	3	5	2	4		4
21-Jan-01			5			5			7	2	4	2	4		4
22-Jan-01			6			6			8	3	4	2	4		4
23-Jan-01			11			9			8	12	14	5	7	6	8
24-Jan-01			44			8			20	71	81	14	13	17	21

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
25-Jan-01	5	4	6		3	5		7	7	13	18	2	4	6	9
26-Jan-01			6			5			7	5	6	3	5	4	5
27-Jan-01			58			16			9	**521**	**665**	22	25	6	8
28-Jan-01			27			14			10	**345**	**272**	8	10	4	6
29-Jan-01			27			21			21	13	16	10	12	5	7
30-Jan-01			13			28			25	5	6	21	25	5	7
31-Jan-01	11	11	13		13	15		7	78	6	8		6	6	8
01-Feb-01			7			9			59	5	9	4	6	4	6
02-Feb-01			8			13			48	5	8	4	7	4	7
03-Feb-01			10			11			14	6	11	6	9	6	9
04-Feb-01			6			6			8	3	5	2	5	2	5
05-Feb-01			10			9				9	5	3	5	3	5
06-Feb-01	**1089**	**1308**	**1324**		48	57		41		**4291**	**5124**	131	149	**208**	**201**
07-Feb-01			131			132				**10963**	**10510**	**448**	**467**	**171**	**176**
08-Feb-01			132			**310**				**12153**		**683**	**697**		67
09-Feb-01			49			24				**386**		37	39	34	41
10-Feb-01			147			7				45		17	15	5	8
11-Feb-01			50			6				111		5	7	4	8
12-Feb-01	4	4	5		2	4		6		2		2	5	1	4
13-Feb-01						4					3		3		3
14-Feb-01						6					4	2	4	3	5
15-Feb-01						11				6	5	4	7	4	6
16-Feb-01			3			7				9	6	8	9	8	5
17-Feb-01			7			7				9	6	7	8	8	5
18-Feb-01	6	6	7		5	6		9		8	7	4	7	5	6
19-Feb-01			6			6				6	7	5	7	5	6
20-Feb-01			4			5			10	3	5	3	5	3	5
21-Feb-01			6			6			10		5	3	5	4	5
22-Feb-01			**199**						9	**178**	**197**	25	27	69	68
23-Feb-01						6			7	3	5	3	5	2	4
24-Feb-01	7	6	8		6	8		9	7	3	5	3	6	2	4
25-Feb-01			7			5			5	5	6	3	6	5	5
26-Feb-01			4			4			3	2	4	1	3	1	3
27-Feb-01			14			10			5	**338**	**564**	24	27	11	12
28-Feb-01			22			29			15	**258**	**872**	16	18	13	16
01-Mar-01			8			9			9	10	10	6	7	5	7
02-Mar-01	7	7	8		9	8		8	8	6	8	5	6	5	6
03-Mar-01			6			8			8	5	12	4	7	3	6
04-Mar-01			10			9			10	9	16	8	9	10	10
05-Mar-01			9			8			8	6	10	5	8	6	8
06-Mar-01			6			5			5	3	6	3	5	3	5
07-Mar-01			11			6			5	32	34	5	7	2	5
08-Mar-01	5	4	5		4	6		10	9	4	-4	4	5	3	4

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
09-Mar-01			13			7			19	40	27	9	10	6	7
10-Mar-01			86			12			5	**681**	**750**	58	71	6	10
11-Mar-01			24			119			9	**254**	**270**	20	26	18	22
12-Mar-01			9			12			10	12	4	7	9	7	10
13-Mar-01			12			76			9	104	116	11	13	8	10
14-Mar-01	9	8	10		12	14		8	9	6	8	6	8	5	8
15-Mar-01			13			14			16	24	15	9	11	9	11
16-Mar-01			15			17			14	14	16	9	12	8	11
17-Mar-01			11			12			10	8	10	6	9	6	9
18-Mar-01			10			12			10	6	9	5	8	6	9
19-Mar-01			10			11				5	8	5	7	5	7
20-Mar-01	10	7	9		12	14		39		6	8	5	7	5	7
21-Mar-01			10			11				6	9	5	8	6	7
22-Mar-01			14			16				11	11	8	11	9	9
23-Mar-01			9			12				5	8	6	8	6	7
24-Mar-01			15			15				27	38	8	10	7	10
25-Mar-01			15			15				13	15	11	14	10	12
26-Mar-01	14	14	17		36	36		14		**500**	**537**	8	11	**199**	**186**
27-Mar-01			13			25				23	23		12	15	16
28-Mar-01			13			17				10	12	7	10	8	11
29-Mar-01			16			69				**390**	**822**	20	22	114	123
30-Mar-01			10			24				7	6	6	8	8	7
31-Mar-01			20			19				14	15	10	12	11	12
01-Apr-01	79	90	97		16	17		18		**2680**	**2730**	**329**	**342**	**820**	**1136**
02-Apr-01			**474**			34				**213**	**189**	83	78	**270**	**327**
03-Apr-01						29				119	96	22	24	49	47
04-Apr-01						18				15	14	13	13	12	14
05-Apr-01						12				16	10	10	13	14	9
06-Apr-01						22				106	125	26	30	**155**	**203**
07-Apr-01	**320**	**380**			6	8		58		**162**	**191**	64	73	129	142
08-Apr-01						7				42	53	7	8	8	10
09-Apr-01						10				12	15	8	10	9	10
10-Apr-01						29				**3023**	**3519**	**169**	**191**	**353**	**367**
11-Apr-01						128				**1923**	**1890**		**442**	**295**	**362**
12-Apr-01			44			**250**					**993**	55	45	**188**	**255**
13-Apr-01	87	97	102		27	27		66	69	54	44	28	27	50	46
14-Apr-01			71			67			67	68	71	64	68	64	69
15-Apr-01			74			58			59	57	60	59	63	55	60
16-Apr-01			63			47			49		55	45	47	41	46
17-Apr-01			34			31			46		37	25	28	31	29
18-Apr-01			**254**			27			50		**189**	23	27	32	36
19-Apr-01	**1209**	**1469**	**1400**		23	27		**247**	**260**		**690**	110	122	**177**	**209**
20-Apr-01			**789**			18			30		101	66	73	123	129

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Summary of GBUAPCD PM10 Monitoring 1987-2002
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	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
21-Apr-01						10			10		**538**	3	5	38	43
22-Apr-01			7			12			10		8	5	8		
23-Apr-01			9			14			11		10	6	9		
24-Apr-01			14			18			14	15	10	9	11	9	10
25-Apr-01	13	13	16		2	20		15	16	13	14	11	14	12	13
26-Apr-01			17			21			19	19	18	13	15	13	15
27-Apr-01			14			19			16	14	15	12	14	11	13
28-Apr-01			22			22			30	27	30	18	21	21	23
29-Apr-01			20			21			19	18	20	17	21	17	20
30-Apr-01			24			23			22	18	21	17	20	17	19
01-May-01	20	20	20		23	24		18	18	100	85	16	17	33	33
02-May-01			**687**			**1545**			**159**	**20754**	**12038**	**1670**	**1779**	**3189**	**2660**
03-May-01			50			80			16	**4130**	**1841**	74	72	81	34
04-May-01			14			17			16	42	18	17	12	18	11
05-May-01			22			22			19	28	20	17	18	25	17
06-May-01			23			25			25	30	24	20	23		23
07-May-01	20	20	23		27	27		23	23	29	21	18	20		20
08-May-01			28			23			21	26	20	19	20	19	19
09-May-01			20			21			18	49	48	17	18	19	21
10-May-01			23			27			23	56	23	20	21	19	21
11-May-01			24			30			26	42	40	23	24	25	26
12-May-01			24			16			21	23	22	14	16	17	19
13-May-01	6	5	6		6	7		8	7	6	6	5	6	5	6
14-May-01			13			13			15		13	9	12	10	13
15-May-01			23			24			19	20	19	18	20	18	20
16-May-01			22			26			13	126	81	15	17	17	18
17-May-01			16			19			19	17	17	14	16	16	17
18-May-01			22			29			23	119	84	18	21	22	25
19-May-01	13	12	14		16	18		15	16	14	13	12	13	13	13
20-May-01			31			19			19	85	61	17	19	13	16
21-May-01			19			25			18	**468**	**242**		16	21	22
22-May-01			14			19			17	16	17	13	15	13	14
23-May-01			18			23			18	119	87	15	17	19	20
24-May-01			31			21			22	**188**	114	30	32	34	36
25-May-01	18	18	21		26	26		26	24	26	23	17	19	20	20
26-May-01			22			24			24	24	21	19	21	19	21
27-May-01			15			19			20	18	16	13	16	15	17
28-May-01			22			21			21	**550**	**264**	16	18	24	27
29-May-01			20			20			20	22	30	15	17	15	18
30-May-01			18			21			20	91	65	13	15	14	16
31-May-01	15	15	18		17	18		18	20	30	21	14	16	15	17
01-Jun-01			**159**			36			23	**1517**	**1031**	40	38	**194**	**197**
02-Jun-01			27			17			19	**229**	48	17	19	31	29

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Summary of GBUAPCD PM10 Monitoring 1987-2002
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	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
03-Jun-01			61			27			27	**1082**	**506**	52	51	48	53
04-Jun-01			96			113			38	**2646**	**1133**	**185**	**192**	95	101
05-Jun-01			23			27			21	34	48	16	19	17	20
06-Jun-01	18	22	21		18	19		16	17						
07-Jun-01			20			20			16	17	18	12	15	12	12
08-Jun-01			20			16			17	74	58	12	14	14	16
09-Jun-01			14			17			16	20	20	13	15	11	13
10-Jun-01			18			19			17	34	31	14	17	14	16
11-Jun-01			24			16			15	14	17	15	18	11	13
12-Jun-01	33	40	41		12	13		18	20	**226**	134	32	35	11	13
13-Jun-01			86			77			29	**3912**	**1742**	117	125	**157**	**178**
14-Jun-01			38			22			17	31	34	11	13	14	15
15-Jun-01			43			29			25	50	26	20	23	22	25
16-Jun-01			26			25			22	25	19	20	22	19	22
17-Jun-01			22			22			19	26	21	17	18	17	19
18-Jun-01	33	37	41		18	20		16	18	15	13	13	15	12	14
19-Jun-01			72			20			21	18	15	15	18	15	18
20-Jun-01			26			22			21	21	15	15	17	15	17
21-Jun-01			28			27			22	20	18	17	20	18	21
22-Jun-01			51			33			27		26	24	27	24	27
23-Jun-01			28			30			26	51	49	23	24	26	28
24-Jun-01	24	26	25		23	23		24	22	30	28	20	21	21	23
25-Jun-01			27			20			22	25	43	12	14	13	15
26-Jun-01			26			19			22	18	21	14	18	16	21
27-Jun-01			31			21			31	39	41	12	12	14	15
28-Jun-01			19			21			16	13	16	12	15	12	13
29-Jun-01			22			20			17	12	14	11	13	12	14
30-Jun-01	12	15	18		19	20		16	18	13	15	10	11	10	13
01-Jul-01			16			16			18	12	14	12	15	11	14
02-Jul-01			34			22			23	37	37	14	17	14	16
03-Jul-01			28			23			23	20	19	16	19	15	18
04-Jul-01			15			17			17		15	12	14	12	14
05-Jul-01			21			15			15		17	13	15		15
06-Jul-01	8	9	11		12	13		8	12	9	12	9	12	8	10
07-Jul-01			13			12			11	12	12	10	12	11	13
08-Jul-01			8			8			9	7	8	7	6	7	8
09-Jul-01			15			22			10	8	9	25	27	10	12
10-Jul-01			12			13			11	11	13	10	10	10	12
11-Jul-01			17			19			16	19	18	14	15	13	15
12-Jul-01	13	12	14		15	16		13	15	12	14	11	13	11	13
13-Jul-01			14			17			15	14	16	10	12	11	12
14-Jul-01			16			17			16	22	24	11	13	12	14
15-Jul-01			14			14			14	11	13	12	14	11	13

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
16-Jul-01			18			15			16	13	15	11	13	12	15
17-Jul-01			20			21			17	14	17	11	13	12	15
18-Jul-01	17	20	21		18	20		17	18	16	18	14	16	14	16
19-Jul-01			24			22			19	19	21	15	16	15	17
20-Jul-01			21			19			22	18	20	13	16	14	16
21-Jul-01			19			17			17	14	15	12	14	12	15
22-Jul-01			13			16			13	12	14	12	13	11	13
23-Jul-01			14			16			15	11	13	11	12	10	12
24-Jul-01	16	15	18		16	16		13	14	11	13	12	13	11	12
25-Jul-01			14			14			14	12	11	8	11	9	10
26-Jul-01			22			25			20			16	19	17	22
27-Jul-01			22			24			21			17	18	16	18
28-Jul-01			18			19			18			15	17	14	16
29-Jul-01			19			16			16			12	13		14
30-Jul-01	16	17	19		17	18		18	19	16		15	17		17
31-Jul-01			21			22			19			15	17		17
01-Aug-01			56			26			21			11	13		16
02-Aug-01			34			24			21	19		14	16	17	19
03-Aug-01			34			24			24			15	16	15	19
04-Aug-01			13			15			13			10	13	10	13
05-Aug-01	11	11	12		12	13		12	12	9		7	9	7	10
06-Aug-01			21			19			17			11	14	11	14
07-Aug-01			22			30			18			15	17	16	18
08-Aug-01			27			21			18	17			18	17	19
09-Aug-01			19			21			18				16	15	16
10-Aug-01			21			21			19			15	17	14	16
11-Aug-01	15	15	17		15	17		15	14	12		13	14	11	14
12-Aug-01			20			17			14			11	13	14	16
13-Aug-01			21			23			19			17	19	16	19
14-Aug-01			15			15			16		14		14	11	14
15-Aug-01			19			17			17	12	15		13	12	15
16-Aug-01			21			16			19	15	17	12	14	13	15
17-Aug-01	22	22	25		17	19		22	22	16	18	15	17	16	18
18-Aug-01			20			20			21	30	31	17	18	16	18
19-Aug-01			29			25			26	22	24	20	21	19	22
20-Aug-01			33			22			22	31	30	15	17	17	17
21-Aug-01			24			22			29	19	21	16	21	18	21
22-Aug-01			40			33			34	31	34	25	29	28	32
23-Aug-01	34	34	37		29	30		28	28	23	26	25	27	24	28
24-Aug-01			37			23			21	17	19		17	17	18
25-Aug-01			19			17			17	13	15	12	15	12	15
26-Aug-01			26			23			23	18	20	17	21	17	20
27-Aug-01			28			23			26	20	21	20	21	20	22

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
28-Aug-01			27			23			23	17	18	17	19	18	18
29-Aug-01	44	48	52		29	32		28	29	28	30	26	27	25	27
30-Aug-01			41			35			30	32	34	26	28	28	30
31-Aug-01			30			46			21	21	22	16	17	18	20
01-Sep-01			19			20			17	15	17	12	15	13	16
02-Sep-01			17			19			18	14	17	13	15		16
03-Sep-01			18			17			16	14	16	12	13		17
04-Sep-01	13	14	17		13	13		11	11	8	10	8	8		10
05-Sep-01			18			23			18	18	18	15	15	16	17
06-Sep-01			24			40			34	42	44	23	25	25	27
07-Sep-01			23			21			19	16	18	16	18	15	17
08-Sep-01			14			16			16	16	19	11	14	12	14
09-Sep-01			18			17			16	12	15	12	14	13	18
10-Sep-01	39	41	48		24	26		15	23	20	23	19	21	18	22
11-Sep-01			21			18			17	11	14	11	13		14
12-Sep-01			60			18			22	21	22		15	12	14
13-Sep-01			20			28			22	17	19	16	19	16	20
14-Sep-01			18			19			17	13	14	12	14	12	14
15-Sep-01			15			14			20		12	10	12	10	12
16-Sep-01	13	13	16		17	20		17	19	12	17	12	16	13	16
17-Sep-01			27			28			32	22	26	24	26	24	26
18-Sep-01			19			21			18	16	17	14	16	15	16
19-Sep-01			22			21			17	13	17		15	13	16
20-Sep-01			18			25			15	12	14	10	12	11	14
21-Sep-01			20			19			16	12	14	10	13	11	13
22-Sep-01	12	11	14		16	19		13	15	11	13	11	12	10	13
23-Sep-01			16			19			17	13	16	11	15	12	15
24-Sep-01			38			25			18	15	18	13	16	14	16
25-Sep-01			32			17			17			12	13	20	22
26-Sep-01			16			18			16				11	9	10
27-Sep-01			47			17			23				12	11	13
28-Sep-01	13	12	14		17	19		15	16			10	12	10	12
29-Sep-01			13			16			17			9	11	11	14
30-Sep-01			14			15			16			9	11	9	11
01-Oct-01			22			21			23			17	19	17	19
02-Oct-01			23			31			21			19	20	17	20
03-Oct-01			18			21			19			14	16	14	16
04-Oct-01	56	67	84		26	30		24	25	33	23	19	21	20	22
05-Oct-01			62			34			28	26	28	21	22	21	24
06-Oct-01			27			34			32	30	31	24	26	26	28
07-Oct-01			21			24			24	19	21	19	21	19	22
08-Oct-01			26			34			26	19	22	19	19	17	20
09-Oct-01			16			18			23	32	35	17	18	13	15

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
10-Oct-01	17	15	14		13	15		14	16	10	11	9	11		
11-Oct-01			26						33	139	149	23	26		
12-Oct-01			103						39	**1143**	**981**	**215**	**206**	77	103
13-Oct-01			11						13	8	8	8	9	8	9
14-Oct-01			10						11	5	7	5	7	5	7
15-Oct-01			13						14	9	6		7	4	7
16-Oct-01	12	11	12						15	11	13		11	8	11
17-Oct-01			23						24	16	19		18	15	16
18-Oct-01			21						19	14	16	13	15	12	14
19-Oct-01			19						22	8	11	9	11	8	10
20-Oct-01			14						15	10	12	10	12	10	12
21-Oct-01			13						17	8	11		10		11
22-Oct-01	12	11	12		14			14	15	11	11		10		10
23-Oct-01			25						23	71	75		21		16
24-Oct-01			23			22			18	12	11		15		14
25-Oct-01			18			22			20	10	13	12	14	11	14
26-Oct-01			16			18			20	10	12	10	12	10	12
27-Oct-01			19			24			24	25	30	13	17	14	17
28-Oct-01	18	16	19		19	23		17	18	16	19	14	17	14	17
29-Oct-01			19			19			19	15	15	11	13	10	13
30-Oct-01			23			27			82	119	**168**	6	10	88	98
31-Oct-01			9			7			11		6	4	5	4	6
01-Nov-01			10			11			12	7	7	4	6	5	7
02-Nov-01			11			9			13	9	10		7	5	7
03-Nov-01	10	7	10		8	11		12	14	5	8	6	8	5	8
04-Nov-01			11			10			15	7	9	7	9	7	9
05-Nov-01			14			16			15	9	10	7	10	8	10
06-Nov-01			15			13			15	9	12	8	11	8	11
07-Nov-01			14			12			14	8	10	7	9	7	9
08-Nov-01			13			13			13	12	8	6	9	7	9
09-Nov-01		26	39		10	13		11	12	5	5	5	7	5	7
10-Nov-01			12			13			14		9	7	10	7	10
11-Nov-01			11			16			16		11	5	8	5	8
12-Nov-01			45			9			36		23	25	25	8	9
13-Nov-01			7			5			11			2	5	2	4
14-Nov-01			10			6			16				5	3	5
15-Nov-01		7	9		5	8		12	12	4	5	3	6	4	6
16-Nov-01			17			11			11	6	7	5	7	5	7
17-Nov-01			10			10			11	6	8	5	7	6	8
18-Nov-01			10			9			13	6	8	5	8	7	9
19-Nov-01			26			13			16	10	12	7	9	8	10
20-Nov-01			69			15			17	21	24	7	9	11	12
21-Nov-01	45	46	55		16	18		18	18	36	38	8	10	11	13

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
22-Nov-01			83			56			27	**1195**	**1130**	90	91	**382**	**397**
23-Nov-01			10			7			10	8	1	3	4	7	5
24-Nov-01			12			10			9	84	81	18	19	16	19
25-Nov-01			6			6			6	3	6	2	5	2	5
26-Nov-01			7			11			6	6	7	4	6	4	5
27-Nov-01	6	6	7		22	20		7	7		10	3	5	3	3
28-Nov-01			7			34			6		14		5		
29-Nov-01			9			7			7	13	9			5	6
30-Nov-01			7			6			8		7	4	5	4	6
01-Dec-01			7			7			8		9	7	7	6	7
02-Dec-01			23			6			31		**260**	7	8	17	19
03-Dec-01	4	6	6		4	6		5	6		8		4	3	5
04-Dec-01			7			8			11	7	7	3	5	2	4
05-Dec-01			8			11			9	23	17	4	7	5	7
06-Dec-01			11			10			14	30	14	4	6	5	8
07-Dec-01			17			14			9	25	21	5	8	9	10
08-Dec-01			7			11			9	7	8	3	5	4	5
09-Dec-01	49	55	56		11	13		29	29	**464**	**443**	12	14	36	35
10-Dec-01			123			39			13	**3302**	**2946**	41	43	25	23
11-Dec-01			23			22			9	**190**	**189**	4	7	4	6
12-Dec-01			10			8			11	16	10	2	5	3	6
13-Dec-01			9			25			8	75	78	4	6	9	12
14-Dec-01			**471**			97			41	**2181**	**3007**	69	76	133	117
15-Dec-01	43	48	45		47	42		7	8	**835**	**945**	9	11	40	28
16-Dec-01			5			6			13	11	10	2	4	3	5
17-Dec-01			10			17			9	20	24	3	6		7
18-Dec-01			13			18			11	20	15	4	7	6	7
19-Dec-01			12			11			13	17	13	6	8	10	7
20-Dec-01			67			13			43	65	74	13	16	19	18
21-Dec-01	7	5	7		7	7		13	12	5	6	3	6	4	6
22-Dec-01			7			8			9	10	12	2	5	9	10
23-Dec-01			15			63			12		121	7	10	30	26
24-Dec-01			6			70			13		**329**	3	5	11	10
25-Dec-01			6			8			11		4	3	5	4	5
26-Dec-01			9			19			18		22	5	7	12	10
27-Dec-01	20	17	18		11	13		19	19	31	37	13	14	15	16
28-Dec-01			18			20			21	17	21	11	12	11	13
29-Dec-01			7			6			8	5	7	4	6	4	6
30-Dec-01			6			6			5	5	7	4	5	4	5
31-Dec-01			7			5			8	4	6	3	4	3	5
01-Jan-02			7			5			9	3	6	3	5	3	5
02-Jan-02		7	8		4	6		7	8	5	7	3	5	4	5
03-Jan-02	10		8			6			6	5	7	5	6	4	6

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	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
04-Jan-02			9			5			9	5	6	2	4	3	5
05-Jan-02			15			6			10	5	7	3	5	4	6
06-Jan-02			7			7			11	4	6	3	5	3	5
07-Jan-02			13			8			13	12	14	4	6	6	8
08-Jan-02	16	12	13		9	10		9	9	12	15	6	7	6	7
09-Jan-02			71			45			18		**1172**	23	26	24	27
10-Jan-02			9			15			9	29	5	4	6	6	8
11-Jan-02			11			12			12	16	16		5	4	6
12-Jan-02			11			11			13	14	15	4	6	5	7
13-Jan-02			9			9			12	5	6	4	5	4	6
14-Jan-02	46	47	48		21	23		23	21	66	75	7	9	10	12
15-Jan-02			86			111			39	119	130	60	68	98	89
16-Jan-02			12			11			10	24	24	5	7	7	7
17-Jan-02			14			17			9	33	29	5	8	9	8
18-Jan-02			10			11			13		12	4	6	6	7
19-Jan-02			73			**277**			40		**1109**	48	57	80	70
20-Jan-02	12	17	11		13	6		19	12		1	5	7	6	5
21-Jan-02			19			14			15		40	10	12	11	13
22-Jan-02			**194**			29			33		**871**	52	63	23	30
23-Jan-02			41			10			9	**189**	**265**	7	9	35	33
24-Jan-02			12			8			14	14	15	5	7	4	5
25-Jan-02			136			11			121	87	107	8	9	30	29
26-Jan-02	**190**	**219**	**190**		14	16		**218**	**217**	115	144	10	13	66	67
27-Jan-02			39			8			71	54	64	10	13	22	21
28-Jan-02			7			7			9	74	77	4	6	10	11
29-Jan-02			27			17			9	**611**	**589**	5	8	11	10
30-Jan-02			17			83			10	**334**	**344**	6	8	33	24
31-Jan-02			12			12			12	28	29	3	5	4	6
01-Feb-02	18	15	16		7	11		13	13	27	28		6	4	6
02-Feb-02			11			10			11	19	22	4	6	4	7
03-Feb-02			8			9			10	7	9	3	5	3	6
04-Feb-02			20			10			16	19	21	9	12	15	16
05-Feb-02			20			23			16	37	41	6	8	10	11
06-Feb-02			15			14			15	19	22	5	10	6	9
07-Feb-02	17	14	15		19	24		17	17	**226**	30	8	11	11	14
08-Feb-02			20			50			21	41	50	15	18	22	23
09-Feb-02			13			18			14	25	35	8	11	9	10
10-Feb-02			7			8			12	5	8	3	5		6
11-Feb-02			13			29			14	15	25	5	7		8
12-Feb-02			19			19			17	15	18	10	13		13
13-Feb-02	17	15	17		25	21		15	14	41	44	9	11	8	10
14-Feb-02			12			25			20	34	36	6	9	12	14
15-Feb-02			19			19			16	26	27	8	11	10	13

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	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
16-Feb-02			39			22			30	32	36	15	17	18	19
17-Feb-02			94			13			62	**238**	**236**	58	63	112	127
18-Feb-02			11			9			10	8	8	5	7	7	8
19-Feb-02	11	16	13		10	13		14	13	17	19	4	7	5	8
20-Feb-02			12			13			15	15	21	4	8	8	11
21-Feb-02			15			14			11	18	20		7	7	9
22-Feb-02			14			15			19	28	31		11	12	13
23-Feb-02			93			24			70	**522**	**517**	59	70	99	104
24-Feb-02			10			13			11	12	6		8	7	8
25-Feb-02	18	15	16		15	16		11	12	24	27		8	6	8
26-Feb-02			12			19			13	23	24	6	7	5	7
27-Feb-02			13			12			14	17	17	7	7	12	9
28-Feb-02			**713**			99			**315**	**2454**	**2398**	**434**	**504**	**611**	**665**
01-Mar-02			**1077**			**905**			**186**	**7856**	**6703**	**495**	**521**	**2269**	**2120**
02-Mar-02			12			19			17	**173**	125	21	12	45	28
03-Mar-02	10	7	9		15	10		18	11	15	10	8	7	10	28
04-Mar-02			15			14			14	74	37		8	30	10
05-Mar-02			16			21			16	35	31	19	11	16	9
06-Mar-02			100			43			19	**875**	**967**	123	130	132	**168**
07-Mar-02			**179**			13			35	**293**	**264**	96	88	92	83
08-Mar-02			20			70			19	**205**	122	17	21	25	20
09-Mar-02	17	16	17		20	20		40	39	78	79	18	20	21	23
10-Mar-02			48			23			34	**1504**	**1239**	18	22	89	98
11-Mar-02			9			13			10	19	21	5	7	9	12
12-Mar-02			14			14			14	21	22	8	11	13	12
13-Mar-02			**338**			61			53	**972**	**905**	96	109	**768**	**819**
14-Mar-02			23			8			8	71	40	6	8	53	17
15-Mar-02		9	9		8	6		9	8	15	14	5	4	10	5
16-Mar-02			16			10			10	13	12	5	7	8	7
17-Mar-02			76			8			11	93	94	14	15	54	45
18-Mar-02			136			49			12	**1055**	**1057**	29	31	**682**	**621**
19-Mar-02			12			9			10	14	13	5	7	15	33
20-Mar-02			17			11			10	16	17	6	8	10	13
21-Mar-02		16	16		9	13		12	13	24	26	8	9	9	8
22-Mar-02			47			16			41	69	80	19	19	27	26
23-Mar-02			30			8			10	**212**	**226**	13	15	16	18
24-Mar-02			9			7			9	6	8	6	9	3	8
25-Mar-02			8						8	10	13	3	6	4	6
26-Mar-02			10			15			10	10	12	5	7	5	7
27-Mar-02	9	10	13		13	15		11	11	13		6	8	7	10
28-Mar-02			19			30			18		71	10	13	43	53
29-Mar-02			38			69			17		**371**	19	21	141	**152**
30-Mar-02			18			18			18		13	14	15	19	14

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PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
31-Mar-02			19			18			21		17	15	17	14	17
01-Apr-02			21			23			20		27	14	16	14	18
02-Apr-02	17	17	20		19	21		17	20	42	44	13	15	16	16
03-Apr-02			24			23			18	30	33	14	16	19	19
04-Apr-02			22			23			19	44	51	13	16	14	17
05-Apr-02			35			22			19	21	24	9	12	11	14
06-Apr-02			28			24			29	38	41	23	25	22	26
07-Apr-02			16			17			18	17	19	12	14	12	15
08-Apr-02	17	16	20		18	22		16	18		31	12	16	12	19
09-Apr-02			70			23			30		55			39	19
10-Apr-02			19			26			16	20	25			14	
11-Apr-02			18			18			20	51	55	12	14	15	14
12-Apr-02			17			26			20	22	25	11	12	11	12
13-Apr-02			17			20			21	30	27	11	14	12	15
14-Apr-02	55	55	55		17	27		19	20	**513**	**554**	123	131	92	103
15-Apr-02			**749**			**196**			**303**	**2175**	**1585**	**988**	**759**	**1110**	**1456**
16-Apr-02			**365**			41			**155**	**567**	**660**	**155**	**192**	118	117
17-Apr-02			**151**			76			35	**7071**	**3934**	86	80	**213**	**232**
18-Apr-02			50			37			17	**611**	**493**	29	28	**338**	**323**
19-Apr-02			61			30			19	**180**	150	16	19	86	92
20-Apr-02	12	10	11		12	14		14	15	12	12	8	10	10	10
21-Apr-02			14			17			17	15	17	11	13	14	24
22-Apr-02			21			26			24	27	28	17	19		20
23-Apr-02			28			30			32	35	40	23	25	23	27
24-Apr-02			24			22			47	109	121	12	14	24	30
25-Apr-02			9			14			13	14	10	7	7	11	16
26-Apr-02	10	8	9		11	12		18	15	20	18	9	10	9	10
27-Apr-02			19			16			23	42	43	15	17	15	19
28-Apr-02			15			17			24	18	19	12	14	12	15
29-Apr-02			41			20			58	**272**	**342**	28	28	36	43
30-Apr-02			39			22			17	**367**	**395**	20	21	51	61
01-May-02			16			16			14	16	18	9	11		11
02-May-02		12	10		12	16		11	13	18	20	6	8	8	9
03-May-02			17			19			29	26	27	12	14	14	20
04-May-02			17			19			20	18	19	15	17	14	18
05-May-02			18			20			21	16	18	15	17	15	21
06-May-02			22			26			22	83	84	18	20	19	21
07-May-02			**217**			81			84	**764**	**857**	107	110	**756**	**737**
08-May-02	103	104	90		139	139		69	73	**193**	**187**	95	95	**256**	**257**
09-May-02			36			38			31	58	57	38	39	36	29
10-May-02			**203**			43			39	**1671**	**1472**	66	73	**718**	**794**
11-May-02			52			39			16	**362**	**405**	15	16	144	145
12-May-02			10			13			12	20	21	7	9	13	16

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
13-May-02			15			20			15	20	21	11	14	15	18
14-May-02	15	13	13		20	20		14	16	26	21	11	12	12	18
15-May-02			20			26			19	38	29	15	16	25	20
16-May-02			19			26			22	38	28	17	18	23	22
17-May-02			22			34			26	46	49	20	20	25	28
18-May-02			18			31			23	57	62	16	18	22	25
19-May-02			81			92			**170**	**354**	**468**	52	52		65
20-May-02	58	67	51		45	35		76	67	**196**	**219**	68	76		58
21-May-02			6			10			8	10	9	4	6		10
22-May-02			7			25			9	15	12	5	6		8
23-May-02			56			36			39	**199**	**249**	39	40	**165**	**192**
24-May-02			10			21			12	16	13	8	9	10	9
25-May-02			15			42			20	18	19	14	16		17
26-May-02	17	15	16		27	29		19	20	23	18	15	17		17
27-May-02			15			29			18	34	16	13	14		15
28-May-02			13			24			15	14	15	9	11	11	12
29-May-02			15			23			16	17	17	9	12	11	14
30-May-02			21			24			21	23	24	13	16	13	16
31-May-02			25			36			27	29	28	21	22	21	24
01-Jun-02	20	19	19		27	26		22	22	75	79	25	26	22	25
02-Jun-02			14			17			17	13	15	11	13	11	14
03-Jun-02			38			20			17	40	40				
04-Jun-02			19			21			18	18	21				
05-Jun-02			17			23			17	21	25				
06-Jun-02			18			27			22	42	42	14	16	15	18
07-Jun-02	29	28	27		24	24		19	20	50	52	12	13	13	16
08-Jun-02			32			34			19	**1654**	**1138**	44	43	74	92
09-Jun-02			**376**			**236**			**157**	**2101**	**1433**	**256**	**262**	**2962**	**2840**
10-Jun-02			20			24			23	28	28	20	20	79	94
11-Jun-02			13			24			15	19	21	13	14	17	15
12-Jun-02			17			32			19	76	24	18	18		17
13-Jun-02	21	21	19		27	30		24	24	32	32	19	20	21	21
14-Jun-02			20			33			26	28	29	19	18	21	21
15-Jun-02			25			35			25	47	50	27	27	28	30
16-Jun-02			34			44			27	35	36	33	32	33	35
17-Jun-02			17			26			19	19	20	17	17	17	17
18-Jun-02			12			18			14	15	16	14	14	12	14
19-Jun-02	20	19	17		30	29		21	22	34	36	18	19	83	85
20-Jun-02			31			27			31	84	88	21	22	25	25
21-Jun-02			23			36			23	26	27	28	29	25	25
22-Jun-02			15			23			18	17	20	16	16	18	16
23-Jun-02			17			24			22	27	29	16	17	17	18
24-Jun-02			16			22			18	26	29	13	14	20	16

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
25-Jun-02	21	19	17		22	24		24	21	18	22	14	15	20	16
26-Jun-02			19			28			23	28	25	17	18	20	20
27-Jun-02			19			29			23	25	25	16	20	20	23
28-Jun-02			24			47			26	31	31		25	23	25
29-Jun-02			20			34			26	23	26		23	21	23
30-Jun-02			19			29			27	21	22		21	20	21
01-Jul-02	29	30	27		38	41		38	37	42	47		27		31
02-Jul-02			21			25			23	19	21	15	16	15	16
03-Jul-02			18			30			29	24	27	17	18	18	20
04-Jul-02			20			29			27	28	28	20	21	20	21
05-Jul-02			20			31			22	21	23	16	18	18	21
06-Jul-02			17			23			21	21	22	16	19	17	19
07-Jul-02	16	16	14		19	21		18	17	21	21	19	19	15	15
08-Jul-02			11			20			15	16	15	9	10	11	13
09-Jul-02			12			20			17	19	19	9	11	10	12
10-Jul-02			18			32			19	27	29	18	21	17	19
11-Jul-02			36			50			42	45	47	39	41	48	52
12-Jul-02			20			29			23	25	25	25	25	18	18
13-Jul-02	27		24		30	31		24	25	31	34	27	28	25	26
14-Jul-02			16			23			20	24	26	16	17	17	18
15-Jul-02			13			24			23	83	81	12	13	12	14
16-Jul-02			17			30			33	27	31	26	28	26	27
17-Jul-02			20			21			22	25	28	18	20	14	15
18-Jul-02			15			20			16	20	19	13	15	13	15
19-Jul-02	12	12	12		17	19		13	15	16	18	12	14	12	14
20-Jul-02			15			23			18	21	22	16	17	15	17
21-Jul-02			9			17			14	11	12	9	10	9	11
22-Jul-02			14			43			36	48	49	13	15	13	14
23-Jul-02			59			95			111	82	83	43	42	54	54
24-Jul-02			85			77			109	75	73	85	78	85	83
25-Jul-02	98	95	87		71	71		68	64	78	75	109	100	93	90
26-Jul-02			64			128			77	90	87	54	47	55	52
27-Jul-02			35			48			92		40	31	29	39	38
28-Jul-02			25			45			34		35	29	28	31	31
29-Jul-02			19			36			21		27	21	20		21
30-Jul-02			70			122			85	110	96	71	69	78	73
31-Jul-02		87	78		110	101		105	98	100	93	83	73	94	88
01-Aug-02			50			69			64	63	62	43	39	52	50
02-Aug-02			47			46			37	45	44	49	45	44	41
03-Aug-02			54			44			55	53	54	60	51	53	52
04-Aug-02			46			21			33	50	50	58	49	38	38
05-Aug-02			53			87			79	91	87	58	50	65	60
06-Aug-02	30	29	24		51	44		49	43	33	28	26	24	31	29

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Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
07-Aug-02			23			46			33	34	35	24	24	26	27
08-Aug-02			15			29			18	17	18	16	15	15	16
09-Aug-02			15			47			25	25	26	14	15	15	16
10-Aug-02			24			69			37	40	44	19	20	24	26
11-Aug-02			85			**167**			96	127	120	74	72	85	85
12-Aug-02	99	95	87		**156**	131		98	94	125	114	84	78	91	87
13-Aug-02			90			115			80	111	97	82	76	86	82
14-Aug-02			58			78			52	76	73	61	55	64	62
15-Aug-02			48			56			47	61	58	45	40	38	36
16-Aug-02			45			54			48	52	52	46	43	45	44
17-Aug-02			55			59			42	61	59	52	48	55	53
18-Aug-02	61	59	50		74	67		68	65	68	66	54	48	56	53
19-Aug-02			41			68			39	65	64	50	44	53	50
20-Aug-02			20			44			21	64	62	23	19	22	23
21-Aug-02			22			31			33	31	33	28	28	26	28
22-Aug-02			23			35			33	45	45	29	28	28	28
23-Aug-02			19			41			27	30	32	25	26	25	26
24-Aug-02	25	24	22		29	30		23	23	29	29	22	23	22	24
25-Aug-02			21			48			28	24	27	20	21	20	22
26-Aug-02			19			27			24	21	23	17	18	18	19
27-Aug-02			18			24			21	18	21	17	18	16	19
28-Aug-02			19			28			23	21	25	19	20	21	23
29-Aug-02			25			40			30	32	35	25	27	31	35
30-Aug-02	23	23	21		42	44		33	31	32	36	21	22	22	24
31-Aug-02			14			23			19	22	25	14	16	15	16
01-Sep-02			14			18			20	14	17	13	15	13	15
02-Sep-02			15			22			23	31	33	15	16	14	16
03-Sep-02			18			26			21	52	58	16	17	17	19
04-Sep-02			20			23			24	66	73	22	24	24	26
05-Sep-02	9	10	10		12	13		20	19	28	32	8	9	8	10
06-Sep-02			13			18			18	62	66	8	8	10	11
07-Sep-02			13			21			18	23	26	10	11	9	11
08-Sep-02			10			13			14	9	13	9	11	9	12
09-Sep-02			11			16			15	9	12	8	10	7	10
10-Sep-02			12			16			16	8	11	7	9	6	9
11-Sep-02	14	13	13		15	17		14	16	11	14	9	12	10	12
12-Sep-02			15			28			19	18	17	14	16	14	15
13-Sep-02			14			22			19	14	15	12	14	12	14
14-Sep-02			14			21			18	14	16	13	15	12	15
15-Sep-02			32			32			28	48	55	27	28	17	21
16-Sep-02			24			43			30	33	37	27	31	30	33
17-Sep-02	25	27	22		29	34		21	22	27	29		25	23	24
18-Sep-02			60			26			27	36	41		24	**378**	**405**

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Summary of GBUAPCD PM10 Monitoring 1987-2002
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	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
19-Sep-02			8			14			15	11	13	6	8	14	18
20-Sep-02			9			22			12	15	17	5	8	6	8
21-Sep-02			10			17			15	11	13	9	11	9	11
22-Sep-02			10			14			13	10	11	7	9	8	10
23-Sep-02		9	9		10	13		15	15	9	11	6	8	7	10
24-Sep-02			13			21			18	30	37	11	13	9	15
25-Sep-02			14			16			27		18	12	14	13	16
26-Sep-02			18			26			20	18	20	17	19	16	19
27-Sep-02			16			25			18	66	70	20	20	15	17
28-Sep-02			24			23			27	19	23	19	19	19	24
29-Sep-02			15		17	20		14	15	17	18	12	13	13	15
30-Sep-02			19			21			20	20	21	16	17		20
01-Oct-02			55			25			39	25	28	31	33	46	52
02-Oct-02			142			41			19	44	57	39		**701**	**790**
03-Oct-02			13			15			14	13	14	8	10	16	16
04-Oct-02			21			24			25	21	23	15	17	16	20
05-Oct-02	11	13	13		12	15		11	13		14	9	11	9	12
06-Oct-02			9			10			11		8	5	8	5	8
07-Oct-02			9			9			13		11	4	7	4	8
08-Oct-02			13			9			13	8	9	3	6	4	5
09-Oct-02			10			15			15	14	17	8	9	8	10
10-Oct-02			20			29			27	49	56	14	17	18	20
11-Oct-02	20	20	23		24	27		30	30	22	28	21	23	19	20
12-Oct-02			16			20			24	17	20	11	14	11	14
13-Oct-02			11			16			17	9	11	8	10	8	11
14-Oct-02			14			17			16	12	14	7	10	7	10
15-Oct-02			11			16			16	13	15	7	9	7	9
16-Oct-02			30			42			47	31	36	18	22		22
17-Oct-02	16	15	19		19	21		27	27	19	21	12	14	21	24
18-Oct-02			13			11			16	7	11	7	9	8	10
19-Oct-02			12			17			15	13	15	10	12	9	12
20-Oct-02			14			17			15	10	13	10	13	10	13
21-Oct-02			21			22			29	16	18	15	17	13	17
22-Oct-02			16			18			24	12	14	11	13	10	14
23-Oct-02	18	17	21		28	30		30	26	17	20	15	17	15	18
24-Oct-02			24			29			23	23	24	19	20	20	21
25-Oct-02			25			23			24	24	21	18	18	18	18
26-Oct-02			17			20			25	18	20	13	16	14	16
27-Oct-02			24			19			23	14	16	12	14	19	22
28-Oct-02			15			21			22	19	21	11	13	12	14
29-Oct-02	17	16	19		20	23		23	22	18	20	13	16	14	17
30-Oct-02			22			24			31	19	23	15	18	16	19
31-Oct-02			24			24			28	27	29	19	20	18	21

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
01-Nov-02			36			35			41	28	31		34	25	31
02-Nov-02			27			23			25	20	24		20		20
03-Nov-02			15			15			18	10	12		9		10
04-Nov-02		16	18			17		16	17		11				
05-Nov-02			13			13			20	12	15	7	10		8
06-Nov-02			15			20			28	20	23		10	8	10
07-Nov-02			121			94			109	**478**	**448**	34	38	88	115
08-Nov-02			5			5			6	4	5	3	3	4	4
09-Nov-02			9			8			4	104	98		5	7	7
10-Nov-02			6		4	6			6	2	6		5	2	5
11-Nov-02			7			6			10	3	7		6	3	6
12-Nov-02			6			4			10	33	6		4	3	6
13-Nov-02		5	6			5		10	11	6	7	3	4	4	5
14-Nov-02			27			9			9	11	11	7	9	9	10
15-Nov-02			8			8			13	8	9	4	5	3	5
16-Nov-02	7	6	7		5	7		14	14	5	6	3	6	4	6
17-Nov-02			9			8			10	6	8	20	8	6	8
18-Nov-02			12			16			11	10	12	5	8	5	8
19-Nov-02			10			12			12	8	10	5	7	5	7
20-Nov-02			7			13			11	6	8	2	5	4	5
21-Nov-02			9			10			12	7	9	4	5	4	6
22-Nov-02	10	8	9		7	9		10	11	10	12	5	7	5	7
23-Nov-02			57			13			11	20	20	20	23	10	12
24-Nov-02			8			9			11	6	7	7	7	6	7
25-Nov-02			**213**			**454**			37	**821**	**877**	137	**153**	**2638**	**2594**
26-Nov-02			57			**338**			10	**1442**	**1214**	43	47	**1785**	**1506**
27-Nov-02			9			37			7		24	4	6	88	83
28-Nov-02	6	23	7		7	10			10		6	3	5	7	5
29-Nov-02			9			12			12		8	5	7	8	9
30-Nov-02			7			7			10		6	3	6	3	6
01-Dec-02			6			6			6		5	2	5	4	5
02-Dec-02			6			6			6		5	2	5	3	5
03-Dec-02			7			7			11	4	5	2	5	3	5
04-Dec-02			8		4	5		9	10	5	8	3	6	2	6
05-Dec-02			8			6			14	8	8	4	6	5	6
06-Dec-02			9			6			12	6	7	5	6	5	6
07-Dec-02			8			8			15	4	7	4	6	4	7
08-Dec-02			8			8			15	5	7	4	6	4	7
09-Dec-02			9			9			11	62	75	4	6	5	7
10-Dec-02			12		8	10		13	14	11	12	6	9	7	9
11-Dec-02			14			20			17	13	15	7	10	8	10
12-Dec-02			13			14			20	13	15	8	10	9	11
13-Dec-02			17			18			22	14	14	10	12	11	12

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Summary of GBUAPCD PM10 Monitoring 1987-2002
(all values are µg/m3 and represent 24-hour samples)

	KEELER			OLANCHA			LONE PINE			DIRTY SOCKS		FLAT ROCK		SHELL CUT	
DATE	SSI	Partisol	TEOM	SSI	Partisol	TEOM	SSI	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM	Partisol	TEOM
14-Dec-02			89			28			122	**187**	**251**	31	36	71	88
15-Dec-02			75			13			15	**348**	**377**	32	33	59	70
16-Dec-02	88	**180**	133		24	30		23	16	**305**	**270**	94	81	132	133
17-Dec-02			6			4			4	1	3	1	4	2	4
18-Dec-02			5			5			5	4	3	2	4	3	3
19-Dec-02			7			6			6		6	8	9	6	6
20-Dec-02			4			5			5	5	4	5	3	6	4
21-Dec-02			4			5			5	4	4	4	3	3	4
22-Dec-02		51	53		5	6		3	5	24	27	7	8	3	5
23-Dec-02			81			18			6	113	133	12	14	8	9
24-Dec-02			6			6			8	2	5	2	4	2	5
25-Dec-02			5			6			8	3	5	2	4	2	5
26-Dec-02			6			6			11	3	5	4	5	2	5
27-Dec-02			6			7			10	5	6	5	5	4	5
28-Dec-02	37	46	44		9	9		13	13	57	60	46	41	16	16
29-Dec-02			5			5			7	10	11	2	5	4	7
30-Dec-02			5			5			8	3	5	2	4	2	4
31-Dec-02			39			29			10	**809**	**633**	28	36	**176**	**220**

* All are midnight-to-midnight unless denoted by an asterisk (*).
PM10 values greater than 150 µg/m≥ are shown in bold.

Appendix B

Modeling Report

Owens Valley Air Quality Modeling Study
Draft Report

Owens Valley PM_{10} Planning Area
State Implementation Plan 2003 Revision

Submitted to:
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514

Submitted by:

MFG, Inc.
19203 36th Avenue W, Suite 101
Lynnwood, WA 98036

June 11, 2003

Owens Valley Air Quality Modeling Study
Draft Report

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1 EXECUTIVE SUMMARY

The CALPUFF dispersion modeling system was applied to simulate dust events at Owens Lake to support the Revised Owens Valley PM_{10} Demonstration and Attainment State Implementation Plan (RSIP). Wind blown dust from the exposed Owens Lake playa produces some of the highest PM_{10} concentrations observed in the United States. Peak hourly and 24-hour PM_{10} concentrations have been observed to exceed 50,000 $\mu g/m^3$ and 12,000 $\mu g/m^3$ at the historical shoreline, respectively. The US EPA approved a 1998 State Implementation Plan (SIP) for the Owens Valley that established interim requirements for implementing dust controls on 43 km^2 of the lakebed by the end of 2003. The current studies support a 2003 SIP revision that assesses the interim control measures, and proposes new control requirements necessary to attain and maintain the PM_{10} National Ambient Air Quality Standards (NAAQS).

Wind blown PM_{10} emissions were estimated over a 135 square kilometer area using a simple relationship based on sand fluxes measured at a single height above the surface and an empirical constant referred to as a "K-factor". This empirical relationship between the horizontal sand flux and the vertical PM_{10} emission flux was found to change spatially and temporally at Owens Lake based on data collected by a 30-month Dust ID Program. The District conducted a field program at Owens Lake from January 2000 through June 2002 to identify PM_{10} emission source areas, provide the basis for the estimation of PM_{10} emission fluxes, and to support development of the RSIP.

A model performance evaluation was conducted to examine model uncertainty and to compare the performance of different empirical K-factor relationships. Statistical measures and diagnostic graphics were used to examine the modeling procedures' ability to explain the frequency distribution, spatial variability, and temporal variability of observed PM_{10} concentrations. Based on comparisons with monitoring data, dispersion model simulations using the sand flux as a surrogate for PM_{10} emissions were able to characterize many aspects of observed dust events at Owens Lake.

The 75^{th} Percentile Storm-Average K-factor algorithm was selected for the attainment demonstration based on performance for the larger dust events. Predictions based on this algorithm were conservative, but relatively unbiased for these events and the observed 24-hour frequency distributions for each monitoring location were generally characterized within a factor-of-two throughout the whole range of observed PM_{10} concentrations.

CALPUFF simulations of a 30-month period were performed to support development of additional control strategies necessary to attain the 24-hour and annual PM_{10} NAAQS. Control strategy development was simplified using a source contribution matrix derived from the top ten 24-hour PM_{10} contributions at receptor sites around the historic shoreline of Owens Lake. The CALPUFF simulations suggest the control strategy proposed in the RSIP would lower both 24-hour and annual PM_{10} concentrations and bring the airshed into attainment with the National Ambient Air Quality Standard.

2 INTRODUCTION

This report describes dispersion modeling studies conducted to support a Revised Owens Valley PM_{10} Demonstration and Attainment State Implementation Plan (RSIP). Dispersion model simulations with the CALPUFF modeling system[1] were used to diagnostically aid in the identification of source areas, to develop PM_{10} emission flux algorithms, and to simulate the effects of different control strategies. The simulations formed the basis of the attainment demonstration required by the US Environmental Protection Agency (US EPA) for the RSIP. After providing some background information, the remainder of this report gives an overview of the field program and describes dispersion modeling methodologies used to develop and assess a control strategy for attainment.

2.1 Background

The Great Basin Unified Air Pollution Control District (hereafter the District) has been studying the mechanisms and effects of wind blown dust from Owens Lake for over two decades. Following diversion of the Owens River, the original 285 square kilometer (km^2) saline lake was reduced to a much smaller brine pool surrounded by exposed, dry alkali soils. Wind blown dust from the exposed Owens Lake playa produces some of the highest PM_{10} concentrations observed in the United States. Peak hourly and 24-hour PM_{10} concentrations have been observed to exceed 50,000 $\mu g/m^3$ and 12,000 $\mu g/m^3$ at the historical shoreline, respectively. In 1993, the US EPA designated the southern Owens Valley as a "Serious" PM_{10} nonattainment area. The US EPA approved a 1998 State Implementation Plan (SIP) for the Owens Valley that established interim requirements for implementing dust controls on 43 km^2 of the lakebed by the end of 2003. The current studies support the 2003 RSIP that assesses the interim control measures and proposed new control requirements necessary to attain and maintain the PM_{10} National Ambient Air Quality Standards (NAAQS).

2.2 Previous Modeling Studies

The District and MFG have conducted a number of modeling studies at Owens Lake. The results of these studies are contained in the following reports:

- *Preliminary Results Owens Dry Lake Air Quality Modeling Study* (October 1995).[2] Simulations in this study were based on the emission algorithms developed for the Mono Lake playa.[3] Predictions in three modeling regions were provided to the District in the form of source area impact matrices. The matrices allowed the District to test different emission algorithms and examine the influence of different source areas to the monitoring stations.

- *Owens Lake Model Evaluation* (August 1996).[4] MFG compared model predictions to ambient observations from six historical episodes in this study. The emission factors for wind blown PM_{10} sources were based on wind tunnel tests conducted on the playa at about the time of the episodes. The size and location of the emitting areas used in the comparisons were also specific to the episodes used in the evaluation.

- *Results of Control Alternative Evaluation* (September 1996).[5] Using the concepts of the prior studies, MFG assessed the effectiveness of different proposed control strategies in this report. A more conservative emission algorithm was used in order to capture the higher potential PM_{10} events and the sources areas were larger than used in the previous evaluation study.

Previous SIP attainment demonstration modeling. The dispersion modeling contained in the *Owens Valley PM_{10} Planning Area Demonstration of Attainment SIP* [6] followed the general procedures of the studies above. Features of the modeling approach supporting the *1998 SIP Attainment Demonstration* included:

- the Industrial Source Complex Short-Term model;[7]
- wind speed dependent emission factors for each season and control alternative based on the interpretation of wind tunnel data collected by the District;
- a 35 square mile source area where emissions varied hourly according to wind speed, but were assumed to be spatially uniform. The outline of the source area was based on on-lake visual inspections of the playa over several seasons of dust events;
- three modeling sub-regions with receptors placed on the historical shoreline and at the air monitoring sites; and
- two years of meteorological data (1994 through 1995) within the three modeling regions.

The modeling approach in the *1998 SIP Attainment Demonstration* was designed to be conservative using a large source area and average PM_{10} emission rates. A model performance evaluation was conducted and showed this approach captured many aspects of the larger historical events, but was biased toward over-prediction for the smaller events. Although visual observations and wind tunnel tests suggested many events were characterized by smaller emitting areas with more intense emissions, a database sufficient to describe this activity was not available for the *1998 SIP Attainment Demonstration*.

Owens Lake Dust Identification Program. The District conducted the Owens Lake Dust Identification (Dust ID) Program from January 2000 through June 2002.[8] The Dust ID Program was conducted to refine the locations of active sources areas on the lakebed and support a more realistic depiction for dispersion modeling. The Dust ID Program collected sand movement data, PM_{10} concentrations, surface and upper air meteorological observations, visual observations and mapped source areas during dust events over this 30-month period. Dispersion modeling played an important role in the Dust ID Program. The CALPUFF modeling system was applied as a diagnostic tool to study the relationship between observed PM_{10} concentrations and sand flux measurements on the lakebed. The following reports are available describing modeling aspects of the Dust ID Program:

- *Owens Valley PM_{10} Attainment Demonstration Modeling Protocol*.[9] The *Modeling Protocol* described the procedures used in the current dispersion modeling studies supporting the 2003 RSIP. A formal protocol describing the modeling techniques including a performance evaluation is recommended by both the US EPA and the California Air Resources Board (CARB). Many of the modeling techniques in the current study follow those outlined in the *Modeling Protocol* including the application of the CALPUFF modeling system, the preparation of the meteorological data, and the use of sand flux measurements as a surrogate for PM_{10} emissions. During the Dust ID Program changes in the modeling approach resulted from discussions between the District and the US EPA, CARB, and consultants for the City of Los Angeles Department of Water and Power (LADWP).

- *Locating and Quantifying Wind Blown Dust PM_{10} Emissions at Owens Lake, California.*[10] This paper by the District describes the field studies of the Dust ID Program and focuses on the methods used to estimate PM_{10} emission fluxes using sand flux measurements. These techniques form the basis for the emission calculations simulated in this study and are summarized in Section 4 of the RSIP. In a similar paper submitted to the *Journal of Geophysical Research*, Gillette and others provide details of the emission algorithm and further discuss the experimental and theoretical support for the method.[11]

This report describes the dispersion modeling aspects of the Dust ID Program and the methods used to assess attainment of the annual and 24-hour PM_{10} NAAQS. Much of the discussion in the present report expands on the material presented in *Modeling Wind Blown Dust Emissions and Demonstrating Attainment with the National Ambient Air Quality Standards at Owens Lake, California.*[12]

2.3 Dispersion Modeling Objectives

The dispersion modeling in this investigation builds on the methods of previous studies using data from the Dust ID Program and the CALPUFF modeling system. The modeling approach is more refined than was employed in the *1998 Attainment Demonstration* and is possible, in part due to the availability of data characterizing source activity and more extensive meteorological observations. Specifically the objectives of the dispersion modeling are as follows:

- Conduct the dispersion modeling in accordance with the regulatory guidance for PM_{10} SIPs using US EPA recommended modeling tools and procedures.

- Perform an evaluation of the dispersion modeling techniques using two years of ambient data collected by the Dust ID Program; focus the evaluation on the higher observed 24-hour PM_{10} concentrations and conditions that influence source area characterization. The performance evaluation was used to assess model uncertainty and aid in the selection of several aspects of the modeling procedures.

- Assess and refine control strategies until the modeling approach demonstrates attainment of the PM_{10} NAAQS.

The PM_{10} NAAQS are attained when areas accessible to the public are lower than US EPA specified criteria. For the purposes of this modeling study, areas accessible to the public are defined as locations at or outside the 3,600-foot terrain elevation contour surrounding Owens Lake. Attainment of the 24-hour PM_{10} NAAQS is achieved when predicted concentrations at these locations are not above 150 $\mu g/m^3$ more than once per year on average. The current modeling simulations are based on 30 months of data collected through the Dust ID Program. Within this 30-month period, no more than two concentrations can be higher than the 24-hour NAAQS at each receptor location. The annual PM_{10} NAAQS is assessed using simulations for 2000 and 2001. Attainment of the annual PM_{10} NAAQS is demonstrated when annual predictions for both years are below 50 $\mu g/m^3$.

2.4 Report Organization

The remainder of the report describes the Dust ID Program, dispersion modeling techniques, evaluation procedures, ambient data sets, the control strategy assessment, and the results of the attainment demonstration. An overview of the measurements collected during the Dust ID Program is presented in Section 3. Section 4 describes dispersion modeling methods and discusses the emission algorithms applied during the study. Section 5 presents the results of a model performance evaluation including the ambient data sets, statistical performance measures, and other methods used to assess uncertainty in the modeling approach. The results of the attainment demonstration and control strategy evaluation are provided in Section 6. The report concludes with references in Section 7.

3 OVERVIEW OF THE DUST ID MEASUREMENT PROGRAM

The District conducted a field program at Owens Lake from January 2000 through June 2002 to identify PM_{10} emission source areas, provide the basis for the estimation of PM_{10} emission fluxes, and to support development of the RSIP. The field program was designed based on the premise that PM_{10} emissions are related to the flux of saltating sand-sized particles.[10,11] Figure 1 shows a map of Owens Lake with the location of the Dust ID instrumentation. Features of the Dust ID Program are as follows:

- Co-located Sensits™ and Cox Sand Catchers (CSC's) were used to measure hourly sand flux rates at 135 locations spaced one kilometer apart. The instruments were placed with their sensor or inlet positioned 15 cm above the surface. Sensits™ measure the kinetic energy and the particle counts of sand-sized particles as they saltate across the surface. CSC's are passive instruments used to collect sand-sized particles blown across the surface during a dust event. For a given period, the total mass of saltating sand was based on the CSC catch and the Sensits™ were used to time resolve the horizontal sand flux. Ono, et al, provide further details concerning the operation of the paired Sensits™ and CSC's.[10]
- Hourly PM_{10} concentration data were collected at six sites around Owens Lake using Tapered Element Oscillating Microbalance (TEOM) PM_{10} monitors. The TEOMs were co-located with filter-based PM_{10} monitors collecting 24-hour samples.
- Surface meteorological data were collected hourly at 13 locations. Winds were observed at 10 m at all locations and individual sites collected surface pressure, precipitation, temperature, and relative humidity. Although not used in the current study, two of the sites record wind and temperature data at multiple heights for the estimation of surface energy fluxes. The Dust ID Program also benefited from the surface wind observations collected by other researchers during the 30-month study.
- A 915 MHz Radar Wind Profiler and Radio Acoustic Sounding System (RASS) were used to collect upper level wind and temperature measurements. The Wind Profiler was initially located at Dirty Socks then moved to the Mill Site during the 4^{th} quarter of 2001.
- To help verify the location of dust source areas, time-lapse video cameras were installed at three sites to continuously record dust events during daylight hours and three human observers mapped dust source areas and plumes during the storms on regular workdays. In addition, the erosion boundaries of some source areas were mapped with the aid of a field crew using a Global Positioning System (GPS) after a storm.

A large Geographic Information System (GIS) database was constructed using observations collected during the Dust ID Program. Using the GIS database, the District prepared hourly maps displaying sand movement, winds, visually observed plume and source area boundaries, and PM_{10} concentrations for dust events at Owens Lake during the study period. Ono, et al, and the Dust ID Program Protocol provide further detail.[8,10]

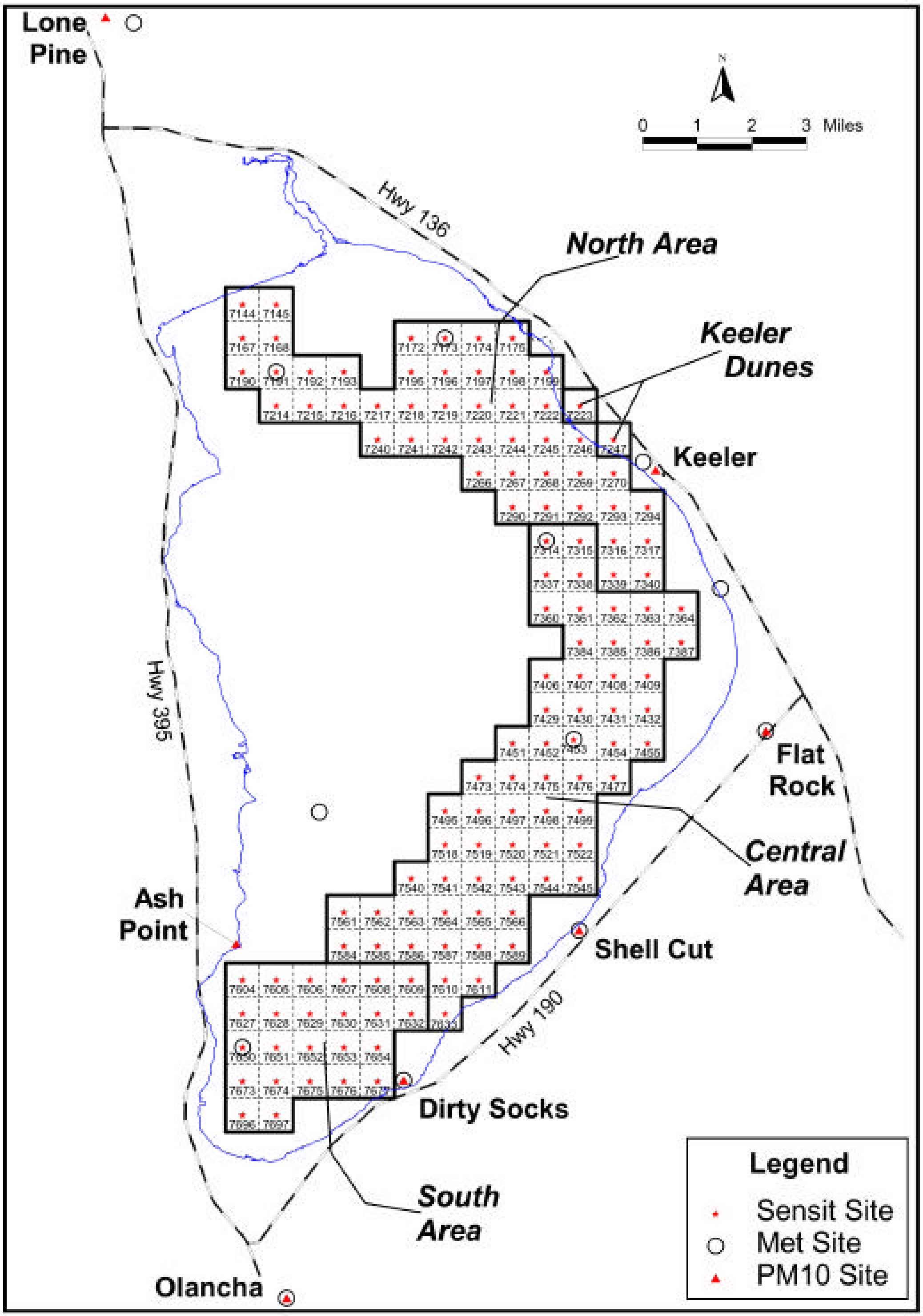


Figure 1. Owens Lake Dust ID Monitoring Network

4 DISPERSION MODELING TECHNIQUES

The CALPUFF modeling system was selected for assessing source contributions to observed PM_{10} concentrations and for the development of control strategies for the RSIP. CALPUFF is the US EPA recommended modeling approach for long-range transport studies and US EPA has recently designated CALPUFF as a *Guideline Model* included in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W). US EPA also allows application of the modeling system on a case-by-case basis to near-field dispersion problems where the three-dimensional qualities of the wind field are important and for stagnation episodes when pollutants remain within the modeling domain over periods of several hours or more. Observations during the Dust ID Program indicate dust events on Owen Lake are sometimes influenced by complex wind patterns, with plumes from the North Sand Sheet traveling in different directions than plumes from the South Sand Sheet. Both CARB and the US EPA approved the application of CALPUFF during their review of the *Modeling Protocol*. Preparation of the meteorological data, application of CALPUFF, and the estimation of PM_{10} emission fluxes are discussed in the remainder of this section.

4.1 Preparation of the Meteorological Data

The three-dimensional wind fields for CALPUFF were constructed from surface and upper air observations using the CALMET meteorological preprocessor program. CALMET combines surface observations, upper air observations, terrain elevations, and land use data into the format required by CALPUFF. Winds are adjusted objectively using combinations of both surface and upper air observations according to options specified by the user. In addition to specifying the three-dimensional wind field, CALMET also estimates the boundary layer parameters used to characterize diffusion and deposition by the CALPUFF dispersion model. CALMET was applied following the general procedures discussed below.

Model domain. The model domain shown in Figure 2 is a 34 km-by-48 km area centered on Owens Lake. The extent of the model domain was selected to include the “data rich” study area, terrain features that act to channel winds, and receptor areas of interest. The meteorological grid used a one-kilometer horizontal mesh size with ten vertical levels ranging geometrically from the surface to four kilometers aloft. The one-kilometer mesh size and orientation of the meteorological grid matched the spacing used for the Sensit™ network.

Surface observations. The majority of the necessary surface meteorological data came from the District’s network of ten-meter towers shown in Figure 1. Very few periods of missing data were contained in the District’s database. Periods of missing data were flagged and CALMET constructed the wind fields using the data from the remaining stations. In addition to the District’s network, surface data from other field programs at Owens Lake were used when available. These additional data sets include wind data from LADWP’s monitoring program on the South Sand Sheet, Desert Research Institute’s field programs on the North Sand Sheet and near the DIVIT site.

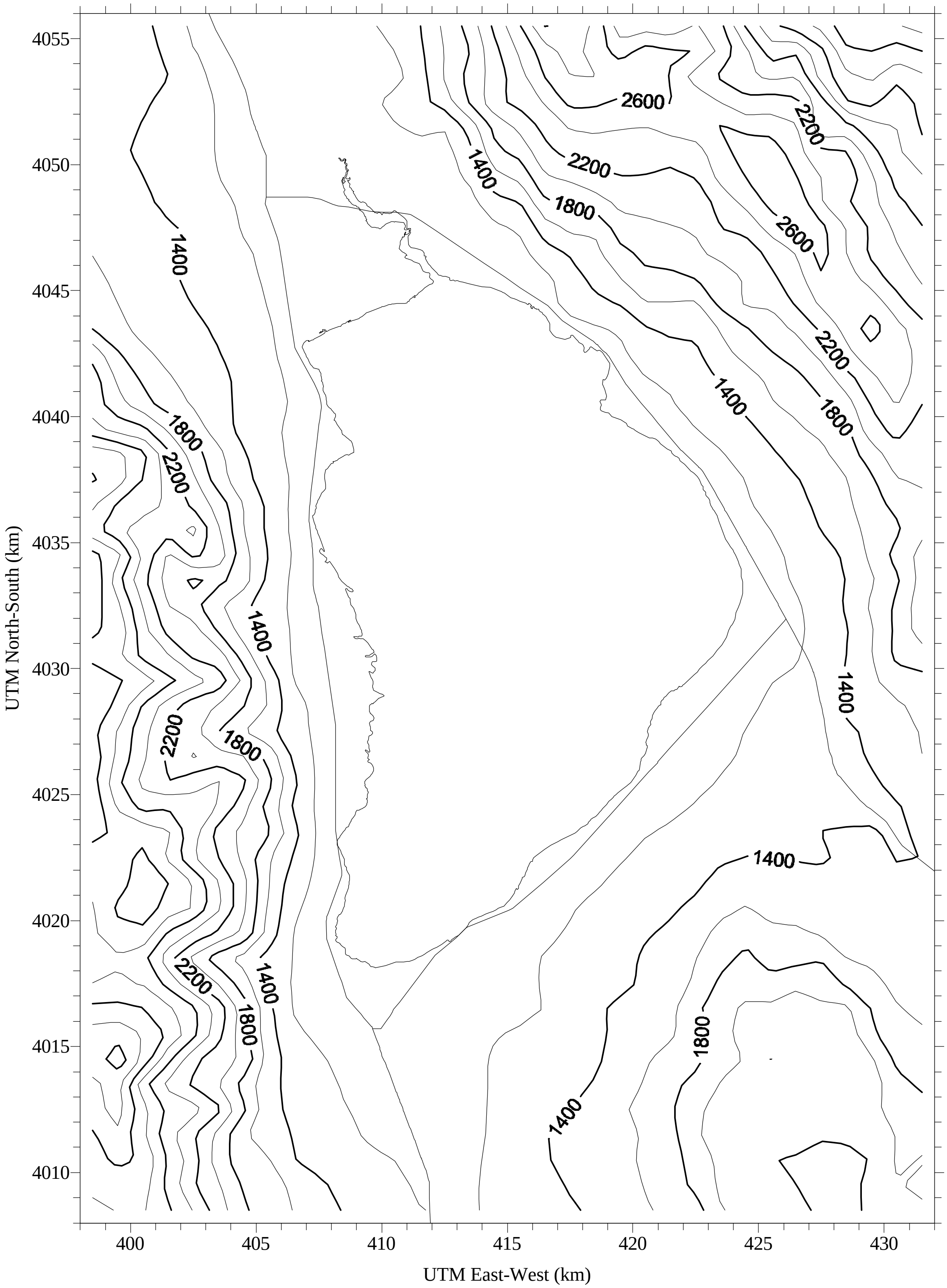


Figure 2. Model Domain and 1-km Mesh Size Terrain (m)

Cloud cover. CALMET requires cloud cover and ceiling height observations. Cloud cover is a variable used to estimate the surface energy fluxes and, along with ceiling height, is used to calculate the Pasquill stability class. Hourly cloud cover and ceiling height observations were collected from the surrounding surface airways observations at China Lake and Bishop Airport. During dust event conditions, the sensitivity of the CALPUFF modeling system to these variables is reduced, as the stability class becomes neutral under moderate to high winds. Algorithms within the modeling system that depend on the surface energy fluxes are dominated by the momentum flux and tend to be insensitive to cloud cover under high winds. For these reasons, the absence of local cloud cover and ceiling height measurements are not expected to significantly affect the results of the modeling study.

Surface characteristics and terrain. The CALPUFF modeling system requires land use and terrain data. These data are used by CALMET to adjust the wind field and affect the calculations performed by the CALPUFF dispersion model. CALPUFF considers spatial changes in land use, including the surface roughness, and the input data are specified on a horizontal grid. The terrain data influence the constructed wind fields and plume trajectories in regions of sparse observations. Land use and terrain data were obtained from the U.S. Geological Survey (USGS) data sets on the Internet. The resolution of these land use and terrain data sets are 200 m and about 30 m, respectively. These data sets were prepared using the pre-processing software provided with the CALPUFF modeling system. The resulting grids were plotted and checked against data from the District's GIS database where the modeling domain overlaps the District's data. The 1-km mesh size terrain used by CALMET and CALPUFF is shown in Figure 2.

Upper air data. The upper air data for construction of the wind fields and estimation of mixing heights with CALMET included local hourly observations from the Dirty Socks Wind Profiler and regional twice-daily upper air soundings from Desert Rock Airport (Mercury, Nevada) and China Lake Naval Air Station. The Wind Profiler with RASS samples wind and temperature from 100 m, up to 5000 m with a vertical resolution as low as 60 m depending on the clutter environment, atmospheric scattering conditions, and pulse length. Experience at Owens Lake indicates wind data recovery is sometimes poor above 1000 m due to the dry environment and the RASS data are limited to the lower levels during windy conditions.

When operating, hourly wind and temperature data from the Wind Profiler and RASS were used for as many vertical levels as possible. In order to extend the profiles aloft near the profiler, 500-mb data were stripped from the China Lake (Desert Rock when missing) sounding. Since the soundings are generally taken at 12-hour intervals, it was necessary to interpolate between the observation times to match the hourly Wind Profiler data. During extended periods when the Wind Profiler was not operating, soundings from China Lake and Desert Rock were used to construct the data set. The China Lake and Desert Rock sounding were primarily used for upper level temperature lapse rates. Except near the Wind Profiler location winds aloft were based on extrapolation of the surface wind measurements.

The methods used to extrapolate surface winds aloft influenced predicted upper level winds in portions of the domain away from the Wind Profiler and during periods when the Wind Profiler data were unavailable. Data from the Wind Profiler at Dirty Socks and at the Mill Site during dust events indicate little or no wind speed shear in the vertical and no consistent turning of the wind direction with height. The default algorithms employed by CALMET based on Similarity Theory often adjust the winds in the wrong direction and predict too much increase in wind speed with height even for very small surface roughness lengths. As an alternative, wind speeds aloft were adjusted using the empirical results suggested by the Wind Profiler. No wind direction turning with height was assumed except near the Wind Profiler site where the actual data were used when available.

CALMET options. The options employed for the application of CALMET to construct the wind fields were provided in the *Modeling Protocol*. The majority of the selected model options are based on the defaults incorporated in the code by the model author.[1] Notable model options include:

- Ten vertical levels varying geometrically from the surface to 4000 m. The geometric spacing provides better resolution near the surface and the upper limit is high enough to be above the boundary layer height.
- Vertical extrapolation of surface winds aloft using the results of the Wind Profiler studies as discussed above.
- Less than default smoothing of wind fields. LADWP consultants suggested less smoothing of the wind fields by CALMET after review of the *Modeling Protocol*.

The wind fields constructed with CALMET were randomly checked with the CALDESK™ software package and by plotting the resultant fields and the surface observations on a base map. Figure 3 shows an example of the surface wind field constructed for an hour during the early portion of the May 2, 2001 event.

4.2 PM_{10} Emissions and Source Characterization

This section provides an overview of the methods used to calculate hourly wind blown PM_{10} emissions for dispersion model simulations at Owens Lake. The detailed procedures, theory, and supporting scientific evidence for the methods employed are given in Section 4 of the RSIP, by Ono, et al., and in Gillette, et al.[10,11] PM_{10} emission fluxes from source areas at Owens Lake were calculated using hourly sand flux activity data and the following simple relationship:

$$F_a = K_f \times q \qquad \textbf{Equation 1}$$

where:

F_a = the vertical PM_{10} emission flux ($g/cm^2/hr$)

K_f = an empirical constant (sometimes referred to as the K-factor)

q = the horizontal sand flux measured at 15 cm above the surface ($g/cm^2/hr$)

Field data at Owens Lake suggest the horizontal sand flux at a single measurement height is proportional to the total horizontal sand flux and is a good indicator of wind erosion processes generating PM_{10} emissions. The total horizontal sand flux is a strong function of both the surface shear stress and the properties of the soil at the time of the event. Rather than trying to predict the horizontal sand flux using wind speed and properties of the soil, sand movement on the lake was parameterized using the network of paired Sensit™ and CSC measurements.

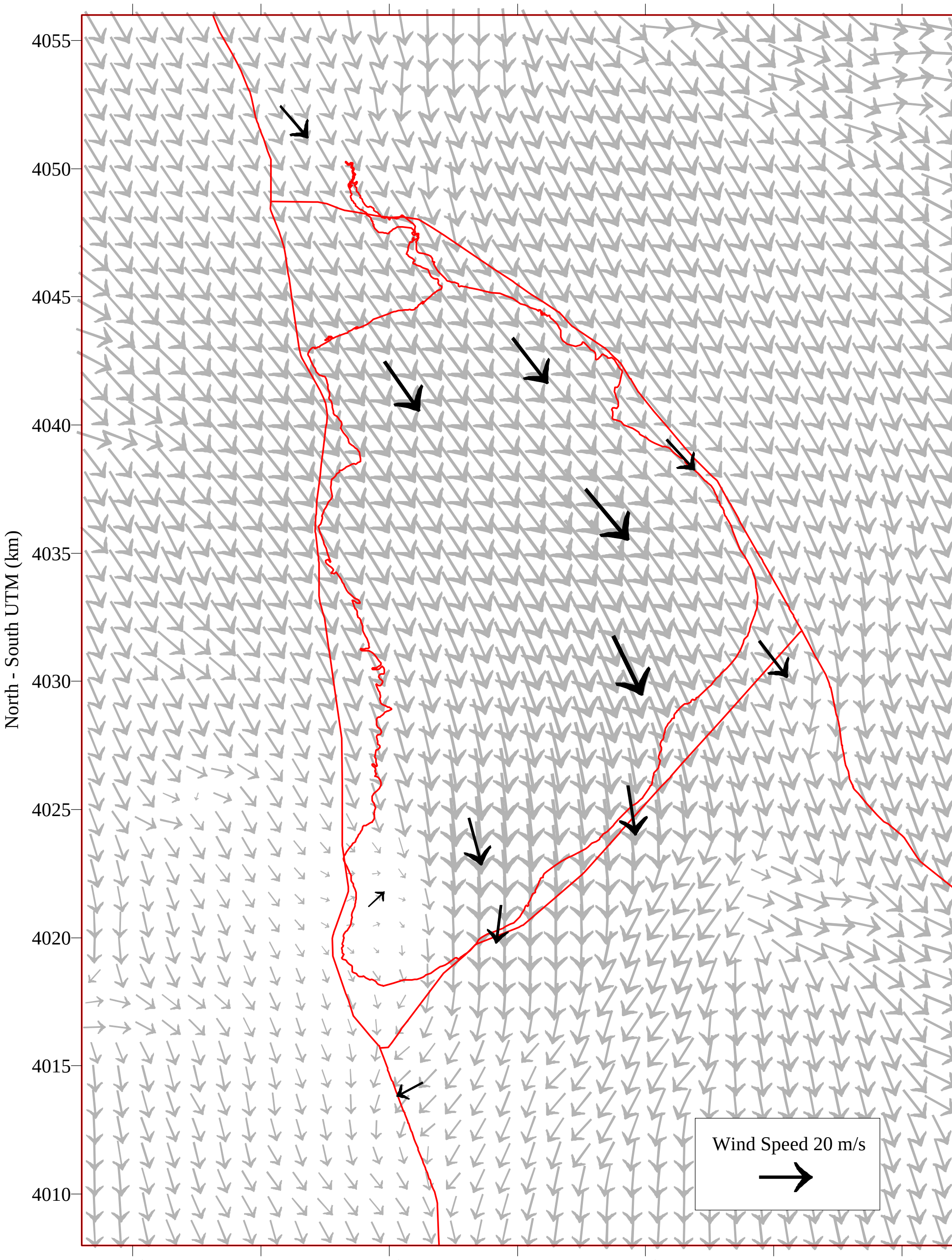


Figure 3. CALMET Predicted Surface Winds with Observations Posted for May 2, 2001 (Hour 0500-0600)

***K_f* estimates.** Experimental and theoretical evidence suggest K_f is a property associated with the binding energies of the soil.[11] On Owens Lake this empirical constant appears to vary by season and by source areas grouped together by surface soil textures. During the Dust ID Program K_f was inferred using the modeling practices described in this study based on a subset of the data and the procedures given by Ono, et al.[10] Simulations were performed using a first guess for K_f and the measured hourly sand flux data. Following a screening analysis, predictions were then compared to observed PM_{10} concentrations and a revised estimate for K_f was obtained. The screening criteria were selected to ensure a strong relationship existed between the source area and the downwind PM_{10} monitoring site. The source-to-receptor relationship was established using wind direction data, sand flux data for the source area, the maps generated from visual observations, and source contribution matrices based on the modeling. The screened estimates for K_f were then grouped together by event and source area.

Figure 4 and Figure 5 provide examples of the hourly K_f data derived for the South Area plotted versus wind speed at the affected TEOM site, PM_{10} concentration at the affected TEOM site, the maximum and the average Sensit™ sand flux within the source area. These data suggest a tendency towards higher, and somewhat less variable K_f with the size of the event. A similar trend was observed for the other source areas.

Table 1 displays an interpretation of the K_f data inferred from modeling. These estimates were obtained from storm ensemble averages grouped by period of the year and source area. The source areas shown in Figure 1 were selected based on common surface soil properties. The periods were subjectively based on inspection of the variability exhibited in time series plots and considerations of the precipitation-temperature history thought to affect surface crusting, surface erodibility, and the formation of efflorescent salts on the surface. In Table 1 the 75th percentile storm-averages are shown. These estimates are somewhat higher than the median or average storm averages and were selected based on consideration of model performance for the larger dust events. Further discussion on model performance is provided Section 5.

Table 1. 75-Percentile Storm-Average K-factors (*K_f*)

Period	**K-factors (10^{-5}) For Different Source Areas [(a)]**			
	Keeler Dunes	**North Area**	**Central Area**	**South Area**
1/1/2000 – 2/3/2001	5.1	2.1	6.6	1.9
2/4/2001 – 4/18/2001	5.1	2.1	26	6.7
4/19/2001 – 11/30/2001	5.1	2.1	6.3	1.9
12/1/2001 – 3/8/2002	20	7.6	36	5.8
3/9/2002 – 4/18/2002	5.5	5.0	6.9	9.0
4/19/2002 – 6/30/2002	5.5	5.0	6.6	1.8

(a) The source areas are shown in Figure 1.

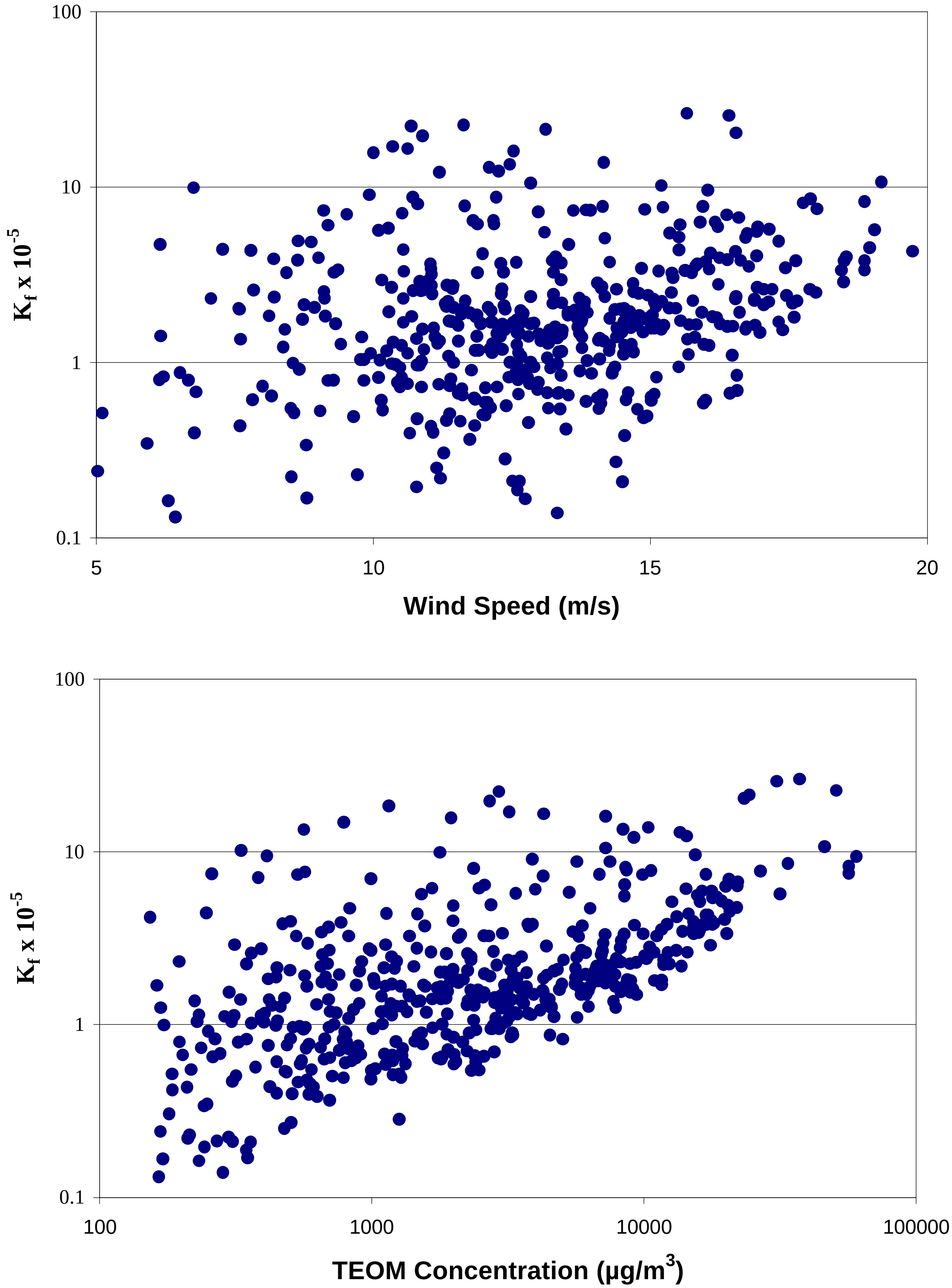
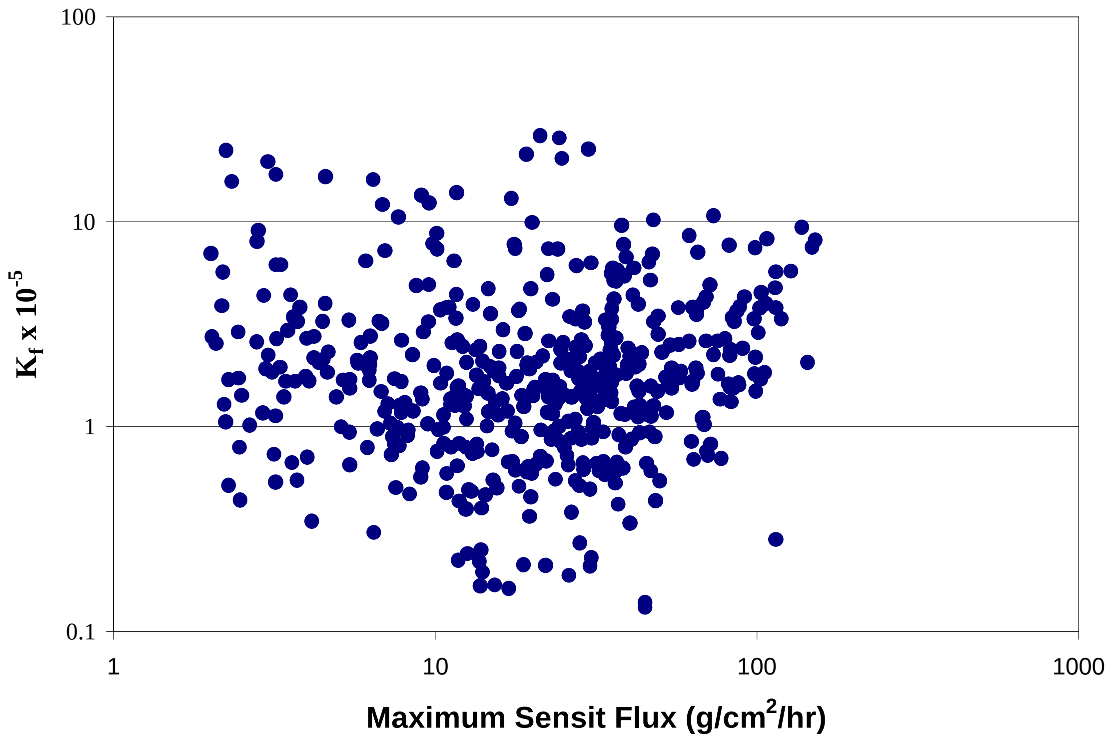


Figure 4. Hourly K_f Data for the South Area as a Function of Wind Speed and PM_{10} Concentration at the Affected TEOM



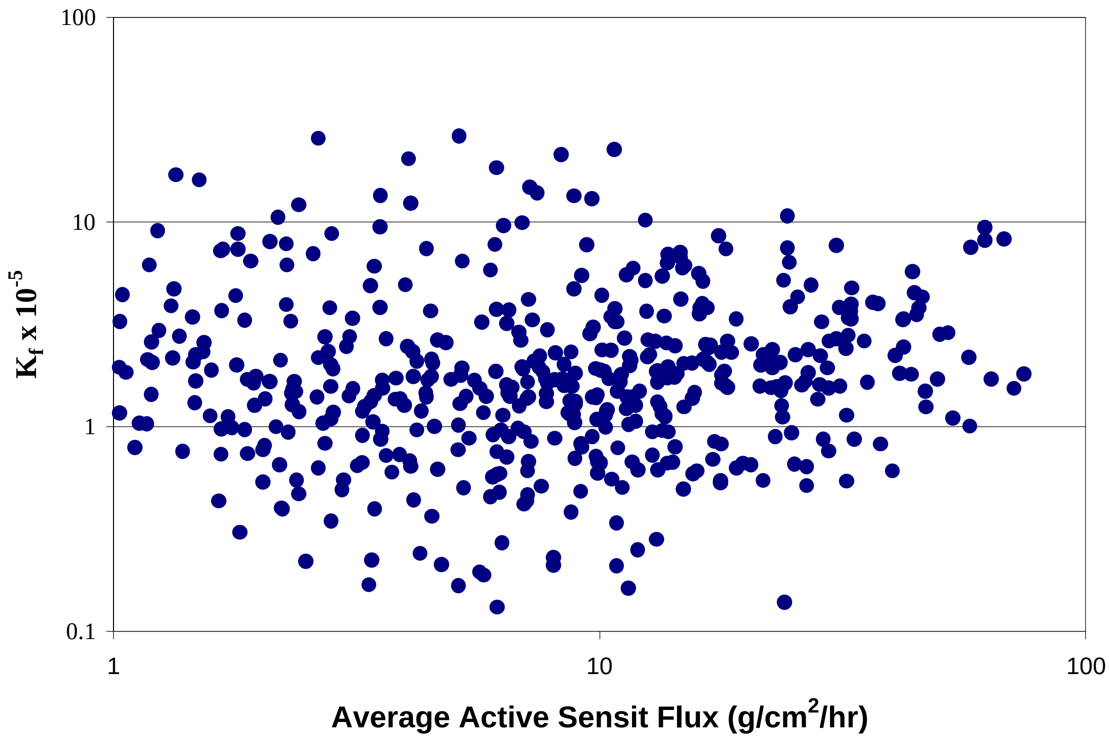


Figure 5. Hourly K_f Data for the South Area versus the Maximum and Average Sensit Flux Observed within the Source Area

Area source configuration. The CALPUFF simulations at Owens Lake are sensitive to source configuration. Emissions were varied hourly according to Equation 1 and supplied to CALPUFF for each Sensit™ location as area sources. CALPUFF contains an area source algorithm that provides numerically precise calculations within and near the area source location. The area source configuration is shown in Figure 6. In most instances, the Sensit™ measurement was assumed to be representative of the horizontal sand flux for the one square kilometer surrounding the measurement location. In some instances, these one square kilometer areas contain wetlands where little or no significant PM_{10} emissions are expected. For these areas, the sources were divided into smaller pieces and the wetlands removed. In addition, for two regions shown in Figure 6 the source areas were extended to neighboring cells without Sensit™ measurements. These areas were included in the simulations based on visual inspection and GPS mapping of the erosive areas following dust events.

4.3 CALPUFF Options and Application

The application of CALPUFF involves the selection of options controlling dispersion. Although the simulations are primarily driven by the meteorological data, emission fluxes, and source characterization, the dispersion options also affect predicted PM_{10} concentrations. In this study, the following options were selected for the simulations:

- Dispersion according to the conventional Pasquill-Gifford dispersion curves. Early in the study, sensitivity tests were performed by applying CALPUFF with dispersion routines based on Similarity Theory and estimated surface energy fluxes. These tests did not indicate improved performance over the Pasquill-Gifford based simulations.
- Near-field puffs modeled as Gaussian puffs, not elongated “slugs.” CALPUFF contains a computation intensive “slug” algorithm for improved representation of plumes when wind directions vary rapidly in time. This option was tested, but did not significantly influence the CALPUFF predictions.
- Consideration of dry deposition and depletion of mass from the plume. The particle size data used were based on measurements taken within dust plumes on Owens Lake as discussed below.

Dry deposition and subsequent depletion of mass from the dust plumes depend on the particle size distribution. Several field studies have collected particle size distributions within dust plumes at Owens Lake. Based on results from Niemeyer, the CALPUFF simulations assumed a lognormal distribution with a geometric mean diameter of 3.5 ìm and a geometric standard deviation of 2.2.[13] These variables are based on the average of 13 dust plume size distributions reported by Niemeyer between June 1995 and March 1996 at different locations within the airshed.

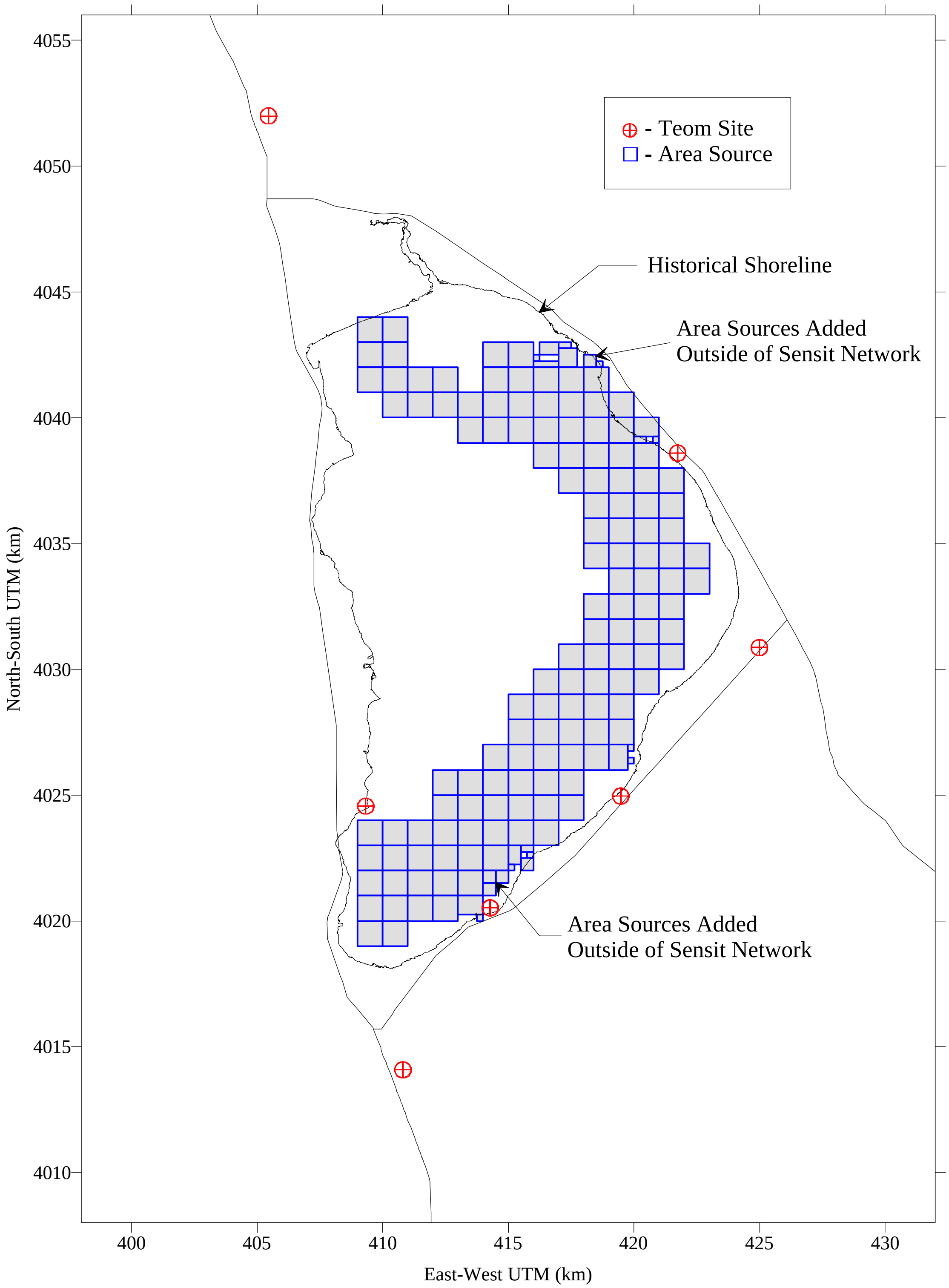


Figure 6. Area Source Configuration Used in the 2003 RSIP

4.4 Background PM_{10} Concentrations

The dispersion model simulations include only wind blown emissions from the source areas with sand flux activity shown in Figure 6. During high wind events other local and regional sources of fugitive dust also contribute to the PM_{10} concentrations observed at the monitoring locations. A constant background concentration of 20 ìg/m^3 was added to all predictions to account for background sources. The constant background was calculated from the average of the lowest observed PM_{10} concentrations for each dust event when 24-hour PM_{10} concentrations at any of the sites were above 150 ìg/m^3. To avoid including impacts from lakebed dust source areas in the background estimate, the procedures used a simple wind direction filter to exclude hours when the lakebed sources may have directly influenced observed PM_{10} concentrations. Such hours were removed and daily average background concentrations were recalculated based on the remaining data.

5 MODEL PERFORMANCE EVALUATION

The District conducted a model performance evaluation comparing CALPUFF predictions to hourly and 24-hour observations at the PM_{10} monitoring sites in Figure 1. Statistical measures and diagnostic graphics were used to examine the modeling procedures' ability to explain the frequency distribution, spatial variability, and temporal variability of observed concentrations. Results from the performance evaluation were also used to compare different interpretations of the derived K-factor (K_f) estimates. The remainder of this section describes the methods employed and presents results of the performance evaluation. Much of the discussion that follows focuses on the 75th Percentile Storm-Average K-factors selected for the attainment demonstration (Table 1). Model performance results for five other K-factor relationships are contained in appendices attached to this report.

5.1 Ambient PM_{10} Data Sets

The performance evaluation used PM_{10} observations from the District's TEOM monitoring stations shown in Figure 1.The data from the first 24 months of the 30-month Dust ID Program were used to develop the statistics. Data from the last six months of the study were not used in the evaluation because several key sand flux monitoring sites were removed to allow construction of dust control measures. Both hourly and 24-hour average data were used in the evaluation. The 24-hour averaging period was selected because the PM_{10} NAAQS is based on a 24-hour average. At the request of the CARB, performance statistics were also prepared from the hourly predictions and observations. Statistics based on the hourly data are more robust because there are more data pairs. Hourly data also provide a more direct means of examining model performance by meteorological conditions or by time of day. Twenty-four hour averages were based on at least 18 valid samples and hourly predictions were not used to develop any of the statistics unless a valid observation was available for the same hour.

5.2 Performance Measures

Several different statistical performance measures were used to compare predictions from the CALPUFF modeling system to observations. The general techniques applied follow the methods used by the US EPA to evaluate AERMOD and ISCPRIME for inclusion as *Guideline Models*.[14] The measures selected provide descriptive information and evaluate the ability of the modeling approach to:

- explain the frequency distribution of PM_{10} concentrations at each monitoring location and
- explain the temporal and spatial variation of the observations.

Q-Q plots. Quantile-quantile (Q-Q) plots were prepared for both hourly and 24-hourly PM_{10} concentrations. Q-Q plots test the ability of the modeling procedures to represent the entire frequency distribution of the observations. Q-Q plots are simple ranked pairings of predicted and observed concentrations, such that any quantile of the predicted concentration is plotted against the same ranking of the observed concentration. The Q-Q plots contain lines on the graphs that indicate an unbiased prediction, over-prediction by a factor-of-two, and under-prediction by a factor-of-two.

Fractional bias of the mean and standard deviation. The fractional bias of the mean examines the overall bias of the model, while the fractional bias of the standard deviation tests whether the model predictions have the same variability as the observations. The fractional bias of the mean was calculated as follows:

$$FB_{MEAN} = 2\frac{\left(\overline{P} - \overline{O}\right)}{\left(\overline{P} + \overline{O}\right)} \qquad \textbf{Equation 2}$$

where "O" refers to the observations and "P" refers to the model predictions.[a] The fractional bias of the standard deviation is calculated in a similar fashion except the means are replaced by the standard deviations of the observed and predicted concentrations. The fractional bias has the advantage of being a symmetrical, bounded measure and because it's normalized it can be used for comparing results from studies involving different dependent variables. The fractional bias varies from -2 (extreme under-prediction) to 2 (extreme over-prediction). Predictions within a factor-of-two are bounded by a fractional bias of ±0.667.

Robust highest concentration. The Q-Q plots, fractional bias of the mean, and fractional bias of the standard deviation above describe the model's ability to predict the whole domain of the observations. In order to focus on the higher observations, the fractional bias of the "robust highest concentration" (RHC) was also calculated. The RHC is a measure designed to be more "robust" in a statistical sense than the maximum value and is recommended by the US EPA for performance evaluations in a regulatory setting. After Cox and Tikvart,[15] the RHC was based on the following:

$$RHC = X_n + \left(\overline{X_{hi}} - X_n\right)\ln\left(\frac{3n-1}{2}\right) \qquad \textbf{Equation 3}$$

where X_n is the nth highest value, $\overline{X_{hi}}$ is the average of the *n-1* highest values, and *n* is the number of high values. The value of *n* is somewhat arbitrary but is typically chosen to be 26 or the number of concentrations exceeding a threshold value. For the purposes of the present analyses, *n* was based on the top 2% of the frequency distribution.

Paired in time statistics. The performance measures listed above do not require that the modeling approach explain the temporal distribution of the observations. While this may be adequate for many regulatory applications, more rigorous statistical tests involve statistical measures paired in time and space. Both geometric and linear correlation coefficients between model predictions and observations were calculated for each data set. The correlation coefficient tests the scatter of model predictions about the observations. A high correlation coefficient can be obtained when the bias (intercept) or the scale (slope) of the model predictions are different than zero and one, respectively. The correlation coefficient is also heavily influenced by "outliers". In order to further diagnose the scatter in the data sets, log-log scatter diagrams of model predictions versus observations were also prepared.

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a. The sign of the fractional bias in this study differs from the usual US EPA definition where the P and O are reversed in the numerator of Equation 2. In this study positive fractional implies over-prediction. The association between a "positive" number and "over"-prediction seems more intuitive.

The mean absolute normalized gross error (E_1) is a statistical measure often used by the CARB for ozone modeling studies and is calculated according to:

$$E_1 = \frac{1}{N}\sum_{1}^{N}\frac{|P_i - O_i|}{O_i}$$ **Equation 4**

Since the observed value is in the denominator of the expression, E_1 is not very "robust" because the measure is unbounded and nonsymmetrical. As an alternative in order to examine the scatter in the paired samples, the mean absolute fractional bias (MAFB) was calculated according to:

$$MAFB = \frac{2}{N}\sum_{1}^{N}\frac{|P_i - O_i|}{(P_i + O_i)}$$ **Equation 5**

A MAFB of 0.667 means the model's typical error is the same magnitude as the observed concentration.

Residual plots. Recent US EPA model evaluation studies for AERMOD and ISCPRIME use residual plots of the ratio of predicted to observed concentrations (P/O), paired in time and space versus meteorological or other variables. The residual plots feature "box and whisker" symbols that show the distribution of (P/O) ratios along the y-axis for different domain segments or cases along the x-axis. In the current study, the fractional bias of individual paired data samples are used instead of the (P/O) ratio to provide a more symmetrical bounded measure. For each observation-prediction pair, the fraction bias is calculated from:

$$FB_i = 2\frac{(P_i - O_i)}{(P_i + O_i)}$$ **Equation 6**

which can be inverted back to (P/O) space using:

$$\frac{P_i}{O_i} = \frac{(2 + FB_i)}{(2 - FB_i)}$$ **Equation 7**

For each data set or case, the "box and whisker" plots show the 12.5th percentile (whisker), 25th percentile (box), median, 75th percentile (box) and 87.5th percentile (whisker) FB ratios. The box-whiskers plots in this study also show the number of samples and lines on the plots show where the predictions are within a factor-or-two of the observations using the transform in Equation 7. Box-whisker residual plots were used to examine model performance: by period of the Dust ID Program, by TEOM monitoring site, and by concentration range.

PM_{10} concentration range. In order to focus the performance analysis on wind blown dust events and PM_{10} concentrations above the NAAQS, many of the statistics above were filtered using a lower limit for the PM_{10} concentration. Selection of a lower limit based solely on either observed or predicted PM_{10} concentrations results in statistics biased towards over-prediction and under-prediction, respectively. For example, removing all data pairs with observed concentrations less than 150 $\mu g/m^3$ could possible exclude all times the model over-predicted concentrations during these hours. In order to remove any bias introduced by the lower concentration filter, both the observed and predicted PM_{10} concentrations were used. The filtering criteria were as follows:

- The sum of the predicted plus the observed concentration must be greater than 150 $\mu g/m^3$. This condition is met when either the observed or predicted concentrations are above 150 $\mu g/m^3$.
- The geometric mean of the prediction and the observation are greater than 150 $\mu g/m^3$. This condition is similar to the one above, except in log-log space the lower portion of the distribution near the cut-off is less distorted.
- The geometric mean of the prediction and the observation are greater than 500 $\mu g/m^3$, 1000 $\mu g/m^3$, and higher. These conditions were intended to increasingly focus the statistics on the higher PM_{10} concentrations.

The different criteria above were applied to both the hourly and 24-hour PM_{10} statistics. With the exception of the Q-Q plots, the first criterion (sum greater than 150 $\mu g/m^3$) was always applied. The Q-Q plots were prepared using the entire data sets. When geometric mean based lower limits were used, the tables and plots indicate the concentration range or lower limit.

5.3 Model Performance Results

This section summarizes the results of the model performance evaluation using the ambient data sets and statistical measures described above. The CALPUFF simulations were performed using the methods described in Section 4. Tabular statistics, Q-Q plots, and box-whisker plots were prepared for both hourly and 24-hour PM_{10} concentrations using CALPUFF predictions for January 2000 through December 2001 based on six different K-factor formulations:

- 50^{th} Percentile Storm-Average K-factors
- 75^{th} Percentile Storm-Average K-factors (These K-factors were used in the attainment demonstration and are listed in Table 1)
- 95^{th} Percentile Storm-Average K-factors
- 50^{th} Percentile Hourly K-factors
- 75^{th} Percentile Hourly K-factors
- 95^{th} Percentile Hourly K-factors

The details concerning the derivation of the different K-factor relationships are given in Section 4 of the RSIP and in Ono, et al.[10] Over the 30-month Dust ID Program, the screened K-factors are derived using the methods described in Section 4.2 by period of the year and source area (shown in Figure 1). The periods of the year were selected based on changing surface erosive conditions after inspections of time-series plots. The "hourly" K-factors were derived based on the hourly K-factors within each period, while the "storm-average" K-factors were derived after the data have been grouped into events or storms where each storm is weighted equally. The hourly K-factors are more robust statistically because there are more data samples.

The storm average K-factors allow different storms to be treated as individual events. Note however, that in the attainment demonstration and for the statistics derived in this section, K-factors varied by period not by storm and there could be many storms for each season or period. The 50^{th}, 75^{th}, and 95^{th} percentiles allow consideration of different levels of conservatism to account for model uncertainty.

The full results of the performance evaluation analyses are provided in the following appendices:

A. Robust Highest Concentration and Tabular Statistics for Hourly and 24-hour Predictions Based on Storm-Average K-factor Formulations
B. Log-Log Scatter Diagrams and Q-Q Plots for 24-hour and Hourly Predictions Based on Storm-Average K-factor Formulations
C. Box Whisker Plots for 24-hour and Hourly Predictions Based on Storm-Average K-factor Formulations
D. Robust Highest Concentration and Tabular Statistics for Hourly and 24-hour Predictions Based on Hourly K-factor Formulations
E. Log-Log Scatter Diagrams and Q-Q Plots for 24-hour and Hourly Predictions Based on Hourly K-factor Formulations
F. Box Whisker Plots for 24-hour and Hourly Predictions Based on Hourly K-factor Formulations

The remainder of this section will discuss the storm-average results listed in Appendix A through Appendix C emphasizing the 75^{th} percentile data selected for the attainment demonstration. Statistics for the "hourly" K-factors are included in the appendices, but were not selected for the attainment demonstration. These algorithms did not offer better performance and were thought to be less justifiable than grouping the data by storms or events.

Robust highest concentration (RHC). RHC performance statistics calculated from 24-hour average predictions and observations are shown in Table 2, Table 3, and Table 4, for the 50^{th}, 75^{th}, and 95^{th} Percentile Storm-Average K-factor emission algorithms, respectively. Table 5 through Table 7 display similar results for statistics based on hourly data. For both the hourly and 24-hour data, observed PM_{10} concentrations at the upper end of the frequency distributed are significantly over-predicted by the 95^{th} Percentile Storm-Average K-factor emission algorithms. Hourly and 24-hour RHCs tend to be over-predicted by a factor-or-two (FB > 0.667) or more depending on the monitoring site. The 50^{th} Percentile Storm-Average K-factors tend to be slightly less biased overall, but RHCs are under-predicted at Keeler, Flat Rock, and to a lesser extent at Dirty Socks. As might be expected based on their formulation, the 75^{th} Percentile Storm-Average K-factors result in more conservative estimates and do not lead to under-prediction of the RHCs at any site. With the possible exception of Olancha where RHCs tend to be over-predicted by about a factor-of-two, the degree of conservatism is not extreme and predicted RHCs are actually less biased than the 50^{th} Percentile Storm-Average K-factors for some sites.

Table 2. Robust Highest Concentration Statistics for 50th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Nth (2%) Point	14	14	7	7	14	14	70
R.H.C. TEOM (ug/m3)	10971	635	1479	1107	1512	204	6568
R.H.C. Pred (ug/m3)	10037	977	1300	635	1224	212	5958
Frac. Bias of R.H.C.	-0.089	0.42	-0.13	-0.54	-0.21	0.036	-0.097

Table 3. Robust Highest Concentration Statistics for 75th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Nth (2%) Point	14	14	7	7	14	14	70
R.H.C. TEOM (ug/m3)	10971	635	1479	1107	1512	204	6568
R.H.C. Pred (ug/m3)	12284	1217	1584	1271	2124	275	7516
Frac. Bias of R.H.C.	0.11	0.63	0.068	0.14	0.34	0.29	0.13

Table 4. Robust Highest Concentration Statistics for 95th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Nth (2%) Point	14	14	7	7	14	14	70
R.H.C. TEOM (ug/m3)	10971	635	1479	1107	1512	204	6568
R.H.C. Pred (ug/m3)	23541	2090	2721	2255	3545	375	12721
Frac. Bias of R.H.C.	0.73	1.1	0.59	0.68	0.8	0.59	0.64

Table 5. Robust Highest Concentration Statistics for 50th-Percentile Storm-average K-factor, 1-hour averages, 1/1/2000 - 12/31/2001

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Nth (2%) Point	332	342	169	170	344	327	1684
R.H.C. TEOM (ug/m3)	37605	1954	5462	3706	5760	680	15318
R.H.C. Pred (ug/m3)	30531	3075	5652	3110	4336	760	14691
Frac. Bias of R.H.C.	-0.21	0.45	0.034	-0.17	-0.28	0.11	-0.042

Table 6. Robust Highest Concentration Statistics for 75th-Percentile Storm-average K-factor, 1-hour averages, 1/1/2000 - 12/31/2001

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Nth (2%) Point	332	342	169	170	344	327	1684
R.H.C. TEOM (ug/m3)	37605	1954	5462	3706	5760	680	15318
R.H.C. Pred (ug/m3)	37691	3910	7241	5414	7691	1002	19004
Frac. Bias of R.H.C.	0.0023	0.67	0.28	0.37	0.29	0.38	0.21

Table 7. Robust Highest Concentration Statistics for 95th-Percentile Storm-average K-factor, 1-hour averages, 1/1/2000 - 12/31/2001

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Nth (2%) Point	332	342	169	170	344	327	1684
R.H.C. TEOM (ug/m3)	37605	1954	5462	3706	5760	680	15318
R.H.C. Pred (ug/m3)	68881	6468	11404	10202	13556	1493	32257
Frac. Bias of R.H.C.	0.59	1.1	0.7	0.93	0.8	0.75	0.71

Log-Log Scatter Diagrams and Q-Q Plots. Log-Log scatter diagrams and Q-Q plots for the different K-factor relationships are included in Appendix B and Appendix C. The data have been grouped by monitoring site, for all sites, and plots were prepared for both 24-hour and hourly PM_{10} concentrations. The Q-Q plots show the model's ability to reproduce the entire range of the observed concentration frequency distribution. The scatter diagrams use paired data to visually examine the correlation between model prediction and observations. In order to more clearly focus on the higher PM_{10} concentrations, the scatter diagrams were prepared using only data pairs where the sum was greater than 150 $\mu g/m^3$.

Scatter Diagrams and Q-Q plots prepared from 24-hour data are shown in Figure 7 to Figure 13 for each monitoring site. These figures compare the performance of the 50^{th}, 75^{th}, and 95^{th} Percentile Storm-Average K-factor relationships. Similar figures for the hourly data are provided in Appendix B. For most of the sites, the scatter diagrams suggest model uncertainty increases as the concentration decreases and approach the region of the frequency distribution where assumptions concerning the background concentrations are more important. In general the scatter or number of points outside the factor-of-two window shown in the plots tends to increase for the more distant monitoring sites (Olancha and Lone Pine). Comparison with the plots in Appendix B shows the scatter in the hourly data is much greater than the 24-hour averages.

When the data for the monitoring sites are combined in Figure 13, the Q-Q plots examining model behavior for all portions of the concentration distribution indicate the 24-hour predictions tend to be biased towards over-prediction in the concentration range near background to about 1000 $\mu g/m^3$. The magnitude of the over-prediction is most pronounced for the 95^{th} Percentile Storm-Average K-factor relationship where even the higher end of the frequency distribution is biased towards over-prediction. Both the 50^{th} and 75^{th} Percentile Storm-Average K-factor algorithms explain almost all portions of the combined (unpaired in space) data set within a factor-of-two.

When the paired in space Q-Q plots are examined, model behavior differs for each monitoring site. Since the number of data points is high at Dirty Socks, the Q-Q plot for Dirty Socks (Figure 8) resembles the combined Q-Q plot with relative unbiased predictions throughout the frequency distribution. At Flat Rock (Figure 9) and Keeler (Figure 7), the higher 24-hour PM_{10} concentrations are under-predicted by the 50^{th} Percentile Storm-Average K-factor relationship and the 75^{th} Percentile Storm-Average K-factors tend to perform better. At Lone Pine (Figure 10) there are very few data points, but both relationships perform fairly well. Q-Q plot performance is also similar at Olancha (Figure 11) and Shell Cut (Figure 12), although the higher 24-hour predictions at Olancha tend to be more biased towards over-prediction by all the simulations.

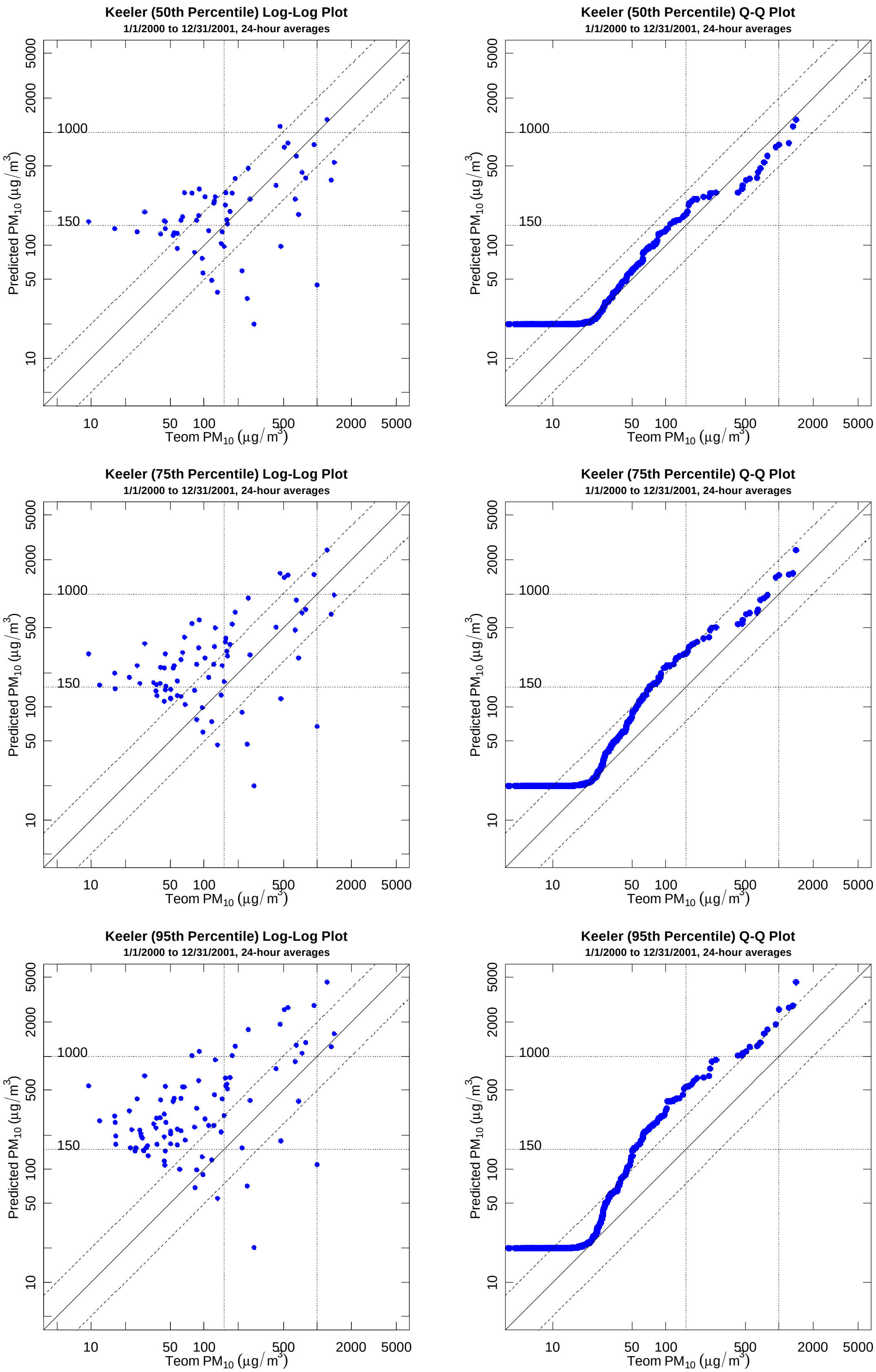

Figure 7. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for Keeler, 24-hour Average Concentrations

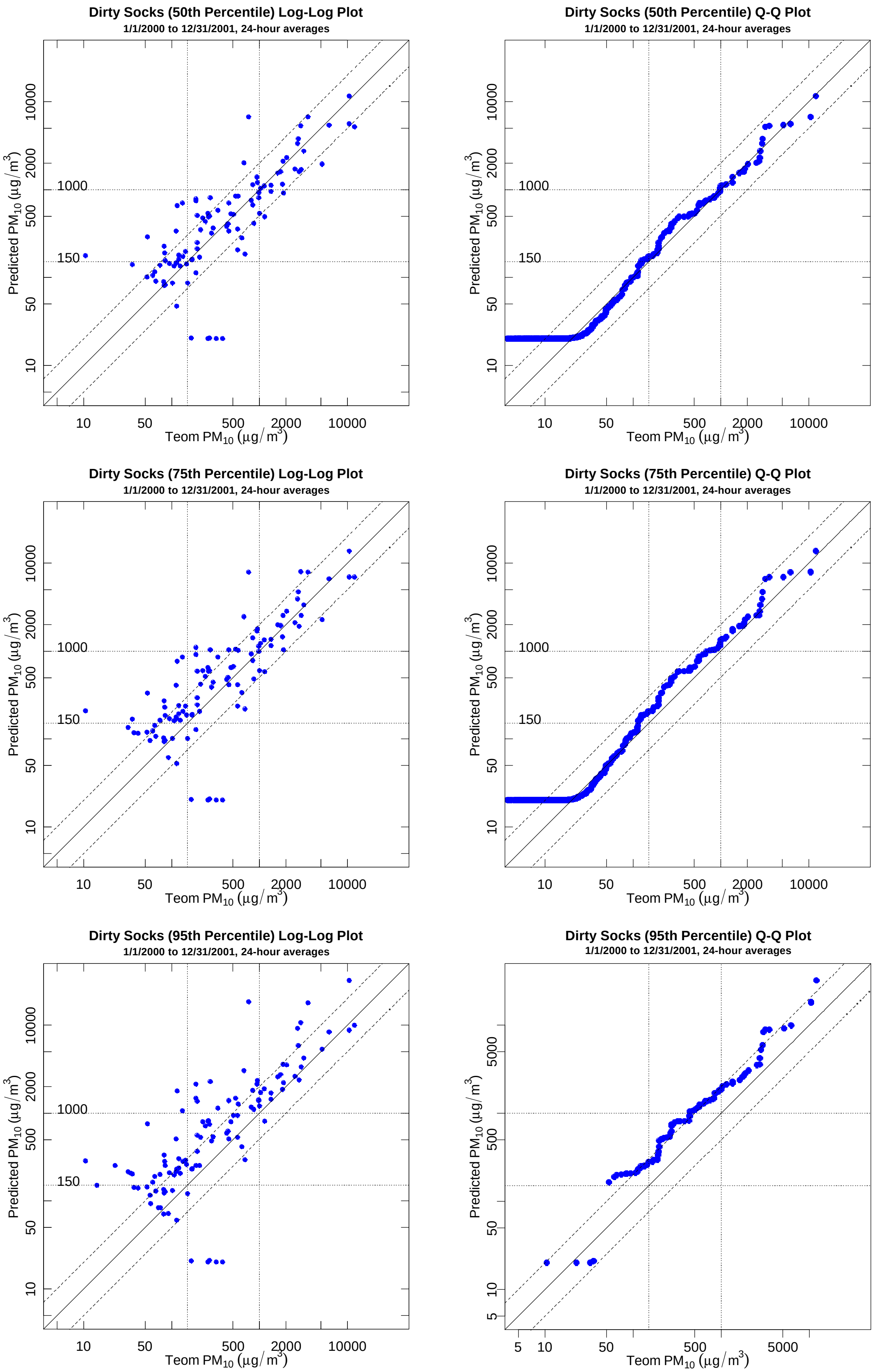

Figure 8. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for Dirty Socks, 24-hour Average Concentrations

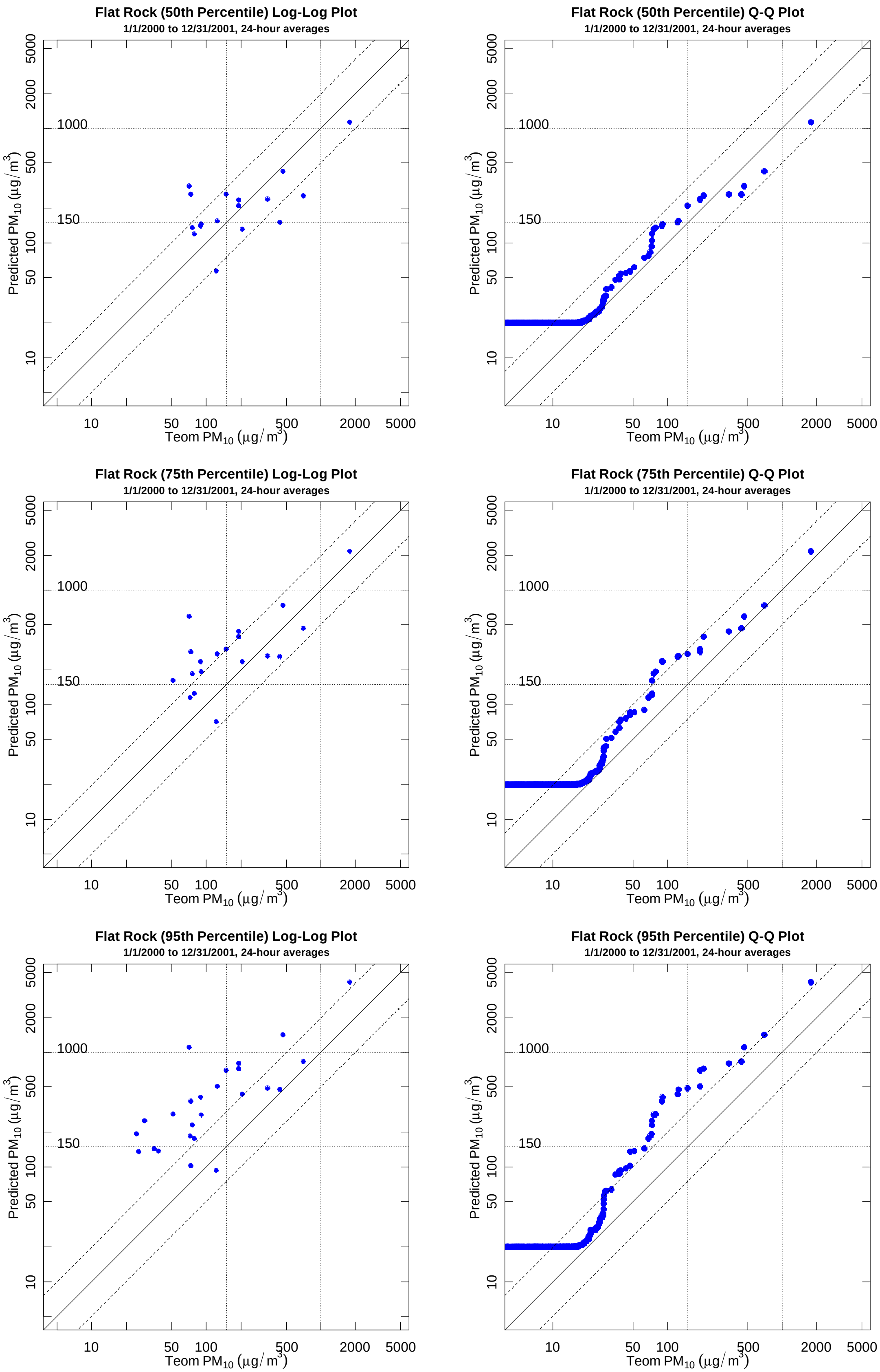

Figure 9. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for Flat Rock, 24-hour Average Concentrations

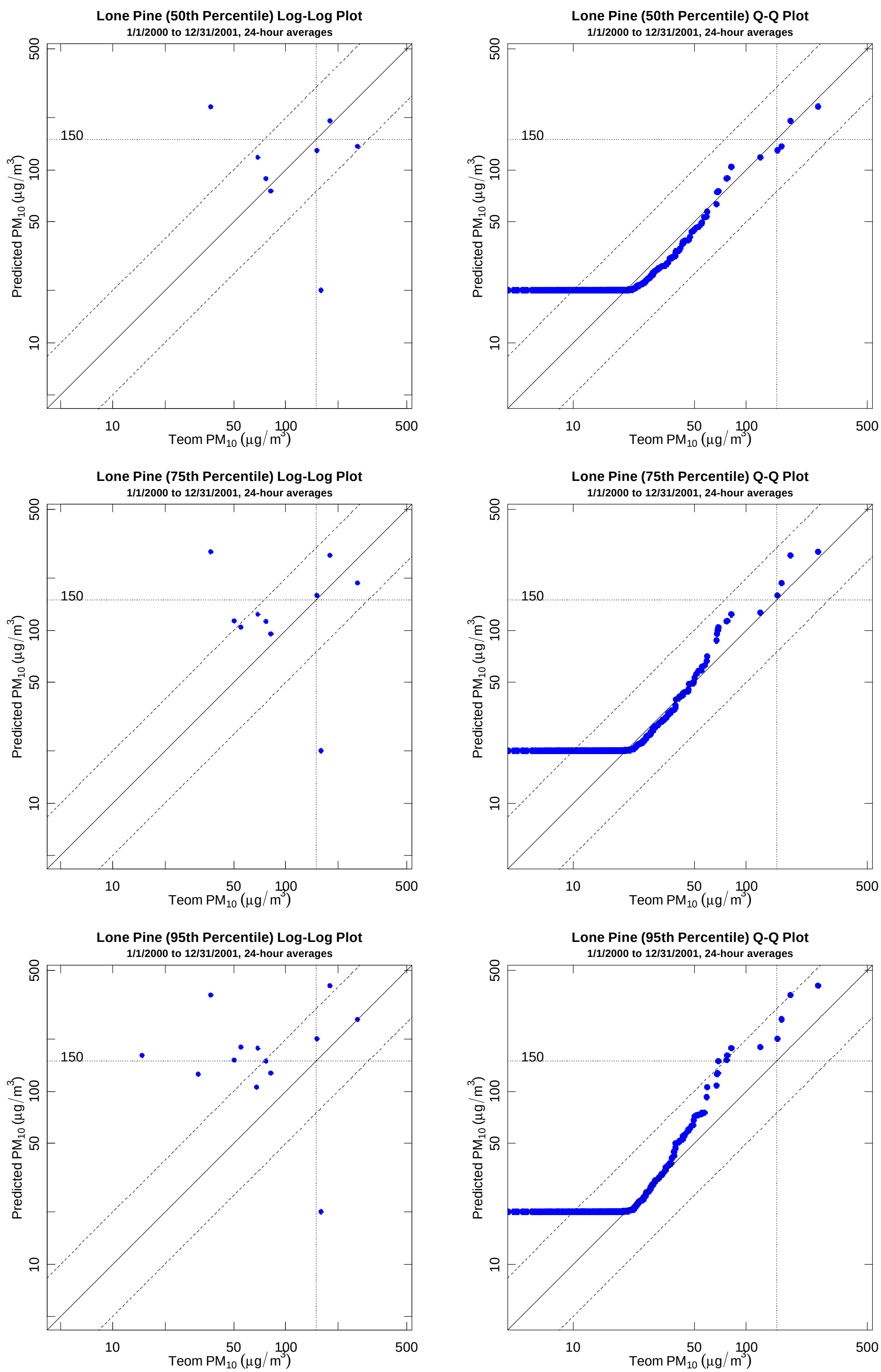

Figure 10. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for Lone Pine, 24-hour Average Concentrations

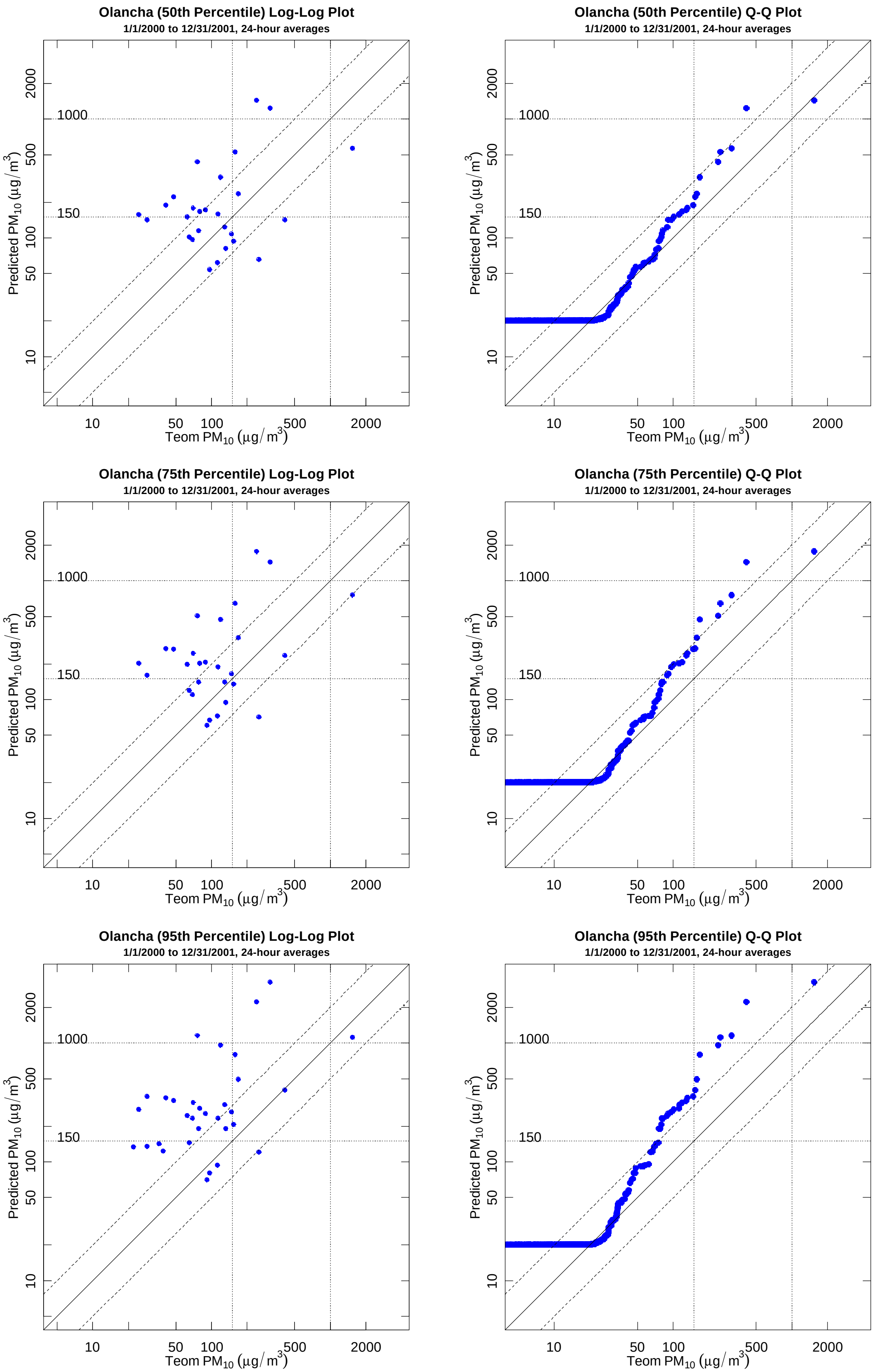

Figure 11. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for Olancha, 24-hour Average Concentrations

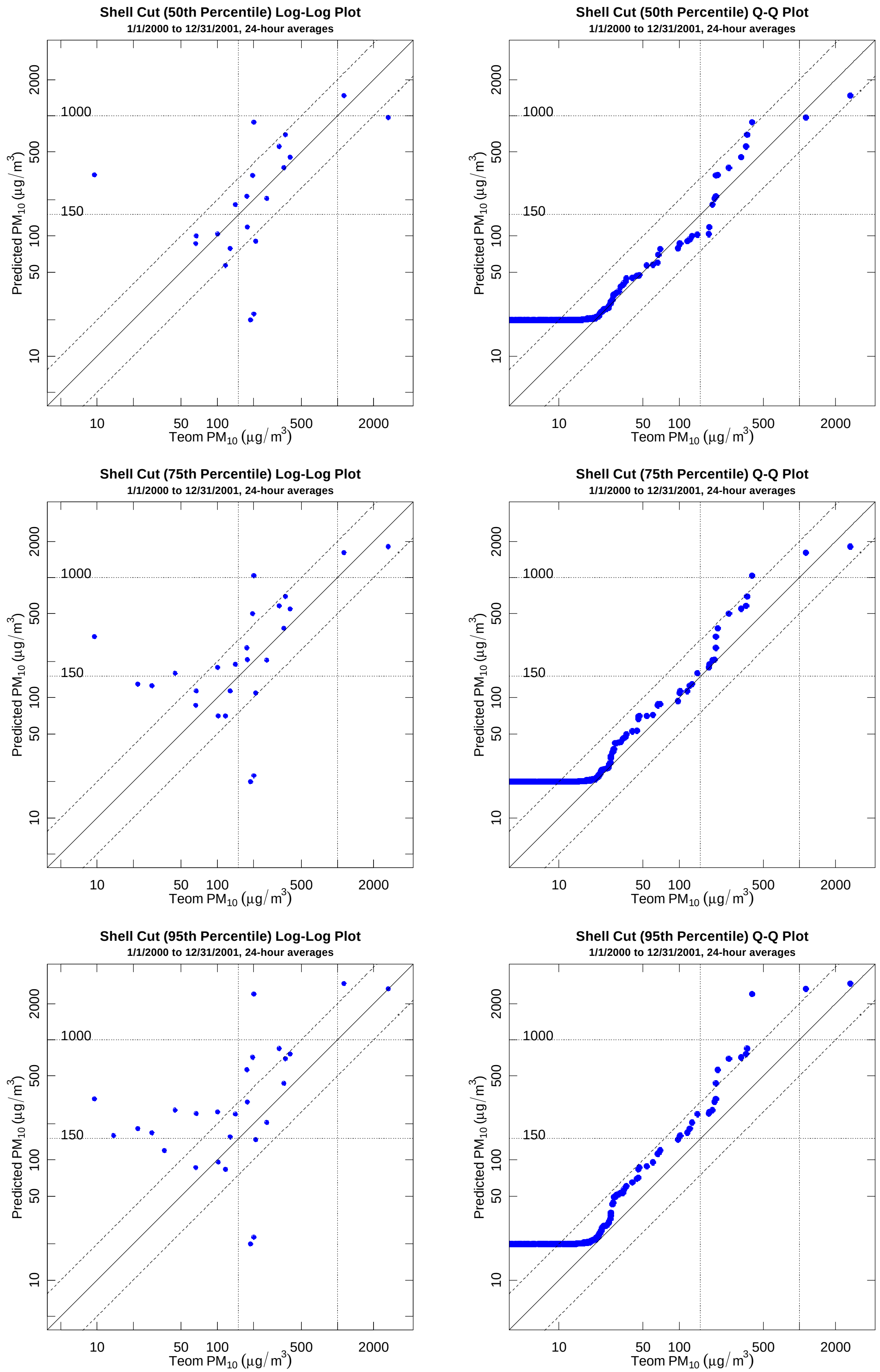

Figure 12. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for Shell Cut, 24-hour Average Concentrations

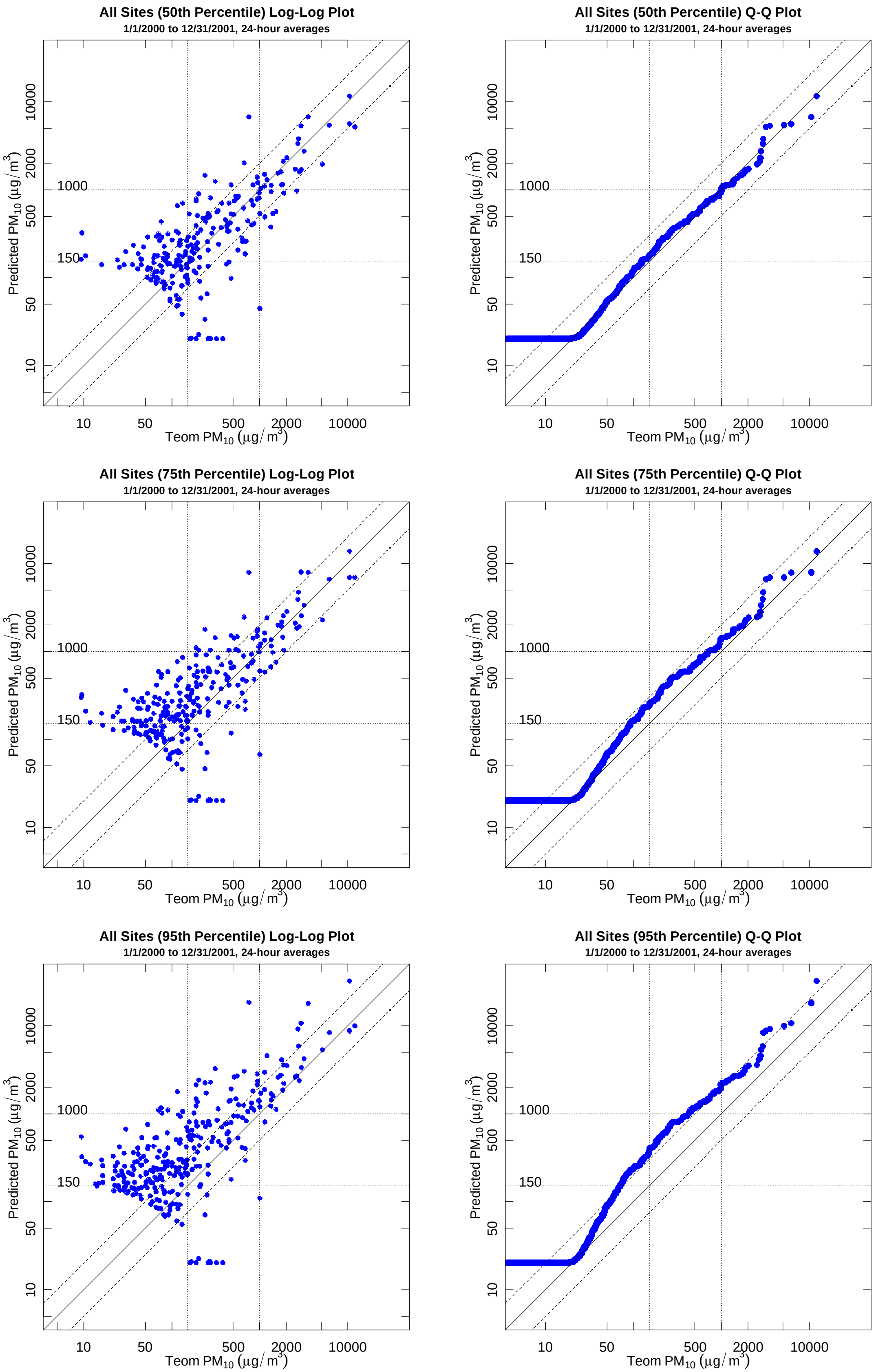

Figure 13. Log-Log and Q-Q Plots, Comparison of 50%, 75%, and 95% K-factor Formulations for All Sites, 24-hour Average Concentrations

Temporal correlation. Figure 14 and Figure 15 provide examples of the temporal correlation between predicted and observed hourly PM_{10} concentrations at four of the monitoring sites during a large dust event on May 2-3, 2001. This event produced some of the highest PM_{10} concentrations observed during the Dust ID Program with hourly concentrations exceeding 10,000 $\mu g/m^3$ at several of the monitoring sites. In general, the model simulations driven by the hourly sand flux measurements explain the temporal patterns observed at the monitoring sites. Note hourly concentrations vary by over three orders of magnitude at the monitoring sites affected during this event. For this episode, the highest hourly concentrations are under-predicted at Dirty Socks and Keeler, the peak predictions match observations at Shell Cut and Flat Rock, and some of the concentrations between 500 to 5,000 $\mu g/m^3$ are over-predicted at Dirty Socks.

Model performance statistics for the 75th and 50th Percentile Storm-Average K-factor algorithms' 24-hour predictions are compared in Table 10 and Table 11, respectively.[b,c] The data sets have been filtered using the criterion that the sum of the prediction plus observed PM_{10} concentration must be greater than 150 $\mu g/m^3$. For the data set as a whole, both algorithms explain more than 50% of the temporal variability in the observations. The linear correlation is higher, but the distribution of the data are more log-normal than normal and the geometric correlation coefficient may be a better measure of the ability of the model. The correlations are highest for the Flat Rock and Dirty Socks sites and lowest at Lone Pine and Olancha.

Spatial correlation. The correlation coefficients in Table 10 and Table 11 for the data set as a whole (all sites) are better than for the individual sites, because the model explains most of the spatial variation in the 24-hour observations. Concentrations are highest at Dirty Socks and lowest at Lone Pine and the linear correlation coefficients calculated from the mean concentrations at each site are greater than 0.99 for both algorithms. Note however, that the ranking of the mean concentrations differs between the 75th and 50th Percentile Storm-Average K-factor algorithms. The 75th Percentile Storm-Average K-factor results suggest concentrations at Flat Rock > Shell Cut > Olancha, while the 50th Percentile Storm-Average K-factors indicate Shell Cut > Olancha > Flat Rock. The actual ranking should be Shell Cut > Flat Rock > Olancha.

Fractional bias. The fractional bias of the mean concentration, fractional bias of the standard deviation of concentration, and mean absolute fractional bias (MAFB) of the 24-hour data are shown in Table 10 and Table 11, respectively. The 50th Percentile Storm-Average K-factor algorithm results in less biased 24-hour predictions at every site and for the data set as a whole. The 75th Percentile Storm-Average K-factor results are biased towards over-prediction, but the bias is less than a factor-of-two for every site. The fractional bias of the standard deviation measures suggest predictions from both model simulations tend to be as variable as the observations, except at Flat Rock where the variability is significantly under-predicted by the 50th Percentile Storm-Average K-factor algorithm. The MAFB results show when observations and predictions are paired in time typical errors are about the same magnitude as the observations. The scatter is highest at the Keeler site, lowest at Dirty Socks, and average errors from the 50th Percentile Storm-Average K-factor algorithm are lower than for the 75th Percentile Storm-Average K-factor predictions.

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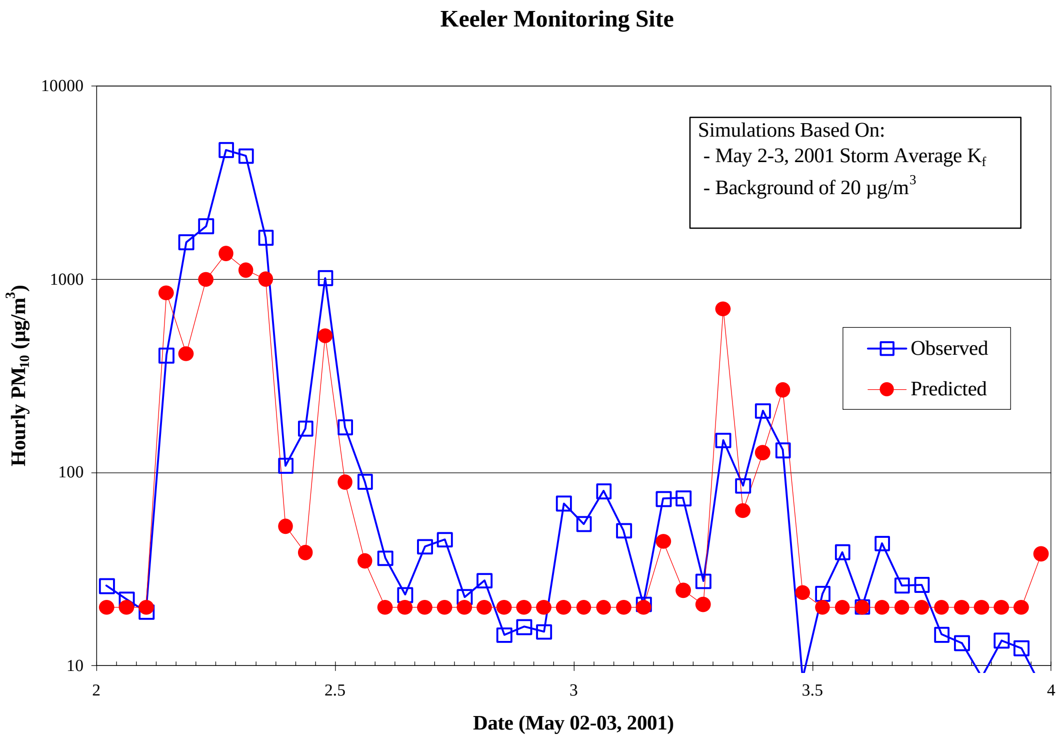
b. The number of data points in the two data sets being compared differs because more data pairs pass the lower PM_{10} filter (sum greater than 150 $\mu g/m^3$) for the 75th Storm-Average K-factor based predictions. Some of the differences in the statistics may be due to slightly different data sets.
c. Appendix A and Appendix D provide tabular statistics for all the different data sets.



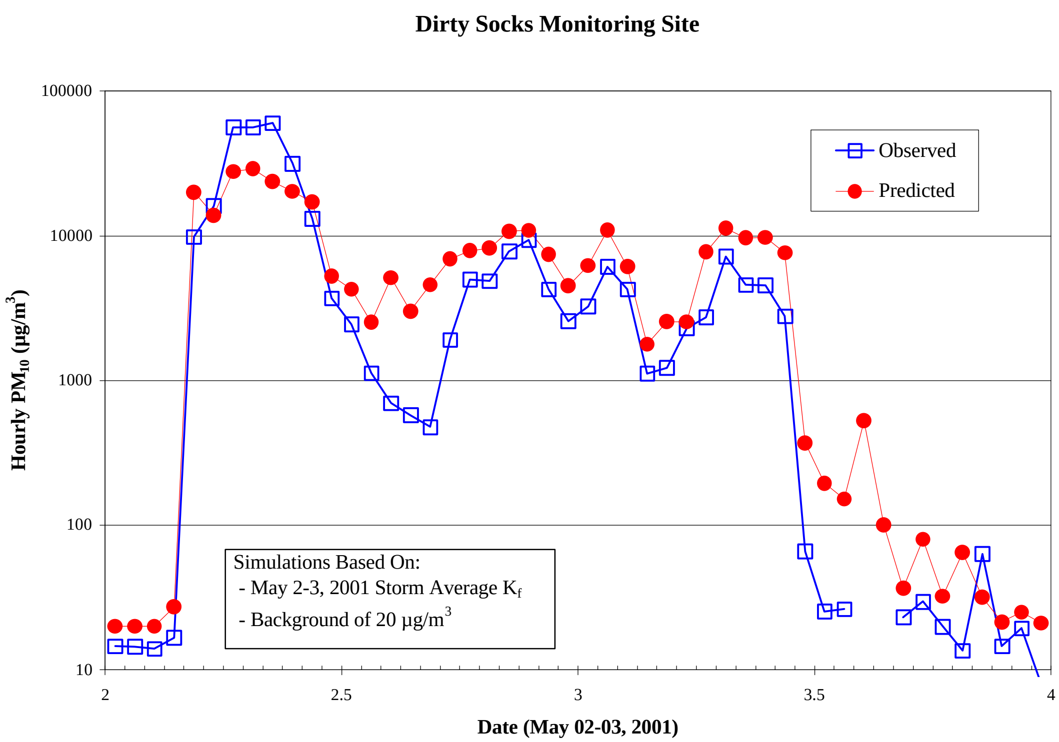
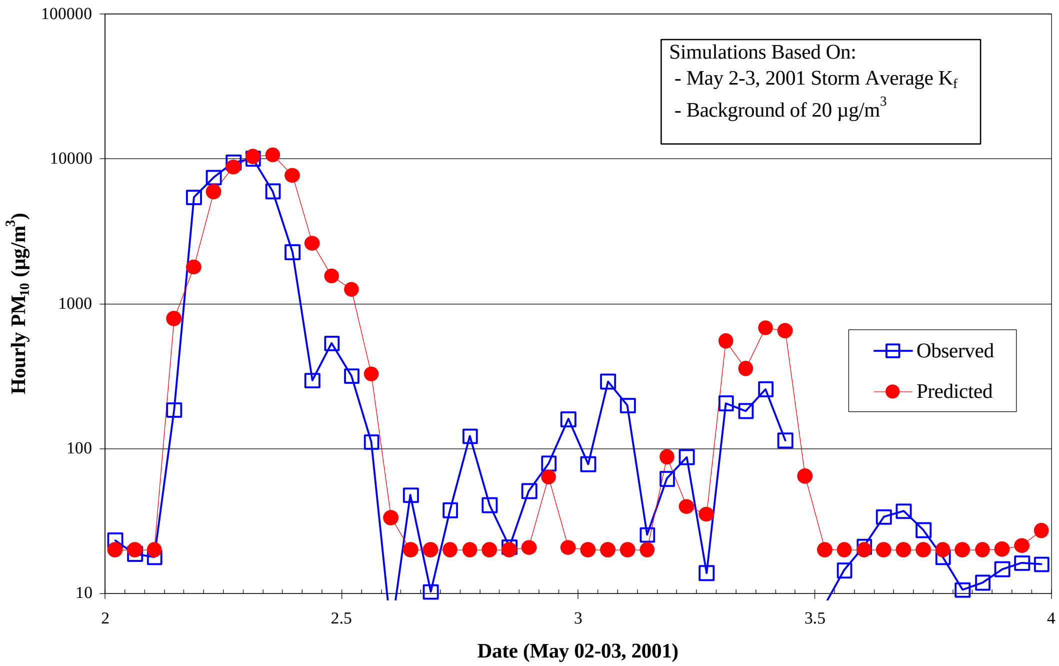


Figure 14. Predicted versus Observed Hourly PM_{10} Concentrations at Keeler and Dirty Socks for May 2-3, 2001

Flat Rock Monitoring Site



Shell Cut Monitoring Site

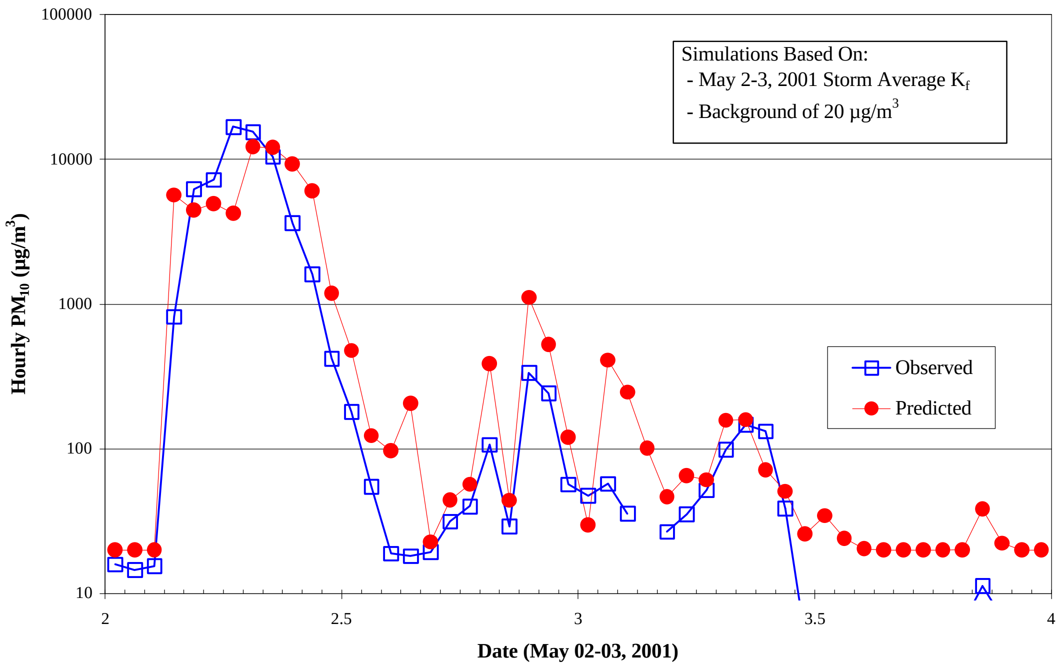


Figure 15. Predicted versus Observed Hourly PM_{10} Concentrations at Flat Rock and Shell Cut for May 2-3, 2001

Table 8. Statistics for 75th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001, TEOM + Pred > 150 ìg/m^3

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	106	28	25	19	76	10	264
Linear Corr. Coef.	0.82	0.34	0.84	0.92	0.65	0.13	0.83
Geometric Corr. Coef.	0.78	0.37	0.49	0.7	0.46	-0.12	0.68
Mean TEOM (ug/m3)	1035	176	308	280	231	112	554
Mean Pred (ug/m3)	1243	330	382	394	370	147	711
Frac. Bias of Means	0.18	0.61	0.21	0.34	0.46	0.27	0.25
S.D. TEOM (ug/m3)	2021	282	538	402	317	72	1365
S.D. Pred (ug/m3)	2127	399	470	458	414	81	1449
Frac. Bias of S.D.	0.051	0.34	-0.14	0.13	0.26	0.12	0.06
Absolute Frac. Bias	0.62	0.83	0.7	0.66	0.94	0.63	0.74

Table 9. Statistics for 50th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001, TEOM + Pred > 150 μg/m^3

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	101	27	21	17	59	8	233
Linear Corr. Coef.	0.81	0.3	0.65	0.91	0.58	-0.1	0.82
Geometric Corr. Coef.	0.78	0.35	0.45	0.62	0.4	-0.24	0.68
Mean TEOM (ug/m3)	1084	179	357	306	285	127	622
Mean Pred (ug/m3)	1052	271	349	257	265	124	609
Frac. Bias of Means	-0.03	0.41	-0.023	-0.17	-0.073	-0.025	-0.021
S.D. TEOM (ug/m3)	2059	287	575	419	342	74	1440
S.D. Pred (ug/m3)	1770	335	380	239	252	66	1244
Frac. Bias of S.D.	-0.15	0.15	-0.41	-0.55	-0.3	-0.11	-0.15
Absolute Frac. Bias	0.55	0.8	0.62	0.55	0.75	0.58	0.64

Scatter at Keeler. Figure 16 shows a contour plot of hourly PM_{10} predictions for hour 0800-0900 on May 2, 2001. Observed PM_{10} concentrations are also posted on this figure. The concentration patterns depict sharp gradients in the crosswind direction for this hour characterized by northwesterly winds near Keeler to north-northeasterly flow near Dirty Socks. PM_{10} concentrations at Keeler for such storms are often difficult to predict because Keeler is typically on the edge of the plume and small differences in plume trajectory can significantly affect predicted concentrations.

Performance as concentration increases. The statistics discussed in the previous paragraph are heavily influenced by the smaller events and the specification of the background concentration. The RHC statistics and Q-Q plots discussed previously can be examined to look at the high-end performance. In additional, model performance for the larger dust events can be examined by filtering the data with higher concentration limits. Table 12 and Table 13 present respective performance statistics based on the 75^{th} and 50^{th} Percentile Storm-Average K-factor algorithms for data when the geometric mean concentration, calculated from the 24-hour observation and prediction, is greater than 500 $\mu g/m^3$. In order to increase the sample set, Table 14 and Table 15 provide a similar comparison using the criterion that hourly geometric mean concentrations must be greater than 1000 $\mu g/m^3$.

The results presented in Table 12 through Table 15 show as concentrations increase there is an increasing tendency for simulations based on the 50^{th} Percentile Storm-Average K-factors to under-predict PM_{10} concentrations, especially at Keeler and Flat Rock. Predictions using the 75^{th} Percentile Storm-Average K-factors still have a tendency to over-predict observations, but the bias is less pronounced.

Fractional Bias Box-Whisker Plots. Box-whisker plots examining the variability of the 24-hour and hourly fractional bias by site, period of the Dust ID Program, and concentration range were prepared for all the K-factor relationships and are included in Appendix C and Appendix F.[d] Figure 17 displays box-whisker plots for the 75^{th} Percentile Storm-Average K-factor algorithms and includes both the 24-hour and hourly paired data. When grouped by site, the predictions are most biased towards over-prediction at the Keeler site, where more than 50% of the observations are over-predicted by more than a factor-of-two. As mentioned previously predictions at the Keeler site exhibit the most scatter as shown by the range of the “whiskers” in the box-whisker plot. The hourly-paired data exhibit some of the same general trends, but a higher degree of scatter, especially at Lone Pine.

Figure 17 examines model performance by period of the Dust ID Program. Note, the last six months (January to June 2002) of the Dust ID Program are shown in the these plots, but data from this period have not been used in preparing any of the model performance statistics or any of the other graphics in the performance evaluation. During the last six months the predictions are more scattered and less biased compared to the previous 2 years. This can be attributed to the removal of the several of the key Sensits™ sites and for this reason this period was not used in the performance evaluation. For the other periods of the year, the over-prediction is more pronounced during the last six months of each calendar year. This suggests there may be more seasonal variation in the K-factor algorithms than the periods shown in Table 1.

d. The paired data include samples where the sum of the prediction and observation are greater than 150 $\mu g/m^3$.

The statistics presented above clearly indicate model performance varies with the size of storm or the magnitude of the PM_{10} concentrations. This behavior is further examined the last two plots in Figure 17. These two box-whisker plots prepared from the paired 24-hour and hourly data show the bias and scatter in the predictions decrease with increasing concentration. Figure 18 shows a comparison of the box-whisker plots prepared with hourly predictions from the 50^{th} and 75^{th} Percentile Storm-Average K-factor relationships for all the sites combined, at Dirty Socks, and at Keeler. Hourly concentrations above about 1000 $\mu g/m^3$ at Keeler tend to be under-predicted by the simulations based on the 50^{th} Percentile Storm-Average K-factor algorithm. The 75^{th} Percentile Storm-Average K-factors tend to be less biased for high concentrations at Keeler, but both algorithms exhibit a high degree of scatter.

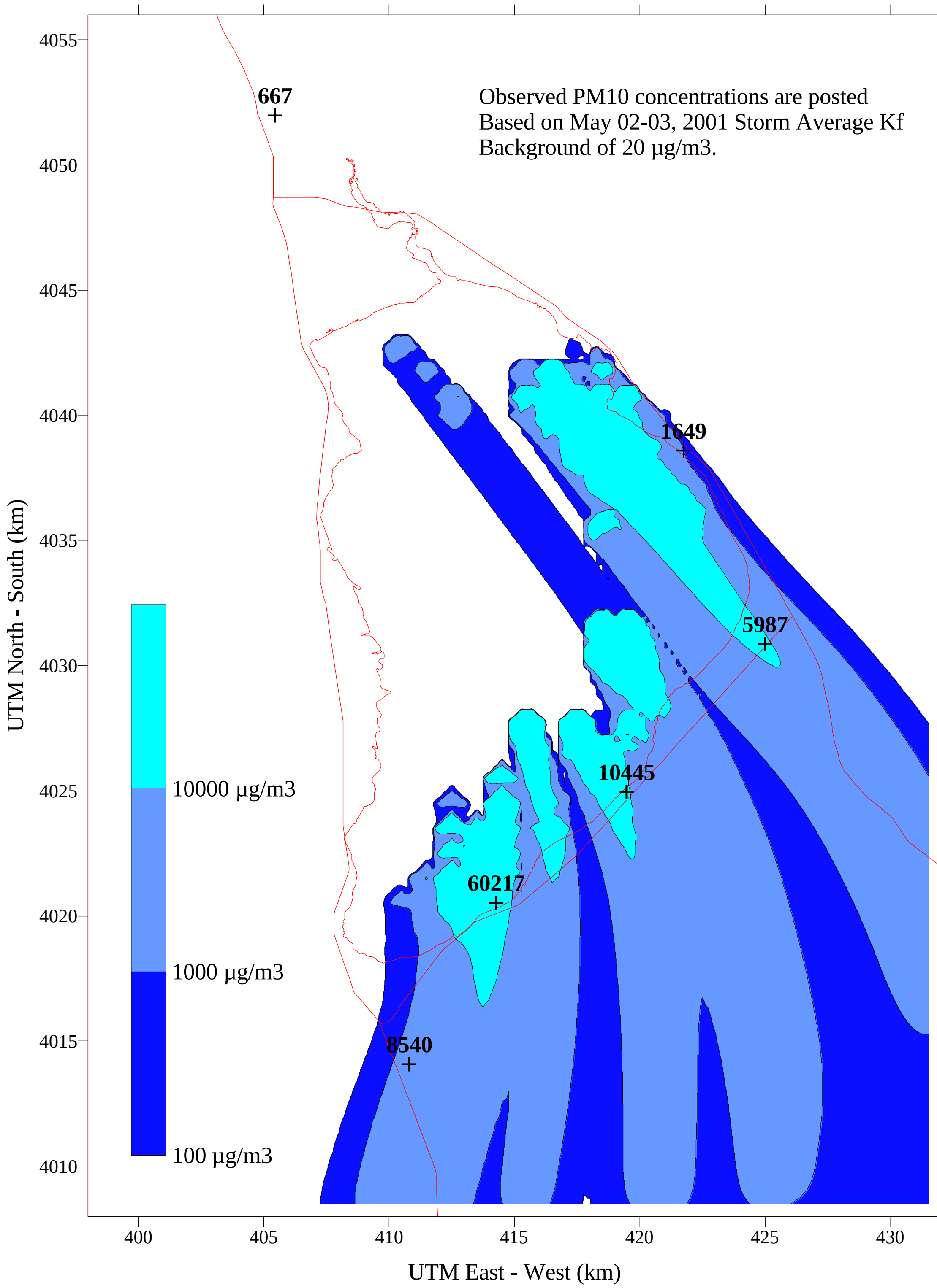


Figure 16. CALPUFF Predicted PM_{10} Concentrations ($\mu g/m^3$) for May 02, 2001, Hour 0800-0900

Table 10. Statistics for 75th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001, TEOM + Pred > 150 ìg/m^3

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	106	28	25	19	76	10	264
Linear Corr. Coef.	0.82	0.34	0.84	0.92	0.65	0.13	0.83
Geometric Corr. Coef.	0.78	0.37	0.49	0.7	0.46	-0.12	0.68
Mean TEOM (ug/m3)	1035	176	308	280	231	112	554
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S.D. TEOM (ug/m3)	2021	282	538	402	317	72	1365
S.D. Pred (ug/m3)	2127	399	470	458	414	81	1449
Frac. Bias of S.D.	0.051	0.34	-0.14	0.13	0.26	0.12	0.06
Absolute Frac. Bias	0.62	0.83	0.7	0.66	0.94	0.63	0.74

Table 11. Statistics for 50th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001, TEOM + Pred > 150 $\mu g/m^3$

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	101	27	21	17	59	8	233
Linear Corr. Coef.	0.81	0.3	0.65	0.91	0.58	-0.1	0.82
Geometric Corr. Coef.	0.78	0.35	0.45	0.62	0.4	-0.24	0.68
Mean TEOM (ug/m3)	1084	179	357	306	285	127	622
Mean Pred (ug/m3)	1052	271	349	257	265	124	609
Frac. Bias of Means	-0.03	0.41	-0.023	-0.17	-0.073	-0.025	-0.021
S.D. TEOM (ug/m3)	2059	287	575	419	342	74	1440
S.D. Pred (ug/m3)	1770	335	380	239	252	66	1244
Frac. Bias of S.D.	-0.15	0.15	-0.41	-0.55	-0.3	-0.11	-0.15
Absolute Frac. Bias	0.55	0.8	0.62	0.55	0.75	0.58	0.64

Table 12. Statistics for 75th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001, Geometric mean of TEOM & Pred > 500 μg/m^3

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	42	3	3	3	11	0	62
Linear Corr. Coef.	0.75	-0.96	0.85	0.95	0.068	N/A	0.76
Geometric Corr. Coef.	0.76	-0.99	0.94	0.83	-0.034	N/A	0.7
Mean TEOM (ug/m3)	2325	698	1388	982	842	N/A	1873
Mean Pred (ug/m3)	2715	1318	1377	1118	1153	N/A	2228
Frac. Bias of Means	0.15	0.61	-0.0075	0.13	0.31	N/A	0.17
S.D. TEOM (ug/m3)	2758	734	1167	700	337	N/A	2379
S.D. Pred (ug/m3)	2797	513	597	909	566	N/A	2423
Frac. Bias of S.D.	0.014	-0.35	-0.65	0.26	0.51	N/A	0.018
Absolute Frac. Bias	0.45	1.2	0.45	0.35	0.52	N/A	0.49

Table 13. Statistics for 50th-Percentile Storm-average K-factor, 24-hour averages, 1/1/2000 - 12/31/2001, Geometric mean of TEOM & Pred > 500 μg/m^3

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	40	3	3	1	10	0	57
Linear Corr. Coef.	0.73	-0.99	0.16	N/A	-0.17	N/A	0.74
Geometric Corr. Coef.	0.76	-1	0.51	N/A	-0.29	N/A	0.67
Mean TEOM (ug/m3)	2426	698	1388	1779	862	N/A	1995
Mean Pred (ug/m3)	2265	1080	1049	1121	709	N/A	1846
Frac. Bias of Means	-0.069	0.43	-0.28	-0.45	-0.2	N/A	-0.078
S.D. TEOM (ug/m3)	2789	734	1167	N/A	348	N/A	2444
S.D. Pred (ug/m3)	2339	457	398	N/A	307	N/A	2066
Frac. Bias of S.D.	-0.18	-0.47	-0.98	N/A	-0.12	N/A	-0.17
Absolute Frac. Bias	0.39	1.2	0.6	0.45	0.5	N/A	0.47

Table 14. Statistics for 75th-Percentile Storm-average K-factor, 1-hour averages, 1/1/2000 - 12/31/2001, Geometric mean of TEOM & Pred > 1000 $\mu g/m^3$

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	439	27	39	31	107	1	644
Linear Corr. Coef.	0.61	-0.2	0.34	0.75	0.41	N/A	0.62
Geometric Corr. Coef.	0.65	-0.36	0.35	0.54	0.053	N/A	0.56
Mean TEOM (ug/m3)	5808	2209	3422	2599	2501	759	4801
Mean Pred (ug/m3)	6600	3816	4090	3395	3086	1344	5585
Frac. Bias of Means	0.13	0.53	0.18	0.27	0.21	0.56	0.15
S.D. TEOM (ug/m3)	7724	2837	3780	2505	2457	N/A	6732
S.D. Pred (ug/m3)	5857	3541	2620	2545	2817	N/A	5306
Frac. Bias of S.D.	-0.27	0.22	-0.36	0.016	0.14	N/A	-0.24
Absolute Frac. Bias	0.56	1	0.73	0.58	0.75	0.56	0.63

Table 15. Statistics for 50th-Percentile Storm-average K-factor, 1-hour averages, 1/1/2000 - 12/31/2001, Geometric mean of TEOM & Pred > 1000 $\mu g/m^3$

	Dirty Socks	Olancha	Shell Cut	Flat Rock	Keeler	Lone Pine	All Sites
Number of Points	420	24	33	27	74	0	578
Linear Corr. Coef.	0.6	-0.24	0.055	0.75	0.27	N/A	0.59
Geometric Corr. Coef.	0.63	-0.4	0.16	0.57	-0.15	N/A	0.5
Mean TEOM (ug/m3)	6038	2415	3875	2892	3203	N/A	5254
Mean Pred (ug/m3)	5520	3280	3608	1877	2064	N/A	4705
Frac. Bias of Means	-0.09	0.3	-0.071	-0.43	-0.43	N/A	-0.11
S.D. TEOM (ug/m3)	7819	2950	3945	2559	2663	N/A	6963
S.D. Pred (ug/m3)	4772	3101	2385	1343	1724	N/A	4427
Frac. Bias of S.D.	-0.48	0.05	-0.49	-0.62	-0.43	N/A	-0.45
Absolute Frac. Bias	0.52	0.98	0.72	0.49	0.83	N/A	0.59

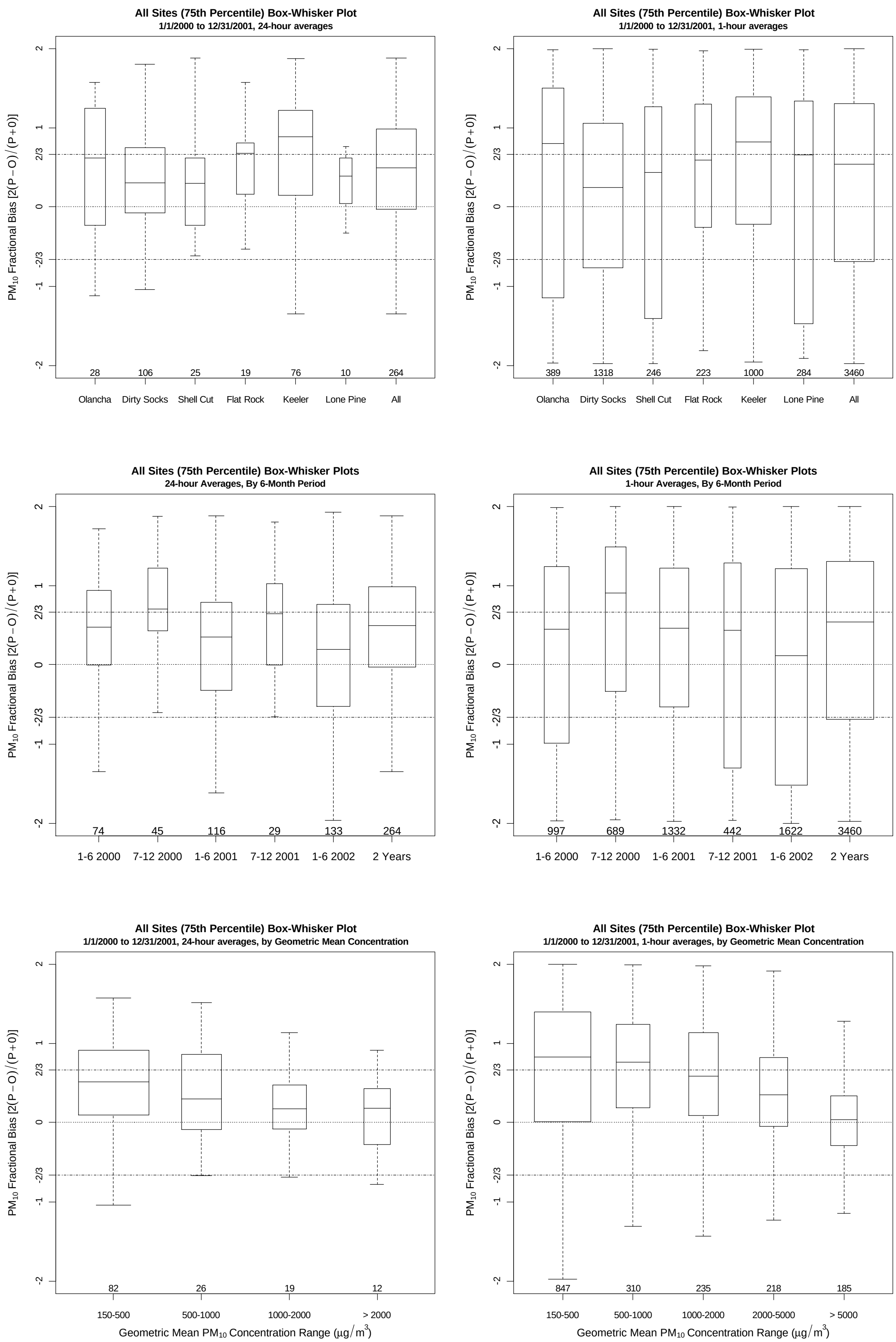

Figure 17. Fractional Bias Box Whisker Plots Based on 75% Storm-Average K-factor Formulation, 24-Hour and Hourly Averages by Site, Period and Concentration Range

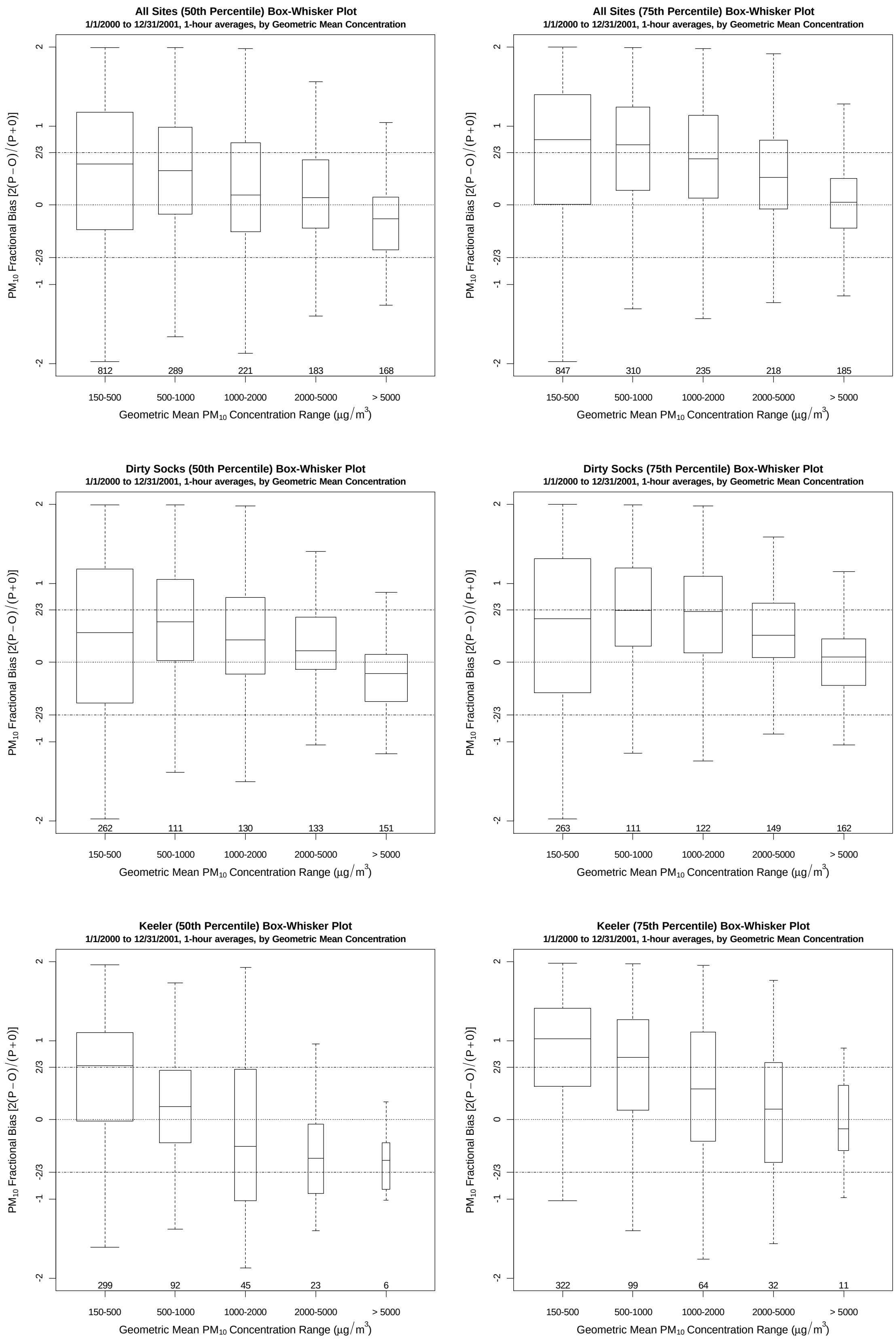

Figure 18. Fractional Bias Box Whisker Plots, Comparison of 50% and 75% Storm-Average K-factor Formulations, Hourly Averages by Concentration Range

6 ATTAINMENT DEMONSTRATION

The CALPUFF modeling techniques described in previous sections were applied to assess control strategies proposed for the Owens Valley PM_{10} RSIP. This section of the report describes the methods used to develop the selected control strategy and demonstrate attainment of the annual and 24-hour PM_{10} NAAQS. The RSIP evaluates the dust control areas (DCAs) controlled under the requirements of the 1998 SIP, plus controls on additional areas required to attain the NAAQS based on dust events prior to July 1, 2002.

PM_{10} emission sources. PM_{10} emissions were simulated using the hourly sand flux data collected during January 2000 through June 2002 based on the area source configuration shown in Figure 6. The characterization of uncontrolled emissions follows the general techniques used to assess model performance except estimated emissions from the Keeler Dunes were removed and the simulation period was six months longer. The District believes emissions from the Keeler Dunes and several other off-lake sources are caused by deposition from the lakebed sources. Once the lakebed emissions are controlled, source material will be winnowed from these areas and PM_{10} emissions are expected to be similar to other relatively non-emissive regions surrounding Owens Lake. The influence of non-lakebed sources is included in the simulations through the use of a background concentration. As discussed in Section 4.4, a background concentration of 20 $\mu g/m^3$ was added to all model predictions.

Attainment criteria. Attainment of the NAAQS was assessed using concentration predictions at the historic shoreline in addition to receptors at the monitoring stations.[e] Attainment of the 24-hour NAAQS is achieved when the third highest 24-hour PM_{10} concentration in two years at each receptor is less than 150 $\mu g/m^3$. For the purposes of the present analysis the simulation period was actually 30 months. The 50 $\mu g/m^3$ annual NAAQS was assessed using the maximum predicted concentration for 2000 and 2001. Predictions were obtained at more than 460 receptor locations placed at the historic shoreline (approximately at the 3600' elevation) of Owens Lake. The shoreline shown in Figure 6 is representative of areas of potential public access at Owens Lake. The receptor spacing along the historic shoreline ranged from 100 to 200 m. Note in several areas, receptors are very close to or even within the eroding playas.

6.1 Control Strategy Development

Control measures. Several different dust control measures are being considered for application at Owens Lake. The extreme hot and cold temperatures, the high salt levels, potential for flash flooding, and the blowing sand presented many engineering challenges to the successful large-scale implementation of control measures at Owens Lake. Through extensive research and field testing, supported by funding from the City of Los Angeles, three dust control measures were found to be effective and are considered as Best Available Control Measures for PM_{10} at Owens Lake; shallow flooding, managed vegetation and gravel. Shallow flooding and managed vegetation are credited with 99 percent PM_{10} emission reductions in areas where these measures are implemented according to criteria specified by the District. Gravel is assumed to have 100 percent control efficiency, but there are currently no plans to use gravel for a large-scale dust control measure. The City of Los Angeles started large-scale implementation of shallow flooding

e. Maximum concentrations from the ground based lakebed sources occur at the historical shoreline near the downwind edge of these emitting areas. Simulations have been performed with gridded receptors and predicted concentrations were always lower at locations outside the shoreline.

in 2001, followed by managed vegetation in 2002. These measures are scheduled for implementation on at least 43 km^2 (16.5 square miles) by the end of 2003. Further details are provided in Section 5 and in Section 7 of the RSIP.

Source contribution matrices. Control strategy evaluations can involve many repetitive dispersion model simulations where different options for control are tested. These simulations can be computer resource intensive, and with 135 source areas and several different control measures, there are many possible source-control combinations at Owen Lake. In order to streamline the process, CALPUFF was first applied to simulate the uncontrolled case. Daily source contribution matrices where then developed for each source-receptor combination resulting in a database with over nine million daily contributions. The database was sorted by PM_{10} concentration at each receptor and the source contributions from the top ten PM_{10} predictions at each receptor imported into a spreadsheet. Within the spreadsheet, District air quality planners could test many different control options without the need for rerunning the dispersion model.

The largest dust events are the most influential. Once a strategy was developed using the spreadsheet, CALPUFF was applied to the controlled area sources to check whether a new day, not in the original top ten, produced PM_{10} concentrations above the NAAQS. It was found that the same dust source areas that caused the ten highest values at each receptor within each season were the same areas that caused all the modeled exceedances during the 30-month simulation. So for the simulations at Owens Lake, source contributions based on the top ten days at each receptor were sufficient to test attainment of the NAAQS. The days with the highest predicted uncontrolled PM_{10} concentrations were the events that influenced the eventual footprint of the DCAs. The less active source areas only became emissive during the larger storms, when the more active source areas were also highly emissive. Thus, model performance is more important for the larger dust events and is one of the reasons the District selected the 75th Percentile Storm-Average K-factor emission algorithm. This algorithm tended to perform the best for the larger events.

Control strategy simulated. Figure 19 shows the control strategy developed from CALPUFF simulations using the 75th Percentile Storm-Average K-factors constants listed in Table 1. DCAs currently constructed are shown and additional areas needing control are separated into three categories: extreme, lone, and pack violators. An area identified as a "lone" violator is predicted to exceed the 24-hour PM_{10} NAAQS at the shoreline in the absence of any other lakebed source. Such areas are identified first since these sources will always need to be controlled to attain the NAAQS. "Pack" violators are area sources that in combination with other lakebed emissions significantly contribute to high-predicted concentrations above the NAAQS. These candidates for control were selected using a strategy that minimized the total number of such area sources and considered their proximity to existing DCAs. The "extreme" violators are a special case. Controlled emissions from these sources are predicted to violate the NAAQS even after implementation of shallow flooding or managed vegetation using 99 percent control efficiencies. The historical shoreline passes through or borders these source areas.

6.2 Attainment Demonstration Results

The predicted third highest 24-hour PM_{10} concentrations at receptors located along the shoreline are shown in Figure 20 based on a CALPUFF simulation of the control strategy in Figure 19. The design or third highest concentration at the same receptor was 149.9 $\mu g/m^3$ for the 30-month simulation, demonstrating attainment of the 24-hour NAAQS. The highest concentrations are along the shoreline at the edges of the three "extreme" violator source areas. In order to attain the 24-hour NAAQS, it was necessary to specify greater than 99% control on these source areas shown in Figure 19. The extreme cell west of Dirty Socks must achieve a 99.75% control efficiency, while the other two extreme cells must achieve 99.5% control to attain the NAAQS. The District is currently investigating the source areas identified as "extreme" violators to establish whether gravel or greater spatial coverage of the shallow flooding or managed vegetation dust control measures may be required in these areas. Further details concerning controls on the "extreme" violator source areas are provided in Section 7 of the RSIP.

The results of the CALPUFF simulations used to assess attainment of the annual NAAQS are posted in the plot shown in Figure 21. The highest predicted annual PM_{10} concentration was 23.7 $\mu g/m^3$ near the Dirty Socks monitoring site, demonstrating attainment of the 50 $\mu g/m^3$ annual NAAQS. The maximum annual predicted concentrations were only slightly above the background concentration. The control strategy proposed to reduce concentrations for the short-term dust events are more than sufficient to attain the annual NAAQS.

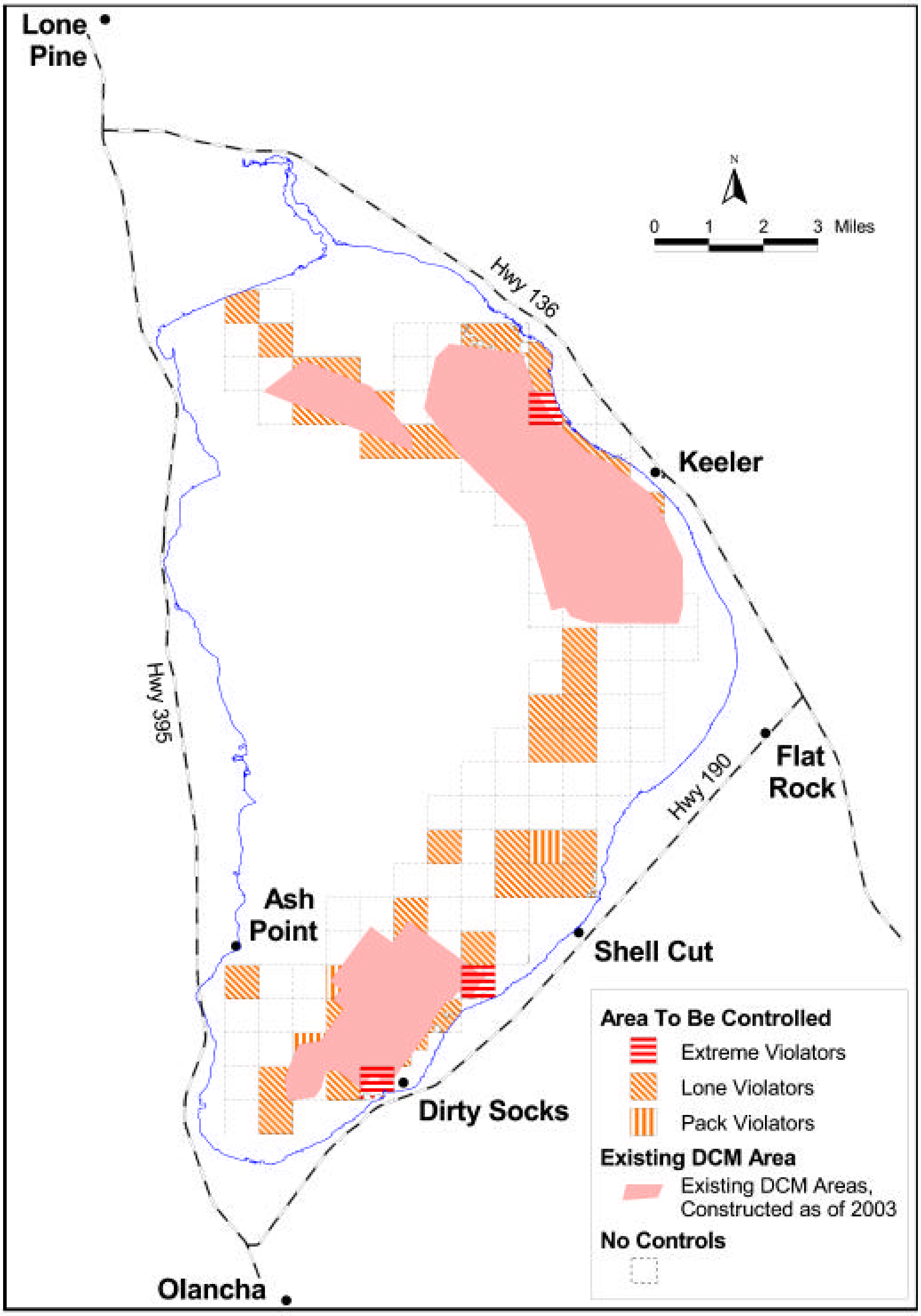

Figure 19. Location of Dust Control Areas and Additional Areas Proposed for Control Assessed in the Attainment Demonstration

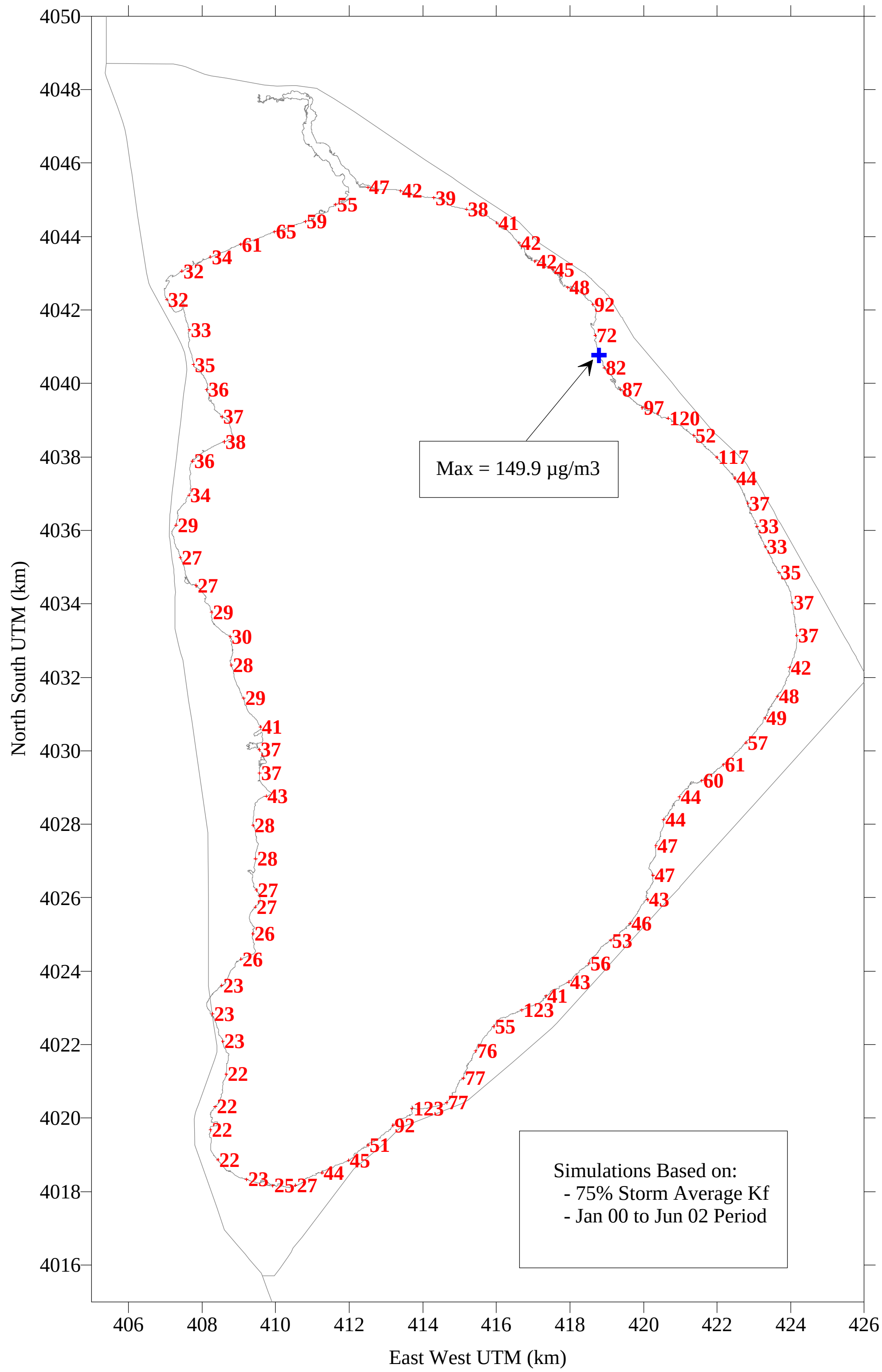

Figure 20. Third Highest 24-Hour PM_{10} ($\mu g/m^3$) at Shoreline Receptors, No Keeler Dunes, After Controls (Every 5th Plotted)

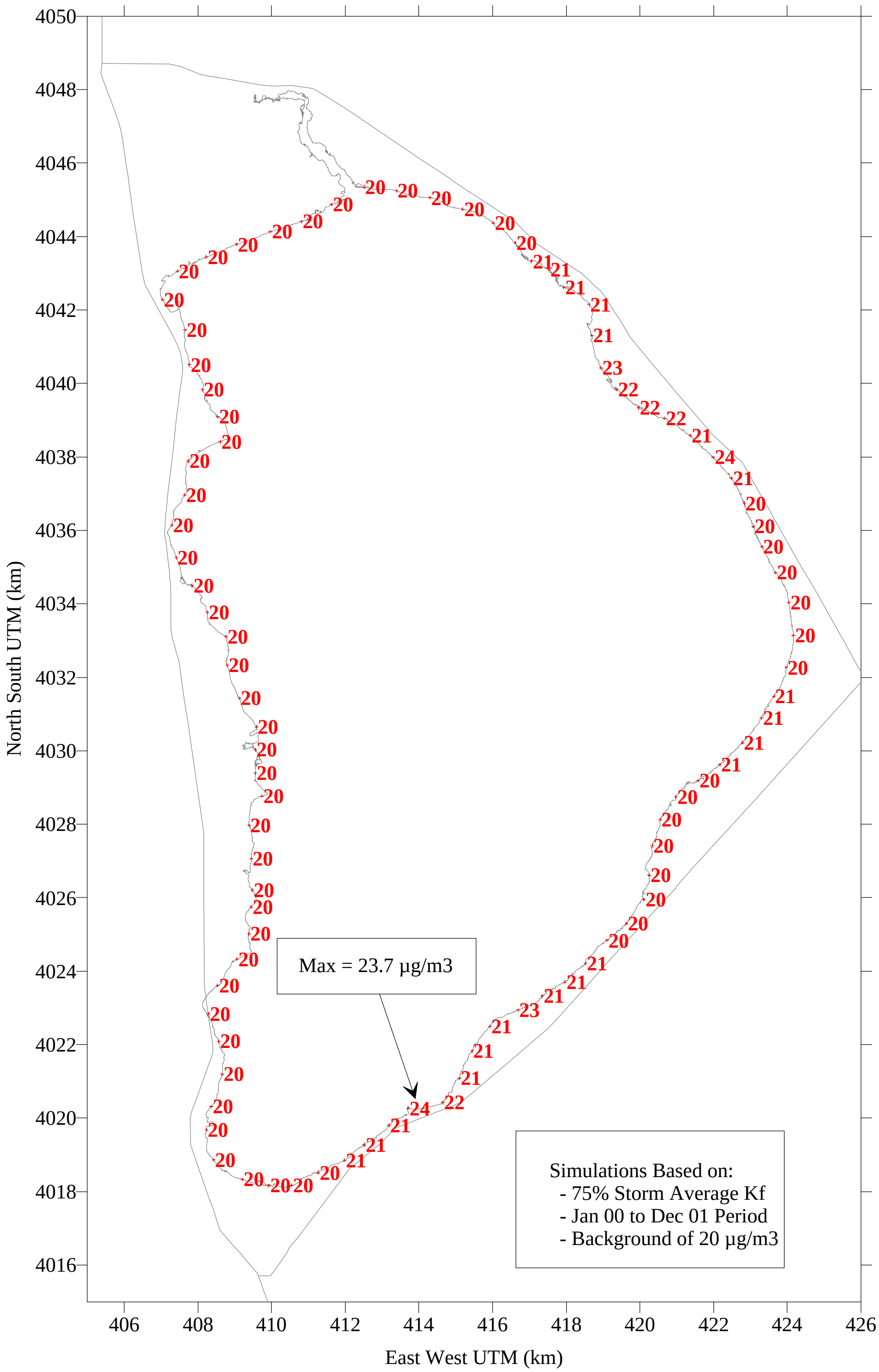

Figure 21. Maximum Annual PM_{10} (µg/m^3) at Shoreline Receptors, No Keeler Dunes, After Controls (Every 5th Plotted)

7 REFERENCES

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Appendix C

Public Comments on the Draft SIP and District Responses

The District received six comment letters regarding issues addressed in the revised SIP. These letters are reproduced here along with the District's responses. Some of the letters contained both SIP and EIR comments. Responses to EIR comments are contained in the Final EIR. SIP comment letters were received from:

1. California Indian Legal Services
2. Fanelli Stores, Inc. (received and responded to prior to release of Draft SIP)
3. Los Angeles Department of Water and Power
4. Lone Pine Paiute-Shoshone Reservation
5. Stephen P. McGreevy
6. Samuel R. Wasson

CALIFORNIA INDIAN LEGAL SERVICES

609 South Escondido Boulevard
Escondido, CA 92025
Phone (760) 746-8941 ◆ Fax (760) 746-1815
www.calindian.org

Directing Attorney
Devon L. Reed

Senior Staff Attorneys
Dorothy Alther
Lawrence R. Stidham
Joanne Willis Newton

Staff Attorneys
Lise J. Cartoni
Wayne J. Rice
Sunshine Sykes

August 25, 2003

VIA FACSIMILE

AUG 27 2003

Mr. Theodore D. Shade
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, Ca 93514

Re: Comments on the Draft Environmental Impact Report , Owens Valley PM10 Planning Area Demonstration of Attainment , State Implementation Plan—2003 Revision ("Draft EIR")

Dear Mr. Shade:

The Owens Valley Indian Water Commission ("OVIWC") would like to take this opportunity to comment on the Draft EIR prepared in support of the proposed Revised 2003 State Implementation Plan ("SIP"). As an overall comment, the OVIWC finds the Draft EIR to be comprehensive and thorough. From all appearances, the Los Angeles Department of Water and Power ("LADWP") is on schedule and complying with the provisions of the 1998 SIP. The OVIWC is optimistic that the LADWP will continue with implementing the dust control measures proposed under the 2003 SIP revision.

The OVIWC has repeatedly commented on and opposed gravel cover as an acceptable dust control measure on the Owens Dry Lake. Under Section ES.2.1.3 of the Draft EIR , it states that the LADWP has indicated that it does not propose to use gravel cover as a dust control measure. In light of LADWP's assertion, the OVIWC recommends that gravel cover be removed from the 2003 Revised SIP and no longer be considered as a dust control measure.

The OVIWC further recommends that LADWP be required to have Native American monitors on site during the Phase II investigation provided for under Mitigation Measurer CUL-1. As acknowledged in Appendix D–Cultural Resources Technical Reports, Section 10.0, Native American participation is an important part of the archaeological investigation in support of the 2003 Owens Valley PM10 Planning Area Demonstration of Attainment SIP. The OVIWC also recommends that LADWP consult with the Tribe's of the Owens Valley regarding the treatment plan developed for those sites determined, through the Phase II investigation, to be eligible for listing on the National Register of Historic Places or the California Register of Historical Resources.

Native American monitors should also be present at all Phase II investigation and earthmoving activities discussed under Mitigation Measure CUL-3. Further, under Mitigation Measure CUL-3, LADWP should enter no agreement with a recognized museum repository regarding the final disposition and permanent storage and maintenance of any unique archaeological resources recovered as a result of archaeological monitoring, without full consultation with the Tribe's of the Owens Valley. The Owens Valley Tribes should also be contacted immediately regarding the discovery of any Native American human remains and disposition of such remains should be determined by the affected Tribe.

As stated above the OVIWC appreciates this opportunity to comment and looks forward to the dust control mitigation at the Owens Dry Lake to continue. Thank you.

Sincerely yours,

Dorothy Alther

DOROTHY ALTHER

cc: Teri Cawelti, Executive Director OVIWC

Letter 1 – California Indian Legal Services, Dorothy Alther, Esq., August 25, 2003

Page 1 – Gravel cover as BACM

The gravel cover dust control measure was determined to be a Best Available Control Measure for Owens Lake in the 1998 version of the Owens Valley SIP. No data have been presented to bring that determination into question.

Also, the 2003 Draft SIP provides for additional controls if new areas on Owens Lake become sufficiently emissive to exceed the National Ambient Air Quality Standards (NAAQS). The fact that the Los Angeles Department of Water and Power has not proposed to use the gravel control measure at this time does not mean they would not wish to use it in the future if conditions change. No change has been made to the 2003 Draft SIP.

FANELLI STORES, Inc.
333 S.State Street
Unit 230
LAKE OSWEGO OR 97034
(503) 666-0307

JUL - 3 2003

June 26, 2003

Sapphos Environmental Inc.
2003 Owens Valley PM
P.O. Box 50241
Pasadena CA 91115

and

Great Basin Unified Pollution
Control District
157 Short Street
Bishop CA 93514-3537

1. Please send us copies of all relevant material, EIRs, etc.

2. Regrettably, in the material you transmitted there is a complete lack of recognition that you are trying to invade and enter private property. Apparently your agencies have adopted the Marxist/socialist concepts that all property belongs to anyone who gets paid by any governmental agency.

3. Your disregard of the constitutional rights to private property is unacceptable. PLEASE TAKE NOTICE that you have no right to enter this property (as illustrated on your "enclosure 2", unless and until you pay agreed compensation, to be agreed by the legal owners. Obviously, your plane, as worked out over many months. do not constitute an emergency, like fire, which would excuse a limited ontime entry

4. Please remember that the 5th Amendment to the US Constitution requires just compensation to property owners; the California Constitution requires payment before entering private property - but it seems that the current California administration usually disregards the Constitution, which they are sworn to uphold.

5. It appears, however, hat your plans include flooding of most of our land. With known enforcement efforts by the federal authorities, as well as state agencies - once an area is flooded it is not only undevelopable, but those few property owners whose property is made undevelopable are jailed if they try to exercise their property rights. Thus, any "flooding" is NOT ACCEPTABLE. It may well be just an excuse to steal our property, or the properties of neighbors simply situated.

6. You may not be aware of the truly atrocious record of California agencies using environmental claims, to steal private property. Thus the California Coastal Commission has "taken" more than 1300 private Lots without paying, and hiding behind local counties or cities, until the US Supreme Court condemned its tactics in the Monterey case some 2-3 years ago. And Tahoe's RPA had to settle with Bernardine Suitum for half a million dollars, after the US Supreme Court condemned their attempted stealing of her Tahoe Lot. Only yesterday did the Supreme

Court struck down California's ex-post-facto extending its statute of limitations, which the lawyers in the Legislature,the governor and the attorney general gleefully enforced - if any kid in high school learns that ex-post-facto laws are prohibited by the US Constitution, as well as by the California Constitution.

7. The Sapphos agency has now realized that a large number of vacant parcels has been not warned of your plans, being absentee owners, but generously taxed for the zero services most counties give in compensation of our good American dollars.

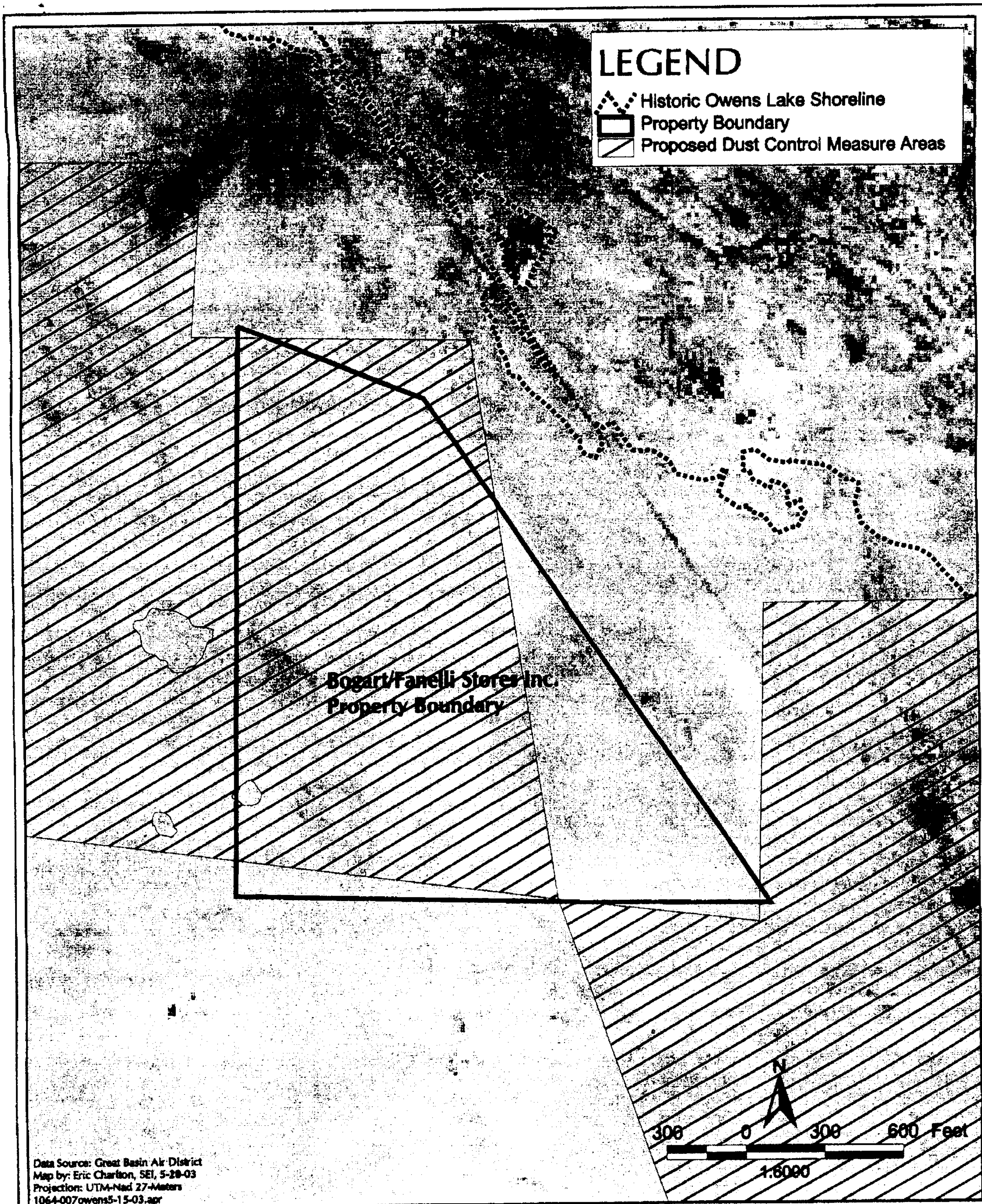
8. It appears that the mere planning of your agencies has already a detrimental effect on the valuation of our land, and nearby properties, where there are known hot steam findings in the neighborhood, and probably also affecting our land.. Such "free energy" should be properly explored, and should be part of your EIR.

9. Even your planning reduces the value of our land and chases would-be entrepreneurs away You are therefore invited to discuss compensation at this stage, and full purchase if your plans will be implemented, especially your plan to flood most of our land and neighbouring properties.

Yours truly,

FANELLI STORES, Inc.

by Sec'y



ENCLOSURE 2

Proposed Dust Control Measures and Private Property

Ellen Hardebeck
Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short Street • Bishop, CA 93514
(760) 872-8211 • Fax (760) 872-6109

July 11, 2003

Secretary
Fanelli Stores, Inc.
333 S. State Street, Unit 230
Lake Oswego, Oregon 97034

Re: 2003 Revision to the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, 2003 Revision

Dear Sir:

Thank you for your June 26, 2003 letter regarding the 2003 Revision of the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (Plan). In response to your request, we have sent to you under separate cover a copy of the Plan and the supporting draft Environmental Impact Report (DEIR). We encourage you to review the Plan and the DEIR to assist your understanding of the air pollution problem in the Owens Valley, and the dust control measures proposed by the Great Basin Unified Air Pollution Control District ("District") to be implemented by the City of Los Angeles ("City").

As you may be aware, the Owens Valley frequently exceeds standards for particulate matter air pollution set by the U.S. Environmental Protection Agency pursuant to the federal Clean Air Act. The Clean Air Act mandates the District to take actions necessary to bring the Owens Valley area into compliance with these air quality standards by December 31, 2006, in order to protect the health of the residents of, as well as visitors to, southern Inyo County.

The City is responsible for this air pollution because of its water diversions from Owens Lake, which exposed and dried the lake bed. As such, the District is requiring the City to construct and maintain, at its own expense, dust control measures to mitigate the resulting air pollution. This is the Project evaluated in the DEIR. You and others have the opportunity to review and comment on the Plan and DEIR. Comments should be provided to the District by August 26, 2003. The District Board will make a decision on the documents at a public hearing in mid-November. You are on the mailing list for notices.

Your property has been included within the Project because a portion of your property has been identified by the District as causing or contributing to these air pollution violations. The City will contact you in advance of any work to receive your permission to flood, gravel, or plant vegetation on your property. However, you are not obligated to accept the City's assistance to mitigate the air pollution resulting from your property. If you choose not to allow the City access to your property to implement the Project, then you will be responsible for controlling the air pollution that results from your property.

Because the District and the City are not currently contemplating condemnation of any private property, there is no need to discuss "just compensation" as your letter suggests. Moreover, neither the District nor the City has taken any action to affect the value of your property. Thus, neither the District nor the City could have "taken" your property pursuant to the Fifth Amendment of the U.S. Constitution or similar provisions in the California Constitution.

Sincerely,

Ellen Hardebeck

Ellen Hardebeck
Air Pollution Control Officer

cc: Richard Harasick, City of Los Angeles
Donna Black, Esq., Morrison and Foerster
P. Bogart, Fanelli Stores, Inc., Incline Village, NV

Letter 2 – Fanelli Stores, Inc., Unknown Sender, June 26, 2003

Fanelli Stores, Inc. wrote a comment letter prior to the start of the comment period. The District responded to the letter on July 11, 2003. Both the comment letter and the District's response letter are included here for the record. There has been no further correspondence. No additional response is necessary.

August 26, 2003

Dr. Ellen Hardebeck
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

Dear Dr. Hardebeck:

Subject: Los Angeles Department of Water and Power's Comments on the 2003 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan (2003 OVPA SIP)

Thank you for the opportunity to provide comments on the proposed 2003 OVPA SIP. We have reviewed it and offer the enclosed comments.

Please contact me at (213) 367-0910, if you have any questions regarding these comments.

Sincerely,

Richard F. Harasick, Director
Owens Lake Dust Mitigation Program

Enclosure
c: w/Enclosure
Mr. Richard Coles, CH2MHILL
Dr. Mark Schaff, Air Sciences

AIR SCIENCES INC.

TECHNICAL MEMORANDUM DENVER • PORTLAND

COMMENTS ON DRAFT OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN 2003 REVISION, DATED JULY 1, 2003

PREPARED FOR:	Richard Harasick, Los Angeles Department of Water & Power Rich Coles, CH2M HILL, Santa Ana, California
PREPARED BY:	Mark D. Schaaf, Air Sciences Inc., Portland, Oregon John Castleberry, CH2M HILL, Los Angeles, California
PROJECT NO.:	179-1-13
COPIES:	
DATE:	August 12, 2003

This memorandum summarizes a review of the draft document, *Owens Valley Pm_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision*, dated July 1, 2003. Our comments are in two categories: Comments of Highest Importance, and Other Comments for the Record.

Comments of Highest Importance

Pg. 7-3: Text states that "DCAs that are in compliance with BACM..." may still require additional controls if emissions are "...found to cause or contribute to an exceedance of the NAAQS..." on the basis of either modeling or monitoring. This could pertain to areas other than extreme-violator cells, even though the text may have been written just with these cells in mind. As currently written, this could pertain to areas that have been controlled according to the SIP specifications but which still have not resulted in attainment of the standards along the shoreline for whatever reason.

Pg. 7-4: Draft SIP states that "if managed vegetation cover or enhanced shallow flooding is selected as the control option, the sites will be monitored using sand flux and/or PM10 monitors to determine if the control measure has achieved the necessary control effectiveness." How to interpret any variability that is present in the monitoring data? Suggest language that states that it is the *arithmetic average control efficiency* that must meet the required 99.5 or 99.75 percent.

Pg. 8-7: Draft SIP states that there is a requirement for "...at least 50 percent on each acre designated for managed vegetation." In a recent modeling analysis, we found that the area that can be sparsely vegetated and still not result in a shoreline concentration above some specified threshold concentration (a maximum daily concentration of either 120 $\mu g/m^3$ or 150 $\mu g/m^3$) varies with distance from the shoreline. Suggest changing text to allow some minimum cover within a certain sized area within zone measured outward from the shoreline. The allowable area as a function of distance was calculated to be:

Maximum Area With 15% Vegetation Cover (75% control efficiency) That Results in a Maximum Daily PM_{10} Concentration of Less Than the Threshold PM_{10} Concentration Along Shoreline

Distance from Shoreline (kilometers)	Threshold PM_{10} Concentration	
	120 µg/m³	150 µg/m³
< 1	1 acre	1 acre
1-2	1 acre	3 acres
2-3	8 acres	16 acres
3-4	8 acres	25 acres
4+	16 acres	>25 acres

Pg. 8-9: Suggest changing text to read (addition in italics): "...greater than *or equal to* 50 percent [managed vegetation] cover...", and "...greater than *or equal to* 75 percent water cover..." Expanded text acknowledges possibility that the District can demonstrate the required control efficiency at either 50 percent vegetation cover or 75 percent water cover.

Pg. 8-52: Default k factors will result in additional areas flagged for control simply by virtue of using the default k factors in Table 5.2 rather than the actual k factors in Table 4.2 (page 4-9). Table 5.2 should not be used in conjunction with the historical sand flux data; they should only be used with future sand flux data.

Pg. 8-62: The procedure outlined starting on 8-62 does not allow a shallow-flood test area to be identified using the 30-months of sand flux data. Our observations:

1. Zones 1 and 2 were modeled as 10 areas (Area 1-8 in Zone 2, Areas 9-10 in Zone 1).
2. Using 24 months of data, the maximum 24-hour PM_{10} concentration along the shoreline is 305 µg/m³ (Note: Need maximum daily concentration of 140 µg/m³ at any shoreline receptor to test an area with a performance standard less than the SIP-required 75% water cover).
3. Assuming 100% control of Sensit grid #7222, the maximum daily concentration lowers to 149.9 µg/m³, which is still not less than the 140 µg/m³ needed to "enter the game."
4. Lowering the standard from the "highest" to the "third-highest" PM_{10} concentration also lowers the concentration to 149.9 µg/m³. But, this is still not enough by itself to produce a maximum daily concentration of less than 140 µg/m³.

5. To test an area using a performance standard lower than 75% water cover would require that the criterion be based on the 3rd highest (not the maximum) ***modeled*** PM_{10} concentration that is less than 150 μg/m³, not 140 μg/m³.

Other Comments for the Record

Page 3-5, Table 3.2: The PM_{10} results at Keeler in 2002 don't show the dramatic reductions that one might expect, given that the Zone 2 shallow flood DCM was operational for the entire year. We suggest adding some text in Section 3.3.4 to offer possible explanations, such as activity at the Keeler Dunes, greater than usual activity from Zone 1, and activity from areas around the perimeter of Zone 2 that are scheduled for dust control. Otherwise, the reader might wonder if the DCMs are not as effective as described in the SIP.

Pg. 4-9: There is no acknowledgement that highest k factors for the Central Area are 100th percentile values based on 1 or 2 storm events only, not 75th percentile values as the text suggests. Also see pg. 6-5.

Page 7-4, 3rd paragraph, 3rd sentence: Please clarify what emission rate was modeled for that portion of the cell *above* the shoreline. We assume the emission rate was set to zero for the attainment demonstration modeling analysis.

Page 8-20, Section 1.1: Please clarify the header to read "...concentration greater than 150 μg/m³ at an historic shoreline PM_{10} monitor or at a near-shore PM_{10} monitor."

Page 8-20, ultimate paragraph: Add another sentence at the end of the paragraph that reads: "This area may be reduced if modeling shows that controlling a smaller fraction of the cell's area is sufficient to meet the NAAQS along the historical shoreline."

Page 8-24, 3rd paragraph: Add another sentence at the end of the paragraph that reads: "This area may be reduced if modeling shows that controlling a smaller fraction of the cell's area is sufficient to meet the NAAQS along the historical shoreline."

Page 8-37, first paragraph: Missing Sensit data should not be replaced with data from a neighboring Sensit. Instead, each entire hour that contains any missing grid cell data should be deleted from the analysis. Substitution with neighboring Sensits introduces much uncertainty, and could result in a prescription for dust control simply on the basis of substituted data.

Page 8-63, first paragraph, first sentence: We suggest revising the sentence to read: "The City's application to reduce the level of control over any area must be accompanied by a modeling analysis that demonstrates that increasing PM_{10} emissions within the test area will not cause the predicted yearly maximum 24-hour concentrations along the shoreline to exceed 140 μg/m³, including background (20 μg/m³)."

Pg. 8-63: Suggest adding the following relationship between managed-vegetation percent cover and control efficiency (based on Lancaster study):

CE = exp{-0.0921*VC)

where VC is the vegetation cover in percent. Relationship is conservative (i.e., results in lowest control efficiency for a given vegetation cover of any study cited in Draft 2003 SIP), and results in 99 percent CE at 50 percent vegetation cover.

Page 8-64, numbered items 1) and 2): Replace "120 $\mu g/m^3$" with "140 $\mu g/m^3$".

Appendix B, Issue #1: There are inconsistencies between the scatter plots and the Q-Q plots. The scatter plots are based on TEOM + Model >150 $\mu g/m^3$, whereas the Q-Q plots are based on values greater than about 5 ug/m3 (eyeball estimate). This alters the shape of the Q-Q plots, making the points appear closer to the 1:1 line than would occur with the T+M > 150 $\mu g/m^3$ cutoff (as we agreed to).

Appendix B, Issue #2: We checked the correlation coefficients and found that the "r2" values were really "r" values. Page 33, paragraph 2, claims that "...more than 50% [of the variation was] explained by model." This is true for linear regression of the un-transformed data (see Appendix B, Table 8, $(0.83)^2=0.69$), but not true for linear regression of the log-transformed data (see Appendix B, Table 8; $(0.68)^2=0.46$). The use of transformed data is more appropriate in this case, as admitted on page 33, 2nd paragraph, penultimate line.

Appendix B, Issue #3: Note that the mean values and fractional biases in Tables 8 through 15 are based on arithmetic means. In our opinion, it would be more appropriate to base this analysis on the geometric means using the log-transformed data. This would greatly reduce the influence of high values, increasing the ratio of TEOM-to-Modeled values (the magnitude of *over-prediction*) from 1.6 (60% over-prediction) to 2.1 (110% over-prediction) at the 75th percentile level. The values used are:

TEOM (ug/m3)	Reported (arithmetic mean) 231	Suggested (geometric mean) 113
Modeled (ug/m3)	Reported (arithmetic mean) 370	Suggested (geometric mean) 240
Ratio of T/M	1.6 (60% over-prediction)	2.1 (110% over-prediction)

Letter 3 – Los Angeles Department of Water and Power, Richard F. Harasick, August 26, 2003

August 12, 2003 Technical Memorandum from Mark D. Schaaf of Air Sciences Comments of Highest Importance, Page 1

Re: SIP Pg. 7-3 – Increment 3 – Supplemental Controls.

This definition of Increment 3 requirements includes areas inside the DCA boundaries because of the use of the Supplemental Controls provision (Chapter 8, Exhibit 2) to correct problems that may arise in the Modifying BACM provision (Chapter 8, Exhibit 3). The 2003 Draft SIP allows BACM requirements to be increased or decreased in order to arrive at the optimum control level. No change has been made to the SIP.

Re: SIP Pg. 7-4 – Extreme Violators.

The District cannot use an arithmetic average control efficiency because the requirements for 99.5% and 99.75% emissions reductions for the extreme cells are based on modeled design days, which have day-specific PM_{10} emissions associated with each of the three extreme cells. Future emissions from enhanced managed vegetation or enhanced shallow flood DCM's in these extreme cells may be estimated using sand flux measurements following the Dust ID Program Protocol. No change has been made to the SIP.

Re: SIP Pg. 8-7 – Averaging Area of something other than one Acre for Compliance with Managed Vegetation Performance Standards.

This is just the type of situation envisioned in the SIP provisions for modifying BACM that can occur after the PM_{10} NAAQS have been achieved. It is clear that the modeling done by Air Sciences was for only a single instance of an enlarged averaging area, and assumed that none of that area had less than 75% control. Running that model with uncontrolled areas as part of the average (Attachment 1) results in a much smaller allowable averaging area.

The Air Sciences August 22, 2003 memo (Attachment 2) makes it clear that only one of the options 1 – 4, and only one example of that option could be used at any one time, since there is no present way to determine the additive effects of multiple bare or reduced control areas. Air Sciences added the additional concentrations to a baseline for the Dirty Socks receptor (98 $\mu g/m^3$), which is not the highest receptor, and leaves no margin of safety (all receptors at 150 $\mu g/m^3$). Near Keeler there is a receptor at 149.9 $\mu g/m^3$ that would go to 200 $\mu g/m^3$ if the same conditions applied there. Air Sciences used a K-factor of 4, and much larger K-factors have been observed. Also, within 1.5 kilometers of the shore, the modeling shows that no area can have less than 75% control, in addition to the 50% cover requirement averaged over one acre.

We conclude that the modeling shows that any adjustment to the averaging area as a function of distance from the shoreline would have to be done on a case-by-case basis, taking into consideration the actual distribution of cover over the entire controlled area on the lakebed. This would allow for the calculation of additive effects from multiple areas.

This process is provided for in Chapter 8, Exhibit 3, Modifying BACM for Owens Lake. No change has been made to the SIP.

Technical Memorandum from Mark D. Schaaf of Air Sciences
Comments of Highest Importance, Page 2
Re: SIP Pg. 8-9 – Extreme Violators
The concept of the extreme violators is intended to address areas where the model shows that more control than the present BACM is required. The suggested change is inconsistent with this control strategy because it allows extreme violators to have no extra control. No change has been made to the SIP.

Re: SIP Pg. 8-52 – Default K-factors
The District never envisioned using the default K-factors on the 30 months of data used in the SIP. The Exhibit 2 process begins in 2004 and the modeling is to determine if "there have been any modeled shoreline exceedances since the last model run" (Page 8-23). This will be clarified to add "since the period included in the last model run".

Re: SIP Pg. 8-62 – BACM Adjustment
It is not clear what change the City is asking for in this comment. One would not expect the current modeling to show that less control is required. The footprint was calculated by the model to allow the City to achieve the 24-hour PM-10 NAAQS with no margin of error (3^{rd} high value for two years of data is 149.9 $\mu g/m^3$). In order to relax controls, which is what the Modifying BACM section may allow, it must be shown that the modeling provided more control than was actually necessary. For example, if there have been no exceedances in a year, instead of the one allowed, then that requirement has been met. If there has been an exceedance of the standard that year, then the NAAQS is just being met, and controls should not be reduced.

In comment sub-points 3 and 4, a concern is expressed over the requirement that every receptor around the lakebed must be under 140 $\mu g/m^3$ for an area to be tested. The intent of the last sentence on page 8-62 is that if an area contributes a small amount (less than 5 $\mu g/m^3$) to a receptor, it can be considered non-contributing if the receptor is less than 140 $\mu g/m^3$. This does not apply to areas with a zero contribution to a receptor. The last sentence on page 8-62 will be changed to read "An area with a non-zero contribution to a receptor would be considered not to contribute … ".

There are three classifications of contributions to a receptor from a test area, and each classification has its own requirement in order for an area to be tested. If the test area has a zero contribution to a receptor, the only requirement on that receptor comes from the Requirements to Begin the Process section; that is, that the receptor is less than 150 $\mu g/m^3$. If the contribution from the test area is greater than zero but less than 5 $\mu g/m^3$, the receptor must be less than 140 $\mu g/m^3$. If the contribution from the test area is 5 $\mu g/m^3$ or more, the receptor must be less than 120 $\mu g/m^3$.

Technical Memorandum from Mark D. Schaaf of Air Sciences
Other Comments for the Record, Page 1
Re: SIP Page 3-5 – Control Effectiveness
The SIP details on page 5-3 a calculation of 99% effectiveness from controls on Zone 2 after BACM was implemented. Emissions from the Keeler Dunes are discussed on page 4-10. No change has been made to the SIP.

Re: SIP Page 4-9 – Central Area K-factors
The phrase "….the 95-percentile and the 75-percentile identical and made…." will be inserted in the sentence beginning "Only one or two storm-average K-factor values…" after "…South and Central areas, which made".

Re: SIP Page 7-4 - Emission Rates
The modeling was performed as stated in the SIP. Since the model receptor locations are on the shoreline, the receptors are generally upwind from the off-lake portion of the cells during the key dust events. The emissions from the off-lake portion do not affect the receptor concentrations. No change has been made to the SIP.

Re: SIP Page 8-20, Section 1.1 – Monitor Clarification
The requested change was made to the SIP.

Re: SIP Pages 8-20 and 8-24 – Fractional Control
The requested language occurs on page 8-21 where modeling is used to "determine the fraction of a single upwind source area that needs to be controlled." No change has been made to the SIP.

Re: SIP Page 8-37 – Missing Data
In the absence of data from one of the 135 Sensits, there is still value in the data from that hour. In view of the necessity for continuous monitoring and control, using the neighboring Sensit to replace the missing data is the best available option; a superior alternative to deleting the data from the other 134 sites from the analysis. No change has been made to the SIP.

Re: SIP Page 8-63, Comment 1 – Trigger Level for Reduction of Control
The modeling must predict less than 120 $\mu g/m^3$ for the District to consider reducing the level of control; the modeled or monitored concentrations after the controls are reduced can be up to 140$\mu g/m^3$. 120 $\mu g/m^3$ is the trigger to try another reduction. If the reduction produces concentrations under 140 $\mu g/m^3$, the City does not have to go back to the last step. "24-hour" has been added to the first paragraph, first sentence.

Re: SIP Page 8-63, Comment 2 – Managed Vegetation Control Efficiency
The City can suggest using the Lancaster study, or any other study done between now and 2007, in 2008. The District will not commit to that formula now since there has been no attempt to review other relevant existing studies, and we could learn more about the relationship between vegetation cover and PM-10 control by 2008. No change has been made to the SIP.

Technical Memorandum from Mark D. Schaaf of Air Sciences
Other Comments for the Record, Page 2
Re: SIP Page 8-64 – Trigger Level for Reduction of Control

See response to comment 1 on page 8-63. No change has been made to the SIP.

Re: SIP Appendix B – Modeling Issues

Comments noted.

Attachment 1

----- Original Message -----
From: Mark Schaaf
To: Ellen Hardebeck
Cc: Kent Norville ; Duane Ono ; Rich Coles ; Richard Harasick
Sent: Monday, August 18, 2003 1:17 PM
Subject: managed veg bare-area analysis.xls

<<...>>
Ellen:

Attached is the spreadsheet (prepared by Kent) that we used to determine the relationship between the size of a partially controlled managed-vegetation area and the maximum daily shoreline PM10 concentration. Sorry for the delay in getting this to you.

To see the bare-area results, set the "% Cover" cell to 0 (currently at 15%), and view the results in the yellow-shaded region at the left as well as on Chart1.

If you have any questions, please don't hesitate to call me or Kent.

Mark Schaaf

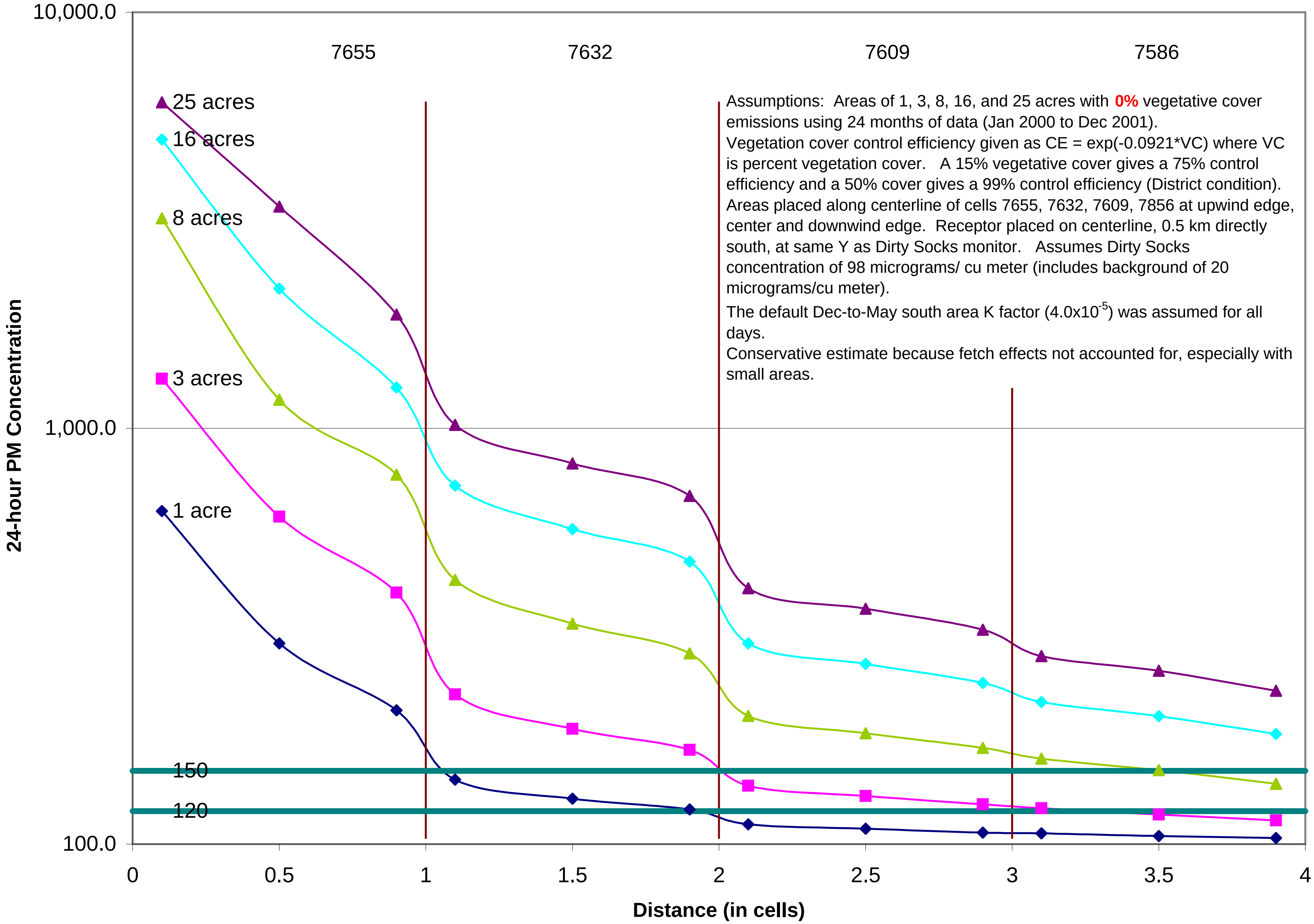
MAXIMUM SHORELINE CONCENTRATION AT DIRTY SOCKS MONITOR
FOLLOWING A CHANGE IN MANAGED VEGETATION COVER AND CONTROL EFFICIENCY

Kf	4	<< Kf
% MV Cover	0	<< 0 to 100
[1 - CE] (%)	1.000	
Exist. Conc.	98	<< Existing maximum controlled PM10 concentration at Dirty Socks Monitor (ug/m3)

	Distance	Max 24-Hr Ave PM10 Conc by Source Area Size (acres)				
By Area	(km)	1	3	8	16	25
7655x1d	0.1	631.6	1,314.9	3,196.6	4,944.7	6,070.3
7655x1c	0.5	303.7	612.4	1,170.7	2,164.3	3,410.2
7655x1u	0.9	209.7	402.5	772.5	1,253.0	1,877.3
7632x1d	1.1	142.8	229.0	431.9	727.4	1,019.1
7632x1c	1.5	128.5	189.3	339.0	572.0	823.1
7632x1u	1.9	121.2	168.4	287.5	477.6	687.4
7632x1d	2.1	111.5	138.1	203.3	304.0	412.2
7632x1c	2.5	108.8	130.5	184.6	271.1	368.0
7632x1u	2.9	106.6	124.6	170.2	243.9	327.5
7632x1d	3.1	106.1	122.0	160.5	219.5	283.0
7632x1c	3.5	104.6	117.8	150.7	202.9	261.1
7632x1u	3.9	103.4	114.0	139.7	183.9	233.7

FOR DIAGRAM OF RESULTS, SEE "CHART3"

For source-area configuration, see "Chart1"


10,000.0
1,000.0
100.0
24-hour PM Concentration
7655
7632
7609
7586
25 acres
16 acres
8 acres
3 acres
1 acre
150
120
Assumptions: Areas of 1, 3, 8, 16, and 25 acres with 0% vegetative cover emissions using 24 months of data (Jan 2000 to Dec 2001).
Vegetation cover control efficiency given as CE = exp(-0.0921*VC) where VC is percent vegetation cover. A 15% vegetative cover gives a 75% control efficiency and a 50% cover gives a 99% control efficiency (District condition).
Areas placed along centerline of cells 7655, 7632, 7609, 7856 at upwind edge, center and downwind edge. Receptor placed on centerline, 0.5 km directly south, at same Y as Dirty Socks monitor. Assumes Dirty Socks concentration of 98 micrograms/ cu meter (includes background of 20 micrograms/cu meter).
The default Dec-to-May south area K factor (4.0x10-5) was assumed for all days.
Conservative estimate because fetch effects not accounted for, especially with small areas.
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (in cells)

Attachment 2

----- Original Message -----
From: Mark Schaaf
To: 'Ellen Hardebeck'
Cc: Rich Coles ; Richard Harasick
Sent: Friday, August 22, 2003 1:11 PM
Subject: Issue of Variable Compliance Areas for Managed Vegetation

<<...>>

Ellen:

Attached is the language that I read to you over the phone earlier today (Friday). The "Note to Ellen" following my suggested text insert is probably more important than the text insert itself! Rich and Richard, this is the same issue that I conveyed to you both in my voice mail earlier today.

I will be out of the office all next week on vacation. I will return on Tuesday, September 2. I'll talk to you all then.

Mark Schaaf

Determining Compliance for Managed Vegetation

Failure to achieve the required 50-percent vegetation cover on each acre will not constitute a violation if:

1. Between 2.5 and 3.5 kilometers from the shoreline, an average of 50 percent vegetation cover or greater is achieved within any 3-acre area. Within this area, up to 1.5 acres may be bare ground (non-vegetated) provided the remaining 1.5 acres is 100 percent vegetated.
2. Between 3.5 and 4.5 kilometers from the shoreline, an average of 50 percent vegetation cover or greater is achieved within any 6-acre area. Within this area, up to 3 acres may be bare ground (non-vegetated) provided the remaining 3 acres is 100 percent vegetated.
3. Between 4.5 and 5.5 kilometers from the shoreline, an average of 50 percent vegetation cover or greater is achieved within any 9-acre area. Within this area, up to 4.5 acres may be bare ground (non-vegetated) provided the remaining 4.5 acres is 100 percent vegetated.
4. At a distance of more than 5.5 kilometers from the shoreline, an average of 50 percent vegetation cover or greater is achieved within any 12-acre area. Within this area, up to 6 acres may be bare ground (non-vegetated) provided the remaining 6 acres is 100 percent vegetated.
5. At any distance from the shoreline, the bare areas of any size are observed to be substantially non-emissive due to the presence of wet (from either natural or DCM-related sources) or stably salt-encrusted soil surfaces.

Note the Ellen: This does not address your concern about possible adverse cumulative effects from multiple areas that *meet* these requirements. We can demonstrate that a single area that meets these requirements will not cause a problem at the shoreline, but we can't tell whether or not multiple areas will cause a problem. It all depends on the wind directions and how the vegetated and non-(or sparsely) vegetated areas are configured. Modeling can't tell us this: the problem is too complex to deal very effectively with in a model. Monitoring, on the other hand, can tell us a great deal about whether a given patchy distribution results in elevated PM_{10} concentrations or not (there is still the issue of how to characterize "patchiness"—this is a common problem with characterizing data that varies continuously but non-uniformly in space—but that's a topic for another day).

Some other thoughts:

Within a distance of 1.5 kilometers from the shoreline, at least 15% vegetation cover must be achieved at each sample point within each acre that is selected for measurement. This is in addition to the requirement to achieve an average cover of 50 percent vegetation.

Between 1.5 and 2.5 kilometers from the shoreline, each acre must achieve the required 50 percent vegetation cover but a maximum of one-half acre may be substantially non-vegetated (bare ground) provided the remaining half is 100 percent vegetated.

Lone Pine Paiute-Shoshone Reservation
1103 South Main St.
P.O. Box 747
Lone Pine, CA 93545
PH.(760) 876-1034 FAX (760) 876-8302
email: lppsr@qnet.com

August 22, 2003

Dr. Ellen Hardebeck
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short St., Suite #6
Bishop, CA 93514

RE: Comments on the Draft Owens Valley PM10 Planning Area Demonstration of Attainment, State Implementation Plan Revision for 2003; Draft Environmental Impact Report

Dear Dr. Hardebeck,

Thank you for this opportunity to comment on the Draft Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Revision for 2003; Draft Environmental Impact Report.

The Lone Pine Paiute-Shoshone Reservation (LPPSR) has the following comments:

> The LPPSR finds the Revised 2003 State Implementation Plan (RSIP) to be a satisfactory document, which outlines the progress and direction of the Dust Mitigation Project at the Owens Dry Lake.
>
> Gravel as a Control Measure:
> The LPPSR recommends that gravel cover not be used as a dust control measure. Though the use of gravel as a dust control measure continues to be discussed as an option in the RSIP, Section ES.2.1.3 of the Draft EIR, states that "LADWP has indicated that it does not propose to use gravel cover as a DCM". It is recommended by the LPPSR that the use of gravel no longer be considered as a DCM and be removed from the RSIP.

Monitoring:

The Lone Pine Paiute-Shoshone Reservation has been conducting ambient PM_{10} measurements since September 2002. The Lone Pine Tribe operates a Tapered Element Oscillating Microbalance (TEOM) PM_{10} monitor in accordance with federal monitoring guidelines (40 CFR, Part 58). The LPPSR intends to continue monitoring for 24-hour exceedences of PM_{10} throughout the dust mitigation project and beyond the December 31, 2006 timeline.

Cultural Resources

With regard to Appendix D- Cultural Resources Technical Reports, Section 10.0, "Native American participation is an important part of the archaeological investigation in support of the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment SIP."

Native American monitors should be present at all Phase II investigation and earthmoving activities discussed under Mitigation Measure CUL-3. Additionaly, under Mitigation Measure CUL-3, LADWP should consult with the affected Tribe regarding the disposition of any archeological resources recovered as a result of archaeological monitoring. The LPPSR should also be contacted immediately regarding the discovery of any Native American human remains.

Again, the LPPSR appreciates the opportunity to comment in the EIR and RSIP and supports the Great Basin Unified Air Pollution Control District in its efforts to protect the health of the residents in the Owens Valley through the dust control mitigation project at the Owens Dry Lake.

Sincerely,

Debbie L Becker for

Rachel A. Joseph
Tribal Chairperson

Letter 4 – Lone Pine Paiute-Shoshone Reservation, Rachel A. Joseph, August 22, 2003

Page 1 – Gravel Cover as BACM
The gravel cover dust control measure was determined to be a Best Available Control Measure for Owens Lake in the 1998 version of the Owens Valley SIP. No data have been presented to bring that determination into question.

Also, the 2003 Draft SIP provides for additional controls if new areas on Owens Lake become sufficiently emissive to exceed the National Ambient Air Quality Standards (NAAQS). The fact that the Los Angeles Department of Water and Power has not proposed to use the gravel control measure at this time does not mean they would not wish to use it in the future if conditions change. No change has been made to the 2003 Draft SIP.

Page 2 – Monitoring
Comment noted.

RECEIVED
AUG 21 2003
Donna Leavitt
GBUAPCD, Clerk

LEAVE THE DUNES ALONE!

The Keeler Dunes (defined as the sand-dunes located 1 to 3 miles to the north-west of the Keeler Township) add great beauty for residents of Keeler such as myself - times around sunset and sunrise on wind-free days prove this. They, like the Olancha Dunes, are also a habitat for a great number of sand-dune-ecosystem desert plants and animals rare to the southern Owens Valley. I know of several Keeler residents who highly value recreational time walking about the dunes observing animal tracks and marveling at the phenomenal landscape surrounding the town.

Strong north and north-west winds do blow dust from the dunes into Keeler - at times exceeding 1000 uG/M according to the GBUAPCD, but the periods this occurs are quite few and far between (from my six years of living in Keeler - maybe on about 10-20 days out of 365 days a year - a small percentage of days overall) and are of little degradation to the quality of life (QWL) in Keeler, in my mind, compared to hoards of noisy construction equipment rumbling through the town 5 or 6 days a week, as is now the situation once Barnard/Kewit Construction and now the LADWP showed up in the area with their offices and lay-down areas. Furthermore, it is still less overall than the day-to-day dust being generated by vehicles driving daily ON the lakebed - especially speeding Yahoos in pick-up trucks racing each other over 40 MPH (and more!!) creating huge dust "roostertails," as I have personally witnessed also. And...work on any sand dune-related dust mitigation projects will greatly worsen the affects on ground-based noise pollution from heavy construction equipment and will degrade the natural beauty of the area and QWL still further.

The township already "suffers" considerable degradation in QWL from the huge-levels of low-frequency afterburner noise (including infrasound noise pollution - the worst kind) from military jet-aircraft (primarily out of Leemore NAS 100 miles to the west in the San Joaquin Valley) performing dive-bombing and air-combat maneuvers near and over the township, though sometimes we like having a "free" air-show. Personally-speaking, this jet activity has a huge negative impact on my recording-studio activities in town, but I recognize that we need this activity if our country is to continue being World Policeman.

Keeler residents live here because we do value times of quietude - particularly when the "Owens Military Operations Area/R-2508" is "cold," i.e., not in active use by jet aircraft. We also greatly value an overall low-level of vehicular traffic here - many of us burned-out from the urban/suburban rat-race afflicting huge areas of California to seek a slower and quieter style of living, and highly value the feeling of living in a little-disturbed "outback" setting - unique in an America filled-up with cultivated land and suburban sprawl and the lemming-like look of thousands of automobiles running amok..

The end result of construction-work on the Keeler Dunes will be a very ugly, "scarfed-up manscape" like the Owens Dry-lakebed has become - ("very ugly looking" say photographer friends who used to frequent the area before the lake-bed became filled with lines , boxes, and berms) - No doubt most of the money earned from such a project will go into the pockets of a small number of corporate executives (majority of it) and a few hundred workers - most of whom who will leave the area after the project is completed. It is known that the entities involved in LADWP sub-contracting have a "hire as few local people as possible" policy - this I learned first-hand from management when I worked for CH2MHill June 1999 to May 2001. As such, very few local Keeler residents (probably one or two) really benefit financially from these construction projects.

I know personally that no-one in town is going to desire any more disturbance to the natural landscape any more than has already taken place over the past three years during the Owens Lake Project. We do acknowledge that the extremely high dust emissions from "Zone 2" the area encompassing the eastern arc of the Owens Dry lakebed have been greatly reduced, and I am personally grateful. Work on the gorgeous sand dunes will raise the ire of many local residents who don't seem to matter to the "larger powers" that be (LADWP, DOD, etc.)

As for the sand-dune encroachment problem, in the six years of living in Keeler, I have seen the dunes move perhaps about 75 to 100 feet closer to the township - mainly near the Old State Highway. 100 feet in 6 years translates to well over 100 years at the same rate for the dunes to encroach into the township - and this will likely not occur as the nearby "Zone 2" shallow-flooding project is reducing sand-dune growth dramatically from sand-blown off of the Owens Lake-bed - in some areas of the dunes, I have witnessed an actual retreat of sand and uncovering of sections of the old railroad right-of-way! And anyway, Keeler is already built upon old dunes anyway.

Case made in point.

Most Sincerely and not-Politically-Correct,

Stephen P. McGreevy
Keeler Resident,
PO Box 75, Keeler, CA 93530

(commentary to the GBUAPCD DEIR)

Letter 5 – Stephen P. McGreevy, Private Citizen, Received August 21, 2003

Pages 1 and 2 – Keeler Dunes

The 2003 Draft SIP does not propose to affect the Keeler Dunes, since there is a reasonable likelihood that controlling the Owens Lake bed will prevent the deposition of fine particles on the Dunes. If, in 2007, it is shown that the Dunes continue to cause violations of the NAAQS at Keeler, a SIP Revision may be needed to deal with those emissions.

Samuel R. Wasson
P.O. Box 223
385 Laws Ave.
Keeler, Ca. 93530

Mr. Theodore Schade
Senior Project Manager
Great Basin Unified Air Pollution Control Dist.
157 Short St. Bishop, Ca. 93514-3537

July 25, 2003

Dear Mr. Schade,

5.2.3: I am pleased to see, in the Draft Environmental Impact Report Owens Valley PM-10 Planning Area Demonstration of Attainment State Implementation Plan - 2003 Revision, that a mandatory element of this project will be to abate mosquito and other pest vector breeding and swarming. Mosquitoes, black biting gnats, flies and other insects have negatively affected Keeler residents for the last two, plus years.

Another issue to address in this project is the "Stink" smell from the brine water (sulfur smell) and other decaying material. The putrid smell is particularly strong when there is a light wind blowing from West to East.

6.5: My last comment regards the Keeler Dunes: if winnowing does not immediately (6 months or less) control the emissions, then these Dunes need to be stabilized or removed.

To date, the various dust control projects have been exceeding effective in reducing PM-10 emissions around the Owens Dry Lake and particularly in Keeler.

Sincerely,

Samuel R. Wasson

Samuel R. Wasson

JUL 28 2003

Letter 6 – Samuel R. Wasson, Private Citizen, July 25, 2003

SIP Section 6.5
The 2003 Draft SIP does not propose to control emissions from the Keeler Dunes, since there is a reasonable likelihood that controlling the Owens Lake bed will prevent the deposition of fine particles on the Dunes. If, in 2007, it is shown that the Dunes continue to cause violations of the NAAQS at Keeler, a SIP Revision may be needed to deal with those emissions.

Great Basin Unified Air Pollution Control District

2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

Environmental Findings of Fact

State Clearinghouse Number 2002111020

Prepared For:

Great Basin Unified Air Pollution Control District
157 Short Street, Suite 6
Bishop, CA 93514-3537

Prepared By:

Sapphos Environmental, Inc.
133 Martin Alley
Pasadena, CA 91105

November 13, 2003

FINDINGS OF FACT REGARDING THE FINAL ENVIRONMENTAL IMPACT REPORT FOR THE 2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN (State Clearinghouse Number 2002111020)

I.A CERTIFICATION

The Great Basin Unified Air Pollution Control District (District) hereby certifies the Final Environmental Impact Report (EIR) for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, Inyo County, State Clearinghouse Number 2002111020 (which consists of Volume I: Draft EIR, dated July 11, 2003; Volume II: Technical Appendices to the Draft EIR, dated July 11, 2003; and Volume III: Clarifications and Revisions to the Draft EIR, Comment Letters on the Draft EIR, and Response to Comments dated November 13, 2003), which has been completed in compliance with the California Environmental Quality Act (CEQA), the State CEQA Guidelines, and all applicable federal, state, and local statutes and regulations that govern the management of environmental resources; and that the District has received, reviewed, and considered the information contained in the Final EIR, all hearings, and submissions of testimony from officials representing the U.S. Army Corps of Engineers, U.S. Bureau of Land Management, California State Lands Commission, California Department of Fish and Game, California Department of Transportation, and California Regional Water Quality Control Board, as well as from other interested agencies, organizations, and private individuals.

Having received, reviewed, and considered the foregoing information, and recommendations of District staff, as well as any and all other information in the record, and Section I herein, the District hereby makes findings pursuant to, and in accordance with, Section 21081 of the Public Resources Code as presented in Sections II through X of these Findings of Fact.

I.B BACKGROUND

I.B.1 Existing Conditions

The Owens River flows south through the Owens Valley and terminates in the Owens Lake brine pool. Prior to the diversion of the Owens River into the Los Angeles Aqueduct in 1913, Owens Lake was more than 100 square miles in size. After the diversion, the lake bed was exposed and is now the source of dust emissions. There are three communities and one Indian reservation in the vicinity of the Owens Lake bed, including Lone Pine, Lone Pine Indian Reservation, Keeler, and Olancha/Cartago. Other land uses include mining, recreation (hiking, birdwatching, hunting, and golfing), and cattle grazing. Historic mining and transportation sites are located along the former Owens Lake shoreline. The Owens Valley has a rich variety of plants, riparian habitat, alkaline meadow, and seep habitat, serving resident and migratory wildlife species. Several archaeological and historical sites are known in the area. The shores of Owens Lake were used by Native American groups. The Los Angeles Aqueduct also traverses the Owens Valley from North to south. Water diverted from the Owens River into the aqueduct has resulted in the dry alkaline Owens Lake bed and the remnant Owens Lake brine pool. Winds in the Owens Valley raise clouds of fine particulate dust from the lake bed, causing exceedances of the National Ambient Air Quality Standards (NAAQS) for PM_{10} (fine particulate matter). Pursuant to an order from the District, the City of Los Angeles Department of Water and Power (LADWP) has installed or is installing dust control measures (DCMs) consisting of shallow flooding areas, and managed vegetation plots on19.5 square miles (12,480 acres) of the emissive dry lake bed pursuant to an existing 1998 State Implementation Plan (SIP) mandated and approved by the U.S. Environmental Protection Agency (USEPA). These DCMs have resulted in a reduction in PM_{10} emissions of approximately 35,000 tons per year. Current annual uncontrolled lake bed emissions are estimated at about 40,000 tons per year.

I.B.2 Project Objectives

The ultimate goal of the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, as stated in the Final EIR, is to reduce dust emissions from the dry Owens Lake bed to attain the NAAQS for PM_{10}, promulgated by the USEPA pursuant to the federal Clean Air Act Amendments of 1990 by December 31, 2006. The following objectives have been identified by the District Governing Board in support of the project goal. These objectives are listed below, beginning with the most important objective:

- Attain the NAAQS for PM_{10} by December 31, 2006 (primary goal)
- Revise the approved November 16, 1998 SIP by December 31, 2003
- Minimize (or compensate for) long-term, significant, adverse changes to sensitive resources within the natural and human environment
- Provide a high technical likelihood of success without substantial delay
- Conform substantially to adopted plans and policies and existing legal requirements
- Minimize the long-term consumption of natural resources
- Minimize the cost per ton of particulate pollution controlled
- Be consistent with the State of California's obligation to preserve and enhance the public trust values associated with Owens Lake

I.C PROJECT IMPROVEMENTS

The project consists of revisions to the 1998 SIP dust control program analyzed in the 1997 Program EIR and the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Final Environmental Impact Report Addendum (1998 Program EIR Addendum), including changes in the location and size of the emissive dust control areas. Program-level environmental analysis is provided for these changes. To develop and operate the 5.5 square miles of new DCMs identified in the 2003 Revised SIP, project-level environmental analysis is provided for the shallow flooding and managed vegetation DCMs. In addition, operational environmental monitoring programs proposed through mitigation measures in this EIR would be used in the operation of previously developed DCMs to provide project consistency and efficiency.

Dust Control Measures

DCMs are defined as those measures of PM_{10} abatement that could be placed onto portions of the Owens Lake dry lake bed (frequently referred to as playa) and, when in place, are effective in reducing the PM_{10} emissions from the surface of the playa. Since 1989, the District has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unique Owens Lake playa environment. The District, in cooperation with the LADWP, has developed three PM_{10} control measures that it has found to be feasible and effective: shallow flooding, managed vegetation, and gravel cover.

Shallow Flooding

The surfaces of naturally wet areas on the lake bed (i.e., those areas typically associated with seeps and springs) are resistant to wind erosion that causes dust. Shallow flooding mimics the physical and chemical processes that occur at and around natural springs and wetlands. This control measure consists of releasing water along the upper edge of PM_{10} emissive area elevation contour lines, allowing it to spread and flow down gradient toward the center of the lake. To attain the required PM_{10} control efficiency, at least 75 percent of each square mile of the control area must be maintained in standing water or saturated soil between October 1 and June 30 (dust season) each year. This DCM includes a network of mainline, submain, lateral, and riser pipes that distribute water throughout the shallow flood area. Drip irrigation tubes or gated pipe may also be used. Shallow flooding areas will be surrounded by perimeter berms approximately 3 to 5 feet in height and 6 to 16 feet in width, and will have tailwater recycling facilities located at the topographic low point in each area to recirculate water. By July 2003, the shallow flooding control measure was implemented on about 13.9 square miles of emissive lake bed. Approximately 4.7 square miles of additional project area will utilize shallow flooding for dust control purposes. This EIR analyzes these approximately 4.7 square miles of additional project area. This EIR incorporates by reference environmental analysis of the shallow flooding DCM from the 1997 Program EIR, the 1998 Addendum No. 1 to the Final EIR, and two Mitigated Negative Declarations.

Managed Vegetation

Vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. Vegetation that has established at least 50 percent total surface cover provides a barrier that prohibits wind speeds from reaching the threshold velocity for emissions at the playa surface. Saltgrass meadows around the playa margins and the scattered spring mounds found on the playa are examples of such areas. Dust control using managed vegetation would occur within a patchwork of irrigated fields provided with subsurface drainage to create soil conditions suitable for plant growth using a minimum of applied water. The managed vegetation DCM consists of creating a farm-like environment from currently barren playa. The saline soils must first be reclaimed with the application of relatively fresh water, and then planted with salt-tolerant plants that are native to the Owens Basin. Thereafter, soil fertility and moisture inputs must be managed to encourage rapid plant development and maintenance of 50 percent plant cover.

Managed vegetation has previously been installed on 3.8 square miles of lake bed. Approximately 5.5 square miles of additional project area will utilize managed vegetation for dust control purposes. These managed vegetation plots would be typically between 40 and 160 acres in size, where locally adapted native species or species approved by the District and California State Lands Commission (SLC) (such as saltgrass [*Distichlis spicata*] or other salt-tolerant native shrubs) would be grown. The size and shape of each block would be modified to fit site-specific requirements. Irrigation systems would support the managed vegetation DCM. This EIR analyzes these approximately 5.5 square miles of additional project areas. This EIR incorporates by reference previous environmental analysis of the managed vegetation from the 1997 Program EIR, 1998 Program EIR Addendum, and two Mitigated Negative Declarations.

Gravel Cover

A 4-inch layer of coarse gravel laid on the surface of the Owens Lake playa would control PM_{10} emissions by preventing the formation of efflorescent evaporative salt crusts and raising the threshold wind velocity required to lift the large gravel particles (i.e., larger than 0.5 inch in diameter). Gravel blankets can work effectively on essentially any type of soil surface. Gravel cover placed onto the lake bed surface would be approximately the same color as the existing lake bed. The 2003 Revised SIP provides for the potential use of the gravel cover DCM. LADWP has indicated that it does not propose to use gravel cover as a DCM. As such, this EIR does not include project-level analysis of the gravel cover DCM. If, in the future, the LADWP chooses to use the gravel DCM in areas not analyzed in appropriate previously prepared CEQA documents, a project-specific analysis will be required at that time. This EIR incorporates by reference previous environmental analysis of the gravel cover from the 1997 Program EIR, 1998 Program EIR Addendum, and two Mitigated Negative Declarations.

Infrastructure Support Systems

Infrastructure systems would be necessary to support the DCMs. Water would be provided through connections to existing mainline and drainwater (brineline) pipelines. Subsurface drainage piping may be installed within shallow flooding areas, beneath irrigated fields, and around the perimeter of the DCMs. Power supply and control facility activities associated with the project would include the relocation of one planned electrical service line and the installation of two additional electric service lines. Approximately 2 miles of access roads would be installed. Utility corridors would contain freshwater and drain water pipelines, fiber optic or electric remote control lines, and underground power cables will be installed along these roads. Storm water control berms would be constructed along the eastern perimeter areas of the project site. These would prevent damage to the DCMs from storm water runoff.

I.D EIR PROCESS

The District prepared an EIR for the project in accordance with CEQA.

The District has taken steps to encourage the public to participate in preparation of the environmental analysis for the project. On November 5, 2002, the District circulated a Notice of Preparation (NOP) for a Draft EIR for the project to the State Clearinghouse and to various federal, state, regional, local government agencies, and individuals. The District attracted approximately five people from the public when it hosted community workshops and scoping meetings on November 13 and 14, 2002, to solicit input from the public on the elements of the project. The public scoping period closed on December 5, 2002. The District received nine letters of comment on the NOP. The District did not receive any late letters of comment on the NOP. The Final EIR considered the environmental issues identified in the NOP and comments received during the scoping period. This consideration included a reassessment of the potential for significant impacts to aesthetics, agricultural resources, geology and soils, mineral resources, population and housing, public services, and recreation. As a result of this analysis, it was reconfirmed that significance thresholds for these issue areas would not be exceeded. A clarification of the analysis of each of these issue areas undertaken in the Initial Study and addressing public comments concerning the scope of this EIR for each of these issue areas is included in Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR.

The Draft EIR was prepared to inform public agency decision makers and the general public about the project and its significant environmental effects, to suggest possible ways of minimizing those effects, and to describe a reasonable range of alternatives that could feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. The Draft EIR was completed and forwarded to the State Office of Planning and Research (OPR) on July 11, 2003, for a 45-day review period that ended on August 25, 2003. A Notice of Completion (NOC) was posted at OPR and the Inyo County Clerk's Office on the same day (July 11, 2003). A Public Notice of Availability (NOA) of the Draft EIR appeared in the following local newspapers: *Inyo Register, Mammoth Times, Ridgecrest Daily Independent,* and the *Tahoe Daily Tribune*; was mailed directly to more than 50 local interested parties; and was posted at 33 locations surrounding Owen's Lake at virtually every access point to the lake bed.

A copy of the Draft EIR was mailed to 44 agency representatives from 29 federal, state, regional, and local agencies, and copies of the Draft EIR were available throughout the public review period at the following libraries: Independence, Big Pine, Bishop, and Lone Pine. In addition, copies of the Draft EIR were available throughout the public review period at the Great Basin Unified Air Pollution Control District and Sapphos Environmental, Inc.

Community workshops were held on July 24 and 25, 2003, to solicit comments on the Draft EIR, including recommended mitigation measures. A total of 11 timely comments were received on the Draft EIR from resource agencies and organized groups: U.S. Bureau of Land Management, California State Lands Commission, California Department of Transportation, California Department of Fish and Game, California Regional Water Quality Control Board–Lahontan Region, Los Angeles Department of Water and Power, Lone Pine Paiute–Shoshone Reservation, California Indian Legal Services, Stephen McGreevy, Samuel Wasson, and Judy Wickman. The Final EIR was prepared based on the Draft EIR, comments provided in response to circulation of the Draft EIR for public review, and clarifications and revisions resulting from public review of the Draft EIR. Upon completion of the evaluation, this Final EIR was prepared and provided to the District Governing Board for certification of compliance with CEQA and for review and consideration as part of the decision-making process for the project.

The LADWP provided the District with recommended input to the response-to-comment letters received on the Draft EIR on September 19 and 25, 2003, 24 and 30 days after the close of the public review period, respectively. The District provided a copy of the comment letters on the Draft EIR to the LADWP on August 27, 2003. The District has used its independent judgment in responding to the letters of comment received on the Draft EIR. In addition, the District has provided a copy of LADWP's recommended input to the response to comments for consideration by the District Governing Board during its decision-making process. The District staff members continue to coordinate with the LADWP throughout the implementation of the mitigation measures in the EIR.

I.E GENERAL FINDINGS

The District has evaluated all environmental issues recommended by CEQA and the State CEQA Guidelines during the environmental evaluation of the project.

The Initial Study: 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (Initial Study) determined that the project was not likely to result in significant impacts to seven environmental issues: Aesthetics, Agricultural Resources, Geology and Soils, Mineral Resources, Population and Housing, Public Services, and Recreation. The Initial Study determined that the project may cause a significant impact to nine environmental issues: Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Transportation and Traffic, and Utilities and Service Systems. These issue areas were carried forward for analysis in the EIR.

The EIR determined that the project is not expected to result in significant impacts to two additional environmental issues: Noise and Utilities and Service Systems. Therefore, there are no mitigation measures necessary for Noise and Utilities and Service Systems.

The EIR determined that the project is expected to result in significant impacts to seven environmental issues that can be mitigated to below the threshold of significance with the incorporation of mitigation measures: Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, and Transportation and Traffic. Measures Air-1 and -2, Bio-1 through -14, Cul-1 through -3, Hazards-1 through -5, Hydro-1 through -3, Land Use and Planning-1 and -2, and Transportation-1 through -3 would reduce the significant impacts in all issue areas to below the threshold of significance.

The EIR determined that development of the project would not result in significant impacts to any environmental issues that cannot be reduced to below the threshold of significance with incorporation of mitigation measures. Therefore, no statement of overriding considerations is required.

The District evaluated four alternatives to the project:

- Alternative 1: No Project
- Alternative 2: Emissive Wetland Avoidance Alternative
- Alternative 3: Mosaic Alternative
- Alternative 4: Habitat Shallow Flooding Alternative

Alternative 4, Habitat Shallow Flooding Alternative, was determined to be the environmentally superior alternative. However, it is not superior to the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (project) in that it does not provide a certainty of meeting the primary goal of the project, which is attaining the NAAQS for PM_{10} by December 31, 2006. In addition, Alternative 4 does not minimize the long-term consumption of natural resources to the extent that the project does.

In accordance with Section 21081.6 (a) (1) of CEQA, the District has prepared a mitigation monitoring program for those measures required to mitigate or avoid significant effects on the environment.

In accordance with Section 21081.6 (a) (2) of CEQA, the District has specified the location and custodian of the documents and other materials that constitute the record of decision used in the decision-making process for the project. The designated location and custodian of documents is as follows:

Mr. Ted Schade, Senior Project Manager
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514
(760) 872-8211

References not available from the District are located at Sapphos Environmental, Inc. and may be reviewed by contacting:

Mr. Dev Vrat, AICP
Senior Planner
Sapphos Environmental, Inc.
133 Martin Alley
Pasadena, CA 91105
(626) 683-3547

In accordance with Section 21082.1 (c) (1), the District has independently reviewed and analyzed the information contained in the reports and environmental documents required by CEQA, has circulated draft documents that reflect its independent judgment, and finds that the Final EIR reflects the independent judgment of the District.

Additional information was secured, and revisions to the Draft EIR occurred in response to comments received from responsible and trustee agencies, as well as members of the public. The District finds and determines that the addition of this information and the changes made to the Draft EIR have not resulted in substantial modifications to the Draft EIR and have merely clarified and amplified the information in the Draft EIR.

These Findings of Fact constitute the required findings pursuant to Section 15091 of the State CEQA Guidelines. No Statement of Overriding Considerations is required pursuant to Section 15093 of the State CEQA Guidelines because the project has no unmitigated significant environmental impacts.

SECTION II
POTENTIAL ENVIRONMENTAL EFFECTS THAT ARE NOT SIGNIFICANT

The analysis undertaken in support of the Initial Study: 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (Initial Study) determined that there are a number of environmental issues that would not result in significant impacts from implementation of the project: Aesthetics, Agricultural Resources, Geology and Soils, Mineral Resources, Population and Housing, Public Services, and Recreation. These issue areas, therefore, were not carried forward for detailed analysis in the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report (EIR) for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (project).

As a result of public comments on the Initial Study suggesting that potential impacts to these issue areas could occur, the potential for significant impacts was reassessed in the Draft EIR; as a result of this analysis, it was reconfirmed that significance thresholds for these issue areas would not be exceeded. A brief clarification of the analysis of each of these issue areas undertaken in the Initial Study and addressing public comments concerning the scope of this EIR for each of these issue areas is included in Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR.

II.A AESTHETICS

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to aesthetics. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on aesthetics, it was determined that implementation of the project would not meet or exceed the thresholds of significance for aesthetics under the State CEQA Guidelines. Therefore, the project is not expected to have a substantial adverse effect on a scenic vista, a scenic highway, the existing visual character, or create a substantial new source of light and glare.

II.B AGRICULTURAL RESOURCES

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to agricultural resources. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on agricultural resources, it was determined that implementation of the project would not meet or exceed the thresholds of significance for agricultural resources under the State CEQA Guidelines. The project is not expected to convert any farmland or land used for agricultural purposes of any kind to another usage, and the project would not conflict with zoning for agricultural use or a Williamson Act contract.

II.C GEOLOGY AND SOILS

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to geology and soils. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on geology and soils, it was determined that implementation of the project would not meet or exceed the thresholds of significance for geology and soils under the State CEQA Guidelines. The project is not expected to result in significant impacts to geology and soils due to the absence of large and/or habitable structures, the small and seasonal nature of the employee population, and the required implementation of standard seismic design measures.

II.D MINERAL RESOURCES

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to mineral resources. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on mineral resources, it was determined that implementation of the project would not meet or exceed the thresholds of significance for mineral resources under the State CEQA Guidelines. The project is not expected to result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally important mineral resource recovery site delineated on a land use plan. The project is not expected to conflict with any mining activities in the area or degrade existing crystalline trona ore deposits.

II.E POPULATION AND HOUSING

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to population and housing. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on population and housing, it was determined that implementation of the project would not meet or exceed the thresholds of significance for population and housing under the State CEQA Guidelines. The project is not expected to result in either direct or indirect population growth, and the project is not expected to result in the displacement of substantial numbers of existing housing units or people.

II.F PUBLIC SERVICES

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to public services. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on public services, it was determined that implementation of the project would not meet or exceed the thresholds of significance for public services under the State CEQA Guidelines. The project is not expected to require the construction of new or expanded public services to maintain service objectives.

II.G RECREATION

Significant Impact:

None.

Finding:

The project is not expected to result in significant impacts to recreation. Therefore, no mitigation is required.

Facts:

The above finding is made based on the analysis included in Section 2.0, Environmental Checklist, and Section 3.0, Environmental Analysis, of the Initial Study and Section 3.0-2, Potential Impacts Found Not to Be Significant, of the EIR. As a result of the analysis of the project elements relative to their effects on recreation, it was determined that implementation of the project would not meet or exceed the thresholds of significance for recreation under the State CEQA Guidelines. The project is neither expected to cause an increase in the use of adjacent neighborhood and regional parks or other recreational facilities nor expected to have an adverse physical effect on the environment through the construction or expansion of recreational facilities.

SECTION III
POTENTIAL ENVIRONMENTAL EFFECTS THAT CAN BE MITIGATED TO A LEVEL OF INSIGNIFICANCE

The analysis undertaken in support of the Final Environmental Impact Report (EIR) determined that impacts to all of the seven environmental issues expected to be significant as a result of the project will be reduced to a level of insignificance with the incorporation of the specified mitigation measures. Impacts to the following seven environmental issues can be mitigated to below the threshold of significance with the incorporation of mitigation measures: Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, Transportation and Traffic, and Land Use and Planning.

III.A Air Quality

Significant Impacts:

Implementation of the project would potentially result in impacts related to the increased generation of PM_{10} emissions, violating District rules 400 and 401 for fugitive dust emissions during construction.

Implementation of the project would potentially result in impacts related to a cumulative net increase of criteria pollutants in areas where managed vegetation will be implemented as a DCM.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to air quality.

Facts:

Incorporation of the mitigation measures described in Section 3.1.6 of the EIR would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Air-1 To mitigate the air quality impact related to the violation of any air quality standard or a substantial contribution to an existing or projected air quality violation, LADWP shall apply BACM during construction to minimize fugitive dust emissions from unpaved roads and areas affected by the construction work specified in the 2003 Revised SIP, or related transportation and staging of equipment and materials to comply with District Rules 400 and 401. This may include, but shall not be limited to, use of chemical soil stabilizers, surface coverings, windbreaks, water trucks, and water sprays twice a day, or comparable measures that prevent visible dust from occurring. The District will monitor the application of BACM at least once a week on an ongoing basis and will maintain a monitoring log on file.

Measure Air-2 To mitigate the air quality impact related to cumulative net increase of fugitive dust (PM_{10}), LADWP shall submit a tilling and planting schedule as well as the installation techniques that shall minimize wind erosion for areas where managed vegetation shall be implemented as a DCM to the District for review and approval prior to final plans and specifications for managed vegetation. The schedule and techniques shall be approved by the District prior to initiating construction of managed vegetation required to achieve the performance standards specified in the 2003 Revised SIP, in order to ensure conformance with the project description.

III.B Biological Resources

Significant Impacts:

Implementation of the project would potentially result in impacts to biological resources related to sensitive habitats and federally protected wetlands.

Implementation of the project would potentially result in impacts to biological resources related to special status biological resources.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to biological resources.

Facts:

Incorporation of the mitigation measures described in Section 3.2.7 would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Bio-1 To minimize potential direct impacts to western snowy plover from construction activities in the areas specified in the 2003 SIP revision to below the level of significance, the LADWP shall institute a lake bed worker education program. The program shall mirror the program instituted for workers for the 1997 EIR and shall focus on western snowy plover identification, basic biology and natural history, alarm behavior of the snowy plover, and applicable mitigation procedures required of the LADWP and construction personnel. The program shall be conducted by a biologist familiar with the biology of the western snowy plover at Owens Lake and familiar with special status plant and wildlife species of the Owens Lake basin. The biologist shall be approved by the District prior to implementation of the education program. The qualifications of the biologist shall be submitted to CDFG for review. The education program shall be based on the 1997 program EIR and shall include relevant updates by the biologist. The education program shall explain the need for the speed limit in the snowy plover buffer areas and the identification and meaning of buffer markers. All construction, operation, and maintenance personnel working within the project area shall complete the program prior to their working on the lake bed. A list of existing personnel who have completed the program shall be submitted to the District prior to the start of any work on the lake bed. A list of new personnel who have participated and completed the education program shall be submitted monthly to the District. A copy of the worker education program shall be provided to CDFG.

Measure Bio-2 To minimize potential direct impacts to western snowy plover within the project area due to construction activities in the areas specified in the 2003 SIP revision, the LADWP shall conduct a preconstruction survey for western snowy plover in all potential snowy plover habitat prior to any construction activity that is performed during the snowy plover breeding season (March 15 to August 15). Preconstruction surveys will be performed no more than seven days prior to the start of ground-disturbing activities. The LADWP shall place a 200-foot buffer around all active snowy plover nests that are discovered within the construction area. Green-colored stakes of less than 60 inches in height with yellow flagging will be used to mark buffer edges, with stakes spaced at eight approximately equidistant locations. The location of the nest (GPS coordinates) and current status of the nest shall be reported within 24 hours of discovery to the District. Maps of snowy plover nest locations shall be posted at the construction office and made available to all site personnel and District staff. The activity of the nest shall be monitored by a biological monitor approved by the District, as per existing guidelines for the North Sand Sheet and Southern Zones dust control projects and any revisions to the monitoring protocol that have been approved by CDFG.[1] Active snowy plover nests shall be monitored at least weekly. The qualifications of the biological monitor will be submitted to CDFG for review. The nest buffer shall remain in place until such time as the biological monitor determines that the nest is no longer active and that fledglings are no longer in danger from proposed construction or maintenance activities in the area. Buffers shall be more densely marked where they intersect project-maintained roads. Vehicles shall be allowed to pass through nest buffers on maintained roads at speeds less than 15 miles per hour, but shall not be allowed to stop or park within active nest buffers. Permitted activity within the nest buffer shall be limited to foot crews working with hand tools and shall be limited to 15-minute intervals, at least one hour apart, within a nest buffer at any one time. Compliance with this mitigation measure shall be confirmed by the District through issuance of a weekly written report by LADWP to the District.

Measure Bio-3 To minimize potential direct and cumulative impacts to western snowy plover and other sensitive biological resources from vehicles associated with construction activities in the areas specified in the 2003 SIP revision, the LADWP shall implement a speed limit within all active construction areas on Owens Lake during construction of dust control measures. Speed limits shall be 15 miles per hour within active snowy plover nest buffers. As specified in measure Bio-2, vehicles can only pass through active nest buffers and shall not be parked within active nest buffers. Designated speed limits for other construction areas outside of active nest buffers shall be maintained at the maximum speed that is determined to be safe according to vehicle capabilities, weather conditions, and road conditions. Site personnel and District staff shall be informed daily of locations where active nest buffers overlap with roads in the construction area. Signs shall be posted that clearly state required speed limits. The number of speed limit signs shall be kept at a minimum to reduce potential perches for raptors

[1] City of Los Angeles Department of Water and Power, 1 November 2002b. Environmental Impact Report and Environmental Impact Statement Lower Owens River Project. Contact: LADWP, 300 Mandich Street, Bishop, CA 93514.

and other snowy plover predators and shall be outfitted with Nixalite or the functional equivalent if greater than 60 inches in height. Contractor education seminars as described in measure Bio-1 shall clearly explain the need for speed limits within the project area and the consequences for noncompliance. Compliance with this mitigation measure shall be confirmed by the District through issuance of a summary written report by LADWP to the District after completion of the education seminar and posting of speed limits. A copy of the summary report shall be provided to CDFG.

Measure Bio-4 To minimize potential direct impacts to the sensitive upland bird species (loggerhead shrike, northern harrier, burrowing owl, and Le Conte's thrasher) found within the project area due to construction activities in the areas specified in the 2003 SIP revision, any upland vegetation brushing or clearing required for construction shall be conducted outside of the breeding season for Le Conte's thrasher and loggerhead shrike (March 15 to August 15) and for northern harrier and burrowing owl (January 15 to July 15). Burrowing owl surveys will follow current CDFG Phase II burrow survey protocols. If brushing or other ground-disturbing construction activity is required between January 15 and August 15, a preconstruction survey shall be performed by a qualified biologist familiar with the special-status bird species within the project area. The survey will be performed no more than seven days prior to the start of ground-disturbing activities. If an active nest or burrow being used as a nest site is found within 200 feet of proposed construction, the biologist shall flag mark a 200-foot buffer around the active nest or burrow, using the flag and stake coloring and placement pattern used for marking snowy plover nests (see measure Bio-3). Construction cannot proceed within this 200-foot buffer until the biologist determines that the nest is no longer active (i.e., the nest has been abandoned, or the fledglings have been out of the nest for 14 days), or owl nestlings are leaving the burrow on their own, or unless specifically authorized by the CDFG. The activity of the nest shall be monitored as per existing guidelines for the North Sand Sheet and Southern Zones dust control projects and any revisions to the monitoring protocol that have been approved by CDFG. The District and all lake bed workers shall be notified within 24 hours of finding any nest, with location (GPS coordinates), nest status, and buffer marker status provided. The District and all lake bed workers shall be updated weekly as to the current status of all nests. The fate of each active nest shall be documented in a written report that shall be submitted by the monitoring biologist to the District, the State Lands Commission, and the CDFG within 14 days after the biologist's determination that the nest is no longer active. Proof of compliance with this mitigation measure shall be performed by providing a copy of the monitoring report to the District, the State Lands Commission, and the CDFG.

Measure Bio-5 To minimize potential direct and cumulative impacts to burrowing owls associated with dust control measures in the areas specified in the 2003 SIP revision and the 1998 SIP, the LADWP and its representative construction companies shall cover and maintain all pipe openings or other artificial structures suitable for burrow creation greater than 4 inches and less than 12 inches in diameter within the entire combined project area with screening or other material to prevent the use of pipes or structures by burrowing owls. Use of screening shall be limited to pipe that is stored within the project area for at least two weeks without being used for construction activities or for openings suitable for burrowing owl use that remain after construction is complete. Screening or other suitable covering will be required for applicable pipe at ground level up to 5 feet above the ground. Any inactive pipe stacked higher than 5 feet above the ground does not require screening. Proof of compliance with this mitigation measure shall be sent to the District and CDFG in the form of monthly written reports.

Measure Bio-6 To minimize indirect impacts to nesting bird species associated with project lighting during construction activities in the areas specified in the 2003 SIP revision, the LADWP shall institute all best management practices to minimize lighting impacts on nocturnal wildlife. Previous construction has occurred during nighttime hours to complete construction schedules and to prevent personnel from working during times of high temperatures. If night work is deemed necessary, then construction crews shall make every effort to shield lighting on equipment downward and away from natural vegetation communities or playa areas, and especially away from known nesting areas for snowy plovers during the nesting season (March to August). All lighting on existing and newly built facilities shall be minimized to the greatest extent possible, while still being in compliance with all applicable safety requirements. Required lighting shall be shielded so that light is directed downward and away from vegetation or playa areas. Proof of compliance with this mitigation measure shall be confirmed by the District, and a copy of the compliance record shall be provided to CDFG.

Measure Bio-7 To minimize the potential direct impacts to nonemissive wetland and upland scrub vegetation communities from construction activities in the areas specified in the 2003 SIP revision to below the level of significance, the LADWP shall clearly mark all nonemissive wetland areas and upland scrub communities in the proposed dust control areas and within 50 feet of the boundary of dust control areas to prevent construction activity from impacting these vegetation communities. Nonemissive areas shall be marked using stakes less than 60 inches high, spaced 10 feet apart, along the edges of spring mounds, and spaced 100 feet apart along other vegetated edges. Marking shall occur prior to the initiation of construction activities. GIS mapping of nonemissive vegetation limits shall be provided to the contractor during the bidding process. Construction buffer areas outside of the dust control boundaries shall be reduced as required to prevent construction activities from impacting adjacent vegetated areas. No temporary or permanent access routes through vegetated areas will be established, except those specified in the Project Description. Incursions into established vegetated areas that cause measurable loss of plant cover will require revegetation with suitable local, native plant species. Proof of compliance with this mitigation measure shall be verified by submitting a written report to the District and CDFG detailing the type and locations of delineated wetland and upland areas. This report shall be submitted prior to the start of construction activities. The mitigation plan must contain a schedule and protocol for achieving revegetation within two years of any impacts to vegetation caused by access routes or construction activities outside the areas specified in the Project Description.

Measure Bio-8 To minimize direct impacts to emissive transmontane alkaline meadow (TAM) wetland communities caused by installation of dust control measures as specified in the 2003 SIP revision on emissive TAM to below the level of significance, the LADWP shall institute a wetland mitigation program prior to the initiation of construction activities. The program shall be designed to emphasize restoration of equivalent functions and values of wetlands within the project area as compared to preproject impacts. The wetlands mitigation program will include mitigation goals, target success criteria, an implementation plan, plant species and spacing, irrigation design, monitoring activities, and maintenance requirements. Managed vegetation is deemed to have equivalent functions and values to dry TAM that would be impacted by the project at a ratio of 2 acres of managed vegetation created for every 1 acre of dry TAM impacted. The project calls for creation of approximately 1,678 acres of managed vegetation. An estimated 102.47 acres of dry TAM are anticipated to be impacted by the project. The creation-to-impact ratio for the project would be approximately 16:1. A managed vegetation area of at least 205 acres shall be designated as the wetland mitigation area within the prescribed managed vegetation areas as proposed in the project description. LADWP shall designate the wetland mitigation area in a managed vegetation area that is either directly adjacent to, or in near proximity to, existing natural TAM areas. Examples of potential wetland mitigation areas would be within areas 18 and 19 as shown in Figure 2.3-7 of the Draft EIR. A design for the designated wetland mitigation area shall be provided to the District for approval prior to construction of any managed vegetation. A copy of the map shall be provided to CDFG and the State Lands Commission.

A TAM management plan shall be created by LADWP to monitor the designated wetland mitigation areas for appropriate coverage of native species, for change in extent of TAM over a five-year period postconstruction, and to conduct weed abatement in wetland areas in and within 500 feet of the project area. The management plan shall monitor wetland mitigation areas for five years postconstruction with specific goals for native plant species coverage and management of invasive, nonnative plant species. The TAM management plan shall be approved by the District prior to the initiation of construction activities. A copy of the management plan and subsequent monitoring reports shall be provided to CDFG and to the State Lands Commission.

Calculations of dry TAM impacts from implementation of the project are estimates based on the mapped extent of TAM areas within the project area and a determination of whether an area is emissive or nonemissive based on dust monitoring data. The total acreage of wetland mitigation for dry TAM shall be two times the actual direct and indirect impact area caused to dry TAM by both construction and postconstruction activities. If any unanticipated direct or indirect postconstruction impacts to moist or saturated TAM communities occur as a result of project construction or operation, LADWP would be required to designate additional wetland mitigation areas and incorporate design parameters that would result in the replacement of equivalent functions and values to the impacted moist or saturated TAM wetlands within two years of the initiation of the replacement effort. Significant impacts would include loss of vegetative cover due to ground disturbance or change in species composition attributable to drying of springs or ponds, which does not self-repair within two years of detection. Managed vegetation would not be suitable mitigation for impacts to moist or saturated TAM communities.

In addition to mitigating impacts to wetlands caused by the project, LADWP shall fully compensate for the loss of 121 acres of TAM associated with implementation and operation of dust control measures mandated under the 1998 SIP. These impacts were predicted in the EIR and EIR Addendum associated with the 1998 SIP, but have yet to be mitigated by the LADWP. The 121 acres of wetland mitigation specified in the 1998 SIP may be adjusted to reflect the actual immediate or predicted long-term area of impact, if it is demonstrated to the satisfaction of the District and the U.S. Army Corps of Engineers that there has been a change in the acreage impacted (more or less than 121 acres). LADWP shall compensate for all loss of TAM that occurs.

Mitigation for impacts to all TAM associated with construction and operation of dust control measures constructed between 1998 and 2003 (prior to the project) will be replaced at a ratio of 1 acre of wetland replacement for every acre of wetland impact (1:1 replacement ratio). Replacement wetlands will consist of similar habitat function and values as the wetland that is lost.

All wetland replacement described in this mitigation measure shall be approved by the District and the U.S. Army Corps of Engineers, and will be constructed and fully functional prior to December 31, 2006.

Measure Bio-9 To avoid direct and cumulative impacts to native wildlife communities that may potentially result from bioaccumulation of toxic substances resulting from construction in the areas specified in the 2003 SIP revision and the 1998 SIP from naturally occurring heavy metals and other potential toxins in lake bed deposits to below the level of significance, the LADWP shall implement a toxicity monitoring program to investigate the potential of bioaccumulation of heavy metals and other potential toxins in wildlife from feeding in dust control areas throughout the Owens Lake dry lake bed. A copy of the long-term monitoring program shall be submitted to the District prior to the start of any construction. Monitoring shall take place in all dust control areas within the Owens Lake as well as at all spring and outflow areas within 500 feet of the construction boundaries. The purpose of the monitoring program shall be to determine if bioaccumulation of toxins is occurring within native wildlife populations. Procedures for bioaccumulation monitoring shall follow existing permits issued by the Lahontan Water Quality Control Board (LWQCB) and any subsequent water quality monitoring requirements deemed necessary by the LWQCB.

All monitoring shall be conducted by individuals familiar with the native wildlife species of the Owens Lake dry lake bed. Monitoring personnel shall be approved by the District prior to implementation of the long-term monitoring. The monitoring plan shall include adaptive management procedures and mitigation procedures to follow in the instance that signs of toxicity do develop in native wildlife populations that are attributable to the Dust Control Mitigation Program. Management procedures would be implemented depending on the type and extent of impact that was observed and could potentially, but not necessarily, include covering of dust control areas to prevent wildlife utilization, hazing of wildlife to prevent utilization of dust control areas, or any other appropriate measures. Any adaptive management measures that would potentially be implemented shall be approved by the District, the CDFG, and the State Lands Commission prior to implementation.

The monitoring shall be conducted as described in Table Bio-9, *Postconstruction Bioaccumulation Monitoring Schedule*. Monitoring shall be conducted on a semiannual basis (two times per year) during each year that monitoring is conducted. If, after the completion of the 14-year monitoring schedule as described in measure Bio-9, it is determined that there is no evidence of toxicity issues in native wildlife populations, then the monitoring program may be discontinued. If monitoring determines that impacts to native wildlife species are occurring, then the monitoring shall continue on a semiannual basis in every year until significant impacts are not detected, and the monitoring sequence shown in Table Bio-9 shall resume at the Year 3 monitoring event and shall continue at the intervals shown in Table Bio-9. Written monitoring reports shall be provided to the District, CDFG, LWQCB, and the State Lands Commission by the approved biological monitor within four months following the end of the monitoring year. Any changes in the existing monitoring requirements by the RWQCB shall be included into this mitigation measure.

TABLE BIO-9
POSTCONSTRUCTION BIOACCUMULATION MONITORING SCHEDULE

Year 1 monitoring event	Year 2 monitoring event	Year 3 monitoring event	Year 4 monitoring event
2007	2008	2009	2010
Year 5 monitoring event	Year 6 monitoring event	Year 9 monitoring event	Year 14 monitoring event
2011	2013	2015	2020

Measure Bio-10 To minimize indirect impacts to native vegetation communities that may result from the project construction and operations in the areas specified in the 2003 SIP revision and 1998 SIP and to prevent creating an environment for weedy plant species to become established in native plant communities, the LADWP shall implement an ongoing and continuous exotic pest plant control program within the designated dust control areas after full build-out of the project (December 31, 2006). The spread of exotic, invasive plant species, such as salt cedar (*Tamarix* spp.), has detrimental effects on habitat quality for native plant and wildlife species and, in the case of species like salt cedar, can reduce the availability and quality of water within native vegetation areas for plant and wildlife species. The goals of the program shall be consistent with the goals specified in the County of Inyo General Plan[2] and the U.S. Fish and Wildlife Service Owens Basin Wetland and Aquatic Species Recovery Plan[3] for the portion of the Recovery Plan included within the project area. The program shall be written by a pest management specialist or other person familiar with exotic plant species management and shall be submitted to the District no later than December 31, 2006. Measures for control shall include all best management practices involving prudent and safe use of control measures such as herbicides, brushing, direct weed removal, and other control measures. The program shall include yearly monitoring to ensure that exotic plant species are being sufficiently controlled. The exotic plant species control program shall be submitted to and approved by the District and the State Lands Commission prior to the initiation of exotic

[2] County of Inyo Planning Department, July 2002c. *County of Inyo General Plan Update*. Contact: 168 North Edwards Street, Post Office Drawer L, Independence, CA 93526. Prepared by: Jones and Stokes, BRW, Mintier &Associates, and Applied Development Economics.

[3] U.S. Fish and Wildlife Service, 1998. *Owens Basin Wetland and Aquatic Species Recovery Plan, Inyo and Mono Counties, California*. Portland, OR: U.S. Fish and Wildlife Service.

plant control activities. Annual written monitoring reports documenting exotic plant location, type, pretreatment abundance, control type used, and control efficacy shall be delivered to the District within four months following the end of each calendar year. A copy of the control program and resulting monitoring reports shall be provided to the State Lands Commission and to the CDFG.

Measure Bio-11 To minimize potential direct, indirect, and cumulative impacts to western snowy plover resulting from required maintenance within shallow flood dust control areas as specified by the 2003 SIP revision and the 1998 SIP during the western snowy plover breeding season (March to August), foot crews and all-terrain vehicles (ATVs) that must enter shallow flood panels within the entire Owens Lake dry lake bed during the snowy plover breeding season shall be briefed in plover identification, nest identification, and adult alarm behavior, and the identification and meaning of buffer markers. Crews shall receive this training from a biologist knowledgeable in western snowy plover biology at Owens Lake as part of the contractor education program as described in measure Bio-1. The qualifications of the biological monitor shall be submitted to CDFG for review. Maintenance crews shall utilize hand tools and ATVs only to conduct maintenance activities during this time period in shallow flood panels where snowy plovers may be present. Crews shall remain within 20 feet of existing panel infrastructure at all times to minimize disturbance of playa areas. Crews shall minimize time within the shallow flood areas to the greatest extent possible. If crews are working within an active nest buffer, they shall be limited to 15 minutes out of every hour within the buffer. If an unanticipated take to western snowy plovers or an active snowy plover nest occurs during any maintenance activities, a project biologist shall document the impact and report the incident to the District and CDFG within 48 hours of the event. A take in this case would be defined as a mortality to adults, chicks, or fledglings, or a modification in adults' behavior due to human pressure that results in a loss of a nest and its contents. Proof of compliance with this mitigation measure shall be verified by submitting copies of any incident reports to the District, the State Lands Commission, and the CDFG.

Emergency repair activities are exempt from the requirements of this provision. An emergency is defined in the State CEQA Guidelines, Section 15269, as "a sudden, unexpected occurrence that presents a clear and imminent danger, demanding action to prevent or mitigate loss of or damage to life, health, property, or essential public services." Emergency repairs as defined under the 2003 SIP revision and the 1998 SIP are further defined as those repairs that must be completed immediately to protect human health and safety, ensure the project is in compliance with required air quality standards, or protect project infrastructure from significant and immediate damage that could result in the failure of a dust control measure to maintain compliance with required air quality standards. In the event that an emergency repair must be performed on a shallow flood panel during the snowy plover breeding season, a qualified biological monitor shall be present on site during the duration of the repair activity to document any impacts to western snowy plover adults, juveniles, or active nests. The District and CDFG shall be notified within 24 hours of the start of all emergency repair activities. A copy of the biological monitor's written report shall be provided to the District and CDFG within 48 hours of completion of the emergency repair activity. Any appropriate mitigation that may be required from impacts to western snowy plovers shall be negotiated between LADWP and CDFG based on the report provided by the biological monitor. A copy of the negotiated agreement between LADWP and CDFG shall be provided to the District.

Measure Bio-12 To minimize potential direct, indirect, and cumulative impacts resulting from operation and maintenance of dust control measures in the areas specified in the 2003 SIP revision and 1998 SIP to western snowy plover, the LADWP shall implement a long-term snowy plover population monitoring program for the entire Owens Lake dry lake bed. Postconstruction surveys shall be conducted 1, 2, 3, 4, 5, 7, 9, and 14 years after full build-out of all construction specified under the 2003 SIP revision and the 1998 SIP. The final western snowy plover monitoring schedule for all DCM measures on Owens Lake dry lake bed shall be coordinated so that long-term monitoring for all DCMs covered within this document, as well as for preceding environmental documents for the North Sand Sheet and the Southern Zones, are conducted simultaneously. The long-term monitoring shall begin in 2007, or at such time that full build-out is completed. The goals of the monitoring are to confirm that overall numbers of snowy plovers within the dust control areas do not decrease due to implementation of the 2003 SIP relative to baseline plover population numbers prior to implementation of the 2003 SIP as shown by the 2002 plover report for Owens Lake, which found the population to be 272 plovers.[4] Monitoring shall be conducted by a qualified biologist familiar with the natural history and habitat requirements of western snowy plovers within the Owens Lake basin. The qualifications of the biological monitor shall be submitted to the CDFG for review. The monitoring methodology shall be consistent with the methodology used for the Owens Lake 2002 plover surveys. Annual summary reports for the monitoring efforts shall be filed with the District, the State Lands Commission, and CDFG by December 31 of each monitoring year.

The District shall require adaptive management changes to operation and maintenance of DCMs if it determines that a decline in snowy plover numbers is occurring that is directly attributable to operation or maintenance procedures of the Owens Lake Dust Mitigation Program. The District shall consult with the LADWP, State Lands Commission, and CDFG prior to implementing adaptive management changes. At the time that adaptive management changes are implemented, monitoring shall continue for a minimum of five years after implementation of adaptive management procedures to ensure that the procedures are having the desired effect on the lakewide snowy plover population.

If after the Year 5 monitoring event, but no earlier than 2012, it is determined that no adverse impacts to the western snowy plover population at Owens Lake are occurring as a result of the project, then the long-term monitoring program and subsequent reporting shall be discontinued. Specified calendar years for conducting lakewide plover population surveys are provided in Table Bio-12. Proof of compliance with this mitigation measure shall be through issuance of a written monitoring summary report for each monitoring year specified in Table Bio-12, *Postconstruction Lakewide Plover Population Monitoring Schedule*. Reports shall be submitted to the District by December 31 of each monitoring year. The report will document

[4] CH2MHill, 2002. *Summary of Surveys for Snowy Plovers at Owens Lake, March 1 through April 30, 2002*. Prepared by: Point Reyes Bird Observatory (Ruhlen and Page), 4990 Shoreline Highway, Stinson Beach, CA 94970.

survey locations and dates, the number of plovers observed, and an estimate of the total plover population. A copy of the yearly summary reports shall be provided to the CDFG.

TABLE BIO-12
POSTCONSTRUCTION LAKEWIDE PLOVER POPULATION MONITORING SCHEDULE

Year 1 monitoring event	Year 2 monitoring event	Year 3 monitoring event	Year 4 monitoring event
2007	2008	2009	2010
Year 5 monitoring event	Year 7 monitoring event	Year 9 monitoring event	Year 14 monitoring event
2011	2013	2015	2020

Measure Bio-13 To reduce potential direct and cumulative impacts to western snowy plover and other migratory shorebirds within the project area due to increased predation on shorebird young and eggs from potential corvid population increases on Owens Lake resulting from construction of dust control measures specified in the 2003 SIP revision and 1998 SIP, the LADWP shall continuously implement a corvid management plan within the project area. Components of the corvid management plan shall include lake bed trash management procedures associated with dust control measures, utilization of Nixalite or the functional equivalent on all structures greater than 60 inches in height to minimize perching of corvids and raptor species on dust control equipment where they can easily observe shorebirds during the nesting season, burial of power and communication lines on all lake bed areas below the elevation of 3,600 feet, and use of harassment techniques for corvids in specific instances where corvids are proving to be particularly harmful to nesting shorebirds. The corvid management plan shall be prepared and implemented by a wildlife biologist familiar with the sensitive shorebird populations within the project area and familiar with corvid management techniques. The qualifications of the wildlife biologist shall be submitted to CDFG for review. Lethal methods of corvid control such as shooting or poisoning shall not be implemented initially due to public and government agency concerns in the project region for such control methods and to prevent putting workers at risk from such control measures. If it is later determined that corvids are having a significant impact on shorebird populations within the project area and direct removal of corvids is a viable alternative, proposed control methods would be presented to the District and CDFG for approval prior to implementation of the additional control measures. The corvid management plan shall include a yearly written report estimating the lake bed nesting and foraging corvid population size, documenting the results of the corvid management techniques, documenting the observed effectiveness of the techniques in minimizing corvid impacts on shorebirds within the lake bed, and any suggestions for improving corvid management within the lake bed. A copy of the corvid management plan shall be submitted to and approved by CDFG, the State Lands Commission, and the District prior to implementation of the plan. Copies of the yearly reports shall be submitted to the District and CDFG no later than December 31 of each corvid management year. If after five years of reporting, the District determines that the corvid management program is effective, and corvids are not impacting snowy plover populations, then the reporting schedule shall phase out in the same time frame as shown in Table Bio-12. However, the corvid management practices shall continue to be continuously implemented.

Measure Bio-14 To minimize potential direct and cumulative impacts to nesting western snowy plover from shutdown of all shallow flood panels constructed as a result of the 2003 SIP revision and 1998 SIP on June 30, a habitat management program shall be implemented by the LADWP on all Owens Lake dry lake bed shallow flood areas to mimic the natural summer drying of seeps and springs in the area. Each year shallow flood lateral lines shall be slowly turned off from July 1 to July 21 to allow snowy plover broods to complete their nesting cycle. Consult Figure 3.2.6-1, *Conceptual Owens Lake Operational Calendar*, and Figure 3.2.6-2, *Shallow Flooding Management for the Month of July*, for a conceptual picture of shallow flood panel operation. LADWP has the option of surveying within 0.5 mile of shallow flooding areas for snowy plovers, and if active snowy plover nests or young are not present on or within a 0.5-mile radius of shallow flooding areas, then the habitat flows described above would not be needed in those areas and those shallow flood panels may be shutdown as LADWP determines to be necessary. A final operations plan detailing the drying operations shall be submitted to the District for approval, and a copy shall be provided to CDFG prior to startup of new shallow flood operations.

III.C Cultural Resources

Significant Impacts:

Implementation of the project would potentially result in impacts related to cultural resources.

Implementation of the project would potentially result in impacts related to 13 recorded sites within the project location that have the potential to constitute significant archaeological or historical resources.

Implementation of the project would potentially result in impacts related to unknown paleontological resources within the project site.

Implementation of the project would potentially result in impacts related to currently unknown archaeological and historic resources within the project site.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to cultural resources.

Facts:

Incorporation of the mitigation measures described in Section 3.3.6 would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Cul-1 The City of Los Angeles Department of Water and Power (LADWP) shall ensure that direct impacts to the 22 newly recorded archaeological sites and 33 isolated artifacts within the Area of Potential Effect (APE) of the Revised 2003 SIP are minimized to below the level of significance prior to the initiation of grading in those areas that contain sites and isolated artifacts within the sequence T-1 through T-33. Prior to the initiation of grading in those areas, the LADWP shall complete Phase II investigations and make a determination of significance for sites within the sequence T-1 through T-33. A Phase II evaluation program is recommended for all the prehistoric archaeological sites and isolated artifacts that have been identified as a result of the Phase I Survey undertaken in support of this EIR. Monitors from Owens Valley Native American Tribes shall be present at all Phase II investigations. This program would include:

- Mapping and systematic collection of surface artifacts
- Subsurface investigation through shovel test pits, surface scrapes, controlled 1 × 1 m units, or a combination of such methods
- Analysis of recovered material
- Preparation of a report, including evaluation of site significance and recommendations for mitigation, if appropriate
- Full data recovery before grading

Of the 22 archaeological sites within the project area, 7 have been identified by Ancient Enterprises as being located on BLM land. Should any additionally identified sites, prior to the implementation of Phase II, be determined to extend onto BLM property, coordination with the BLM shall be required to mitigate impacts consistent with BLM's adopted standards for the mitigation of archaeological sites that occur on BLM-owned land. Coordination shall include, but not be limited to: (1) BLM approval, with 90-day lead time, of District-administered testing and data recovery program; and (2) a qualified archaeologist must obtain a valid BLM permit prior to the implementation of the BLM- approved Phase II testing and data recovery program. The Phase II Data Recovery Program for these sites shall follow the BLM procedures and timeline and be completed concurrently with the other identified archaeological sites. If mitigation is required for sites on BLM land, it shall be necessary to follow the consultation procedures prescribed by the NHPA and 36 CFR 800.

The results of the Phase II Data Recovery Program shall be detailed in a draft report and submitted to the District for review within three months of the completion of the Phase II Data Recovery Program. The LADWP shall respond to the comments of the District and the property owner and submit a final report for the District, the property owner, and the appropriate Archaeological Information Center.

Those sites that are determined to be eligible for listing in the National Register of Historic Places or the California Register of Historical Resources shall be treated in accordance with one of the three feasible measures described in the "CEQA and Archaeological Resources," *CEQA Technical Advice Series*: capping or covering the site with a level of soil prior to construction over the site, incorporation into open space areas of the project site, or excavation and Phase II Data Recovery Program where the first two measures are not feasible. Prior to issuance of a Notice to Proceed for construction, LADWP shall submit the written results of the Phase II Data

Recovery Program for the 22 archaeological sites and 33 isolated artifacts, identified in the numerical sequence T-1 through T-33, to the District. For those sites determined to be eligible for listing in the National Register of Historic Places or the California Register of Historic Resources, the LADWP, prior to the issuance of a Notice to Proceed for construction activities in the quarter section (referring to the identified 7.5' quadrant map) in which the eligible site is located, shall submit, in writing, the applicable treatment plan to the property owner and the District. Owens Valley Native American Tribes shall be consulted during the development of all treatments plans. The treatment plans shall consist of the following:

- Plans and specifications for capping or covering the site with a level of soil
- Plans and specifications for the incorporation of the site into an open space area of the project site
- Preparation of a research design and data recovery plan and language specifying the deposition and curation of any artifacts collected
- Report and research design shall be submitted to the appropriate Archaeological Information Center, curation facility, and the specified information repository that will be handling the curation of archaeological resources.

In the event that the qualified archaeologist, who meets the Secretary of the Interior Standards of Qualification, determines that archaeological resources must be removed during any archaeological reconnaissance or monitoring, the ultimate deposition of the artifacts shall be specified in the Phase III Research Program. Any proposed Phase III Research Program must go through the same process as the Phase II Data Recovery Program specified above, including Native American participation.

Measure Cul-2 This measure applies to the construction in Dust Control Area 18 as shown on Figure 2.3-10 (2003 SIP Impact Area). The impact to cultural resources related directly to the destruction of a unique paleontological resource during implementation of the Revised 2003 SIP shall be reduced to below the level of significance through selective monitoring and the salvage of paleontological resources. The LADWP shall undertake the implementation of a salvage program for all ground-disturbing activities taking place on the lake bed within Dust Control Area 18, which is within 1 mile of the historic shoreline specified along the edge of the playa near Swansea (SIP DCM Area 18). Due to the deflation of sand and sediment, Pleistocene mammalian fossils are visible on the playa surface (Figure 3.3.2-1).

Prior to final plans and specifications, the LADWP shall review the plans to determine if there are any anticipated ground-disturbing activities on the lake bed within 1 mile of the historic shoreline along the edge of the playa near Swansea, within the area surveyed for paleontological resources (see Figure 3.3.2-1). Ground-disturbing activities include, but are not limited to, drilling, excavation, trenching, and grading. Where any such activity is anticipated in conjunction with the work specified in the Revised 2003 SIP, the District shall require that LADWP shall inform the contractor of the minimum requirements of the Paleontological Resource Management Program (PRMP), which will implement monitoring procedures as well as a salvage and recovery program near Swansea where previous surveys have observed and identified fossils. The following requirements shall be duly noted in the plans and specifications:

- **Retain a Qualified Paleontologist.** A qualified paleontologist shall meet the following criteria:

    - Has demonstrated formal education in the discipline of paleontology, preferably at the graduate level
    - Has demonstrated experience in the monitoring, identifying, and collection of vertebrate and invertebrate Pleistocene fauna

    The qualified paleontologist shall be retained to prepare an PRMP, which addresses discovery and recovery procedures, and implementation of the salvage and recovery program.

- **Preconstruction Briefing.** The selected paleontologist shall attend a preconstruction briefing to provide information regarding regulatory requirements for the protection of paleontological resources. Construction personnel shall be briefed on the role of the paleontological monitor and procedures to be followed in the event that a fossil site or fossil occurrence is encountered during construction. An information package shall be developed by the project paleontologist and, subsequent to review by LADWP, provided for construction personnel not present at the initial preconstruction briefing. The paleontologist shall be required to provide a telephone number where he or she can be reached by the construction inspector or construction contractor should a discovery arise.

- **Construction Monitoring, Discovery, and Recovery.** Full-time paleontological monitoring of the entire project site shall not be necessary. However, ground disturbance and excavation on the eastern edge of the playa may impact sediments that, based on prior survey results, contain paleontological resources (see Figure 3.3.2-1). Paleontological monitoring of ground disturbance shall therefore occur within that area as specified by the PRMP. Collections of fossils that would otherwise be impacted shall be performed by a qualified vertebrate paleontological monitor. The paleontological monitor should be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments that are likely to contain the remains of fossil vertebrates.

    Monitoring of ground disturbance to the eastern edge of the playa near Swansea shall consist of the surface collection of visible vertebrate and invertebrate fossils along the area of impact specified along the eastern edge of the playa (see Figure 3.3.2-1) by a qualified paleontological monitor as specified in the PRMP. If recovery of a large or unusually productive fossil occurrence is warranted, earthmoving activities shall be diverted temporarily around the fossil locality and a recovery crew shall be mobilized to remove the material as quickly as possible. The paleontological monitor will be permitted to photograph and/or draw stratigraphic profiles of exposed surfaces and take samples for analysis of microfossils, dating, or other specified purposes according to the research design. Recovery will include the removal of samples of sediments that are likely to contain the remains of small fossil vertebrates.

- **Curation.** Recovered specimens shall be prepared to a point of identification, and bulk sediment samples, if collected, shall be washed to recover smaller fossil remains. According to the specifications of the PRMP, if the excavation reveals a fossil, the paleontologist shall be expected to divert the equipment and recover/salvage the fossil. Similarly, if microfossils are revealed during the washing of sediments, a sample shall be washed at a location established on the project site. If a test results in significant fossils, then the monitor shall request the backhoe to excavate and stockpile the selected sediments to a maximum of 60 cubic feet of loose sediment total so the project can continue. The sediment would be washed on days when monitoring is not required. The PRMP shall specify the amount of sediment to be removed, should it be shown through field testing to contain fossils. Specimens shall be identified and curated into a museum repository, as specified, with retrievable storage. Full-time paleontological monitoring of the project area shall not be necessary.

- **Monitoring Report.** Daily logs shall be kept by the qualified paleontologist during recovery activities and shall be submitted monthly to LADWP and the District. A complete set of the daily monitoring logs shall be kept on site throughout the earthmoving activities and be available for inspection. The daily monitoring log shall be keyed to a location map to indicate the area monitored, the date, assigned personnel, and the results. Should a discovery occur, information that will be collected includes the nature of discovery and stratigraphic unit. Within 90 days of the completion of the paleontological monitoring, the mitigation report shall be submitted to the LADWP and the District with an appended, itemized inventory of the specimens. The report and inventory, when submitted to the LADWP and the District, signify the completion of the program to mitigate impacts to paleontological resources.

- **Agreement for Disposition of Recovered Fossils.** The selected paleontologist shall be required to negotiate a written curation agreement with a recognized museum repository, such as the University of California at Berkeley or the Natural History Museum of Los Angeles County, regarding the final disposition and permanent storage and maintenance of any significant fossil remains and associated data on the specimen and its corresponding geologic and geographic setting that might be recovered as a result of discovery during the monitoring program. The selected museum would be equipped to support the completion of treatment and adequately curate the recovered specimens. The specimens may be loaned to the local Eastern California Museum for display. The fossils recovered shall be curated at the Natural History Museum of Los Angeles County, which may be loaned to the Eastern California museum, which was chosen for its exhibits on area history, anthropology, botany, and geology,[5] thereby providing the local community with the opportunity to view paleontological resources of scientific value from the Owens Valley. The written agreement shall specify the level of treatment (preparation, identification, curation, and cataloging) required and be subject to review by LADWP, before the fossil collection would be accepted for storage. In addition, a technical report shall be completed.

- **Laboratory Analysis.** All significant fossil specimens recovered from the project site as a result of the paleontological mitigation program shall be treated (prepared, identified, curated, and cataloged) in accordance with designated museum repository requirements. Samples shall be submitted to a laboratory, acceptable to the selected museum for identification, dating, and microfossil and pollen analysis.

Proof of compliance with mitigation measures shall be provided to the District in writing by LADWP at least 15 days prior to the initiation of construction activities.

Measure Cul-3 The impact to cultural resources related directly to the destruction of unrecorded archaeological resources from the work specified in the Revised 2003 SIP shall be reduced to below the level of significance through the recovery or treatment of any archaeological resources encountered during construction monitoring should any unrecorded archaeological sites be encountered during mitigation monitoring activities. LADWP shall specify in the Plans and Specifications that a qualified archaeologist shall be required to monitor all ground-disturbing activities required, that is, associated with work specified in the Revised 2003 SIP. Specifically, the LADWP shall be responsible for implementation of a construction monitoring program that meets the minimum scientific standards. Where one of the respective elements of the project is expected to require earthmoving in soils at depths of up to 5 feet below the existing surface, LADWP shall require that the following program be implemented and that the requirement be duly noted in the plans and specifications:

- **Retain a Qualified Archaeologist.** A qualified archaeologist who meets the Secretary of the Interior's definition as a qualified archaeologist shall be retained to implement a monitoring and recovery program in any area identified as having the potential to contain unique archaeological resources. The qualified archaeologist shall coordinate with local tribes regarding the recovery of archaeological resources. Specifically, the LADWP shall be responsible for implementation of a construction monitoring program that meets the minimum specified standards.

- **Retain a Native American Monitor(s).** Native American consultation shall be undertaken as part of the project. Local tribes shall be contacted by the

[5] Lone Pine Chamber of Commerce and Tourist Information Center, 30 June 2003. "The Land of Recreation." Available at: www.lonepinechamber.org.

qualified archaeologist specified for the project, and a Native American monitor(s) shall be retained to be present on site during all ground-disturbing activities associated with the work specified in the Revised 2003 SIP, including but not limited to: construction activities, archaeological evaluation, excavation, and the Phase II and Phase III (if implemented) assessments. The Native American monitor(s) shall coordinate with the qualified project archaeologist, the District, and LADWP to ensure responsible remediation of Native American sites and sacred materials.

- **Agreement for Disposition of Recovered Artifact.** The selected archaeologist shall be required to secure a written agreement with a recognized museum repository, such as the San Bernardino County Museum, Los Angeles County Museum of Natural History, or the Maturango Museum regarding the final disposition and permanent storage and maintenance of any unique archaeological resources recovered as a result of the archaeological monitoring, as well as corresponding geographic site data that might be recovered as a result of the specified monitoring program. The written agreement shall specify the level of treatment (preparation, identification, curation, and cataloging) required before the collection would be accepted for storage. Representatives from Owens Valley Native American Tribes will be consulted during the development of all disposition agreements.

- **Preconstruction Briefing.** The selected archaeologist shall attend a preconstruction briefing to provide information regarding regulatory requirements for the protection of unique archaeological resources. Construction personnel shall be briefed on procedures to be followed in the event that a unique archaeological resource is encountered during construction. In addition, the archaeologists shall ensure that the participants in the preconstruction briefing shall be informed of the requirement to notify the coroner of the County within 24 hours of the discovery of human remains. Upon discovery of human remains, there shall be no further excavation or disturbance of the site or any reasonably nearby area reasonably suspected to overlie adjacent human remains until the following conditions are met:

  The Inyo County Coroner has been informed and has determined that no investigation of the cause of death is required. If the remains are of Native American origin, the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code, Section 5097.98.

  An information package shall be provided for construction personnel not present at the initial preconstruction briefing. The archaeologist shall be required to provide a telephone number where they and the Native American monitor can be reached by the construction contractor, as necessary.

- **Construction Monitoring.** A qualified archaeologist shall monitor earthmoving activities in areas that are likely to contain unique archaeological resources. The archaeologist shall be authorized to halt construction, if necessary, in the immediate area where buried cultural remains are encountered. Prior to the resumption of grading activities in the immediate vicinity of the cultural remains, the project proponent shall provide the archaeologist with the necessary resources to identify and implement a program for the appropriate disposition (as specified by Section 15064.5 (e) of the State CEQA Guidelines).

- **Monitoring Report.** The monitor shall maintain daily monitoring logs that shall be submitted quarterly to LADWP. A complete set of the daily monitoring logs shall be kept on site throughout the earthmoving activities and be available for inspection. The daily monitoring log shall be keyed to a location map to indicate the area monitored, the date, assigned personnel, and the results of monitoring, including the recovery of archaeological material, sketches of recovered materials, and associated geographic site data. Within 90 days of the completion of the archaeological monitoring, a monitoring report shall be submitted to the LADWP, the District, and the Eastern Information Center at the University of California, Riverside. The report, when submitted to the LADWP, the District, and the Eastern Information Center, signifies the completion of the program to mitigate impacts to archaeological resources.

  Should an unrecorded archaeological resource be discovered as a result of construction monitoring, the LADWP shall complete Phase II investigations in the areas that have been identified as those that contain significant archaeological sites. Where Phase II investigations identify unique archaeological resources as defined in Section 21083.2 of the Public Resources Code, the site shall be subject to specified requirements for treatment. Any area where unique archaeological resources are not identified, but the materials recovered from shovel test pits indicate the potential presence of unique archaeological resources, shall be reported to LADWP and the District.

III.D Hazards and Hazardous Materials

Significant Impacts:

Implementation of the project would potentially result in impacts from hazards and hazardous materials related to the accidental release of hazardous materials during construction and operation.

Implementation of the project would potentially result in impacts from hazards and hazardous materials related to wildland fires.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to hazards and hazardous materials.

Facts:

Incorporation of the mitigation measures described in Section 3.4.6 would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Hazards-1 To minimize impacts related to the unauthorized release of hazardous materials during routine transport, use, or disposal of hazardous materials, prior to construction work specified in the Revised 2003 SIP, the LADWP shall ensure through its construction permitting process, or through enforcement of contractual obligations for its own projects, that all contractors transport, store, and handle construction-required hazardous materials in a manner consistent with relevant regulations and guidelines established by the California Code of Regulations (Title 13, Division 2, Chapter 6), the California Department of Transportation (Caltrans), and the California Regional Water Quality Control Board, Lahontan Region, prior to construction. The City shall submit proof of incorporation of this requirement in all construction contracts related to work specified in the Revised 2003 SIP to the District and Inyo County. The City shall submit an Operation Plan for the routine transport, use, storage, handling, and disposal of hazardous materials to the District and Inyo County prior to the operation of dust control measures specified in the Revised 2003 SIP. The City shall provide to the District and Inyo County an annual update as required for the transport, use, storage, handling, and disposal of hazardous materials.

Measure Hazards-2 To minimize impacts related to the unauthorized release of hazardous materials into the environment, the LADWP shall prepare a Spill Prevention Control and Countermeasure (SPCC) program applicable to all statutes and regulations. LADWP shall submit an SPCC to Inyo County for review and approval. LADWP shall demonstrate approval of the SPCC by Inyo County to the District prior to the use, storage, and handling of hazardous materials in conjunction with construction or operation of work specified in the Revised 2003 SIP. The SPCC shall address all above-ground storage tanks within the fertilizer injection and water treatment systems in accordance with all federal, state, and local laws and regulations. The LADWP shall enclose all the fertilizer injection and water treatment systems with a minimum 6-foot-high barb-wire-topped chain-link fence or equivalent enclosure and locked gate to prevent unauthorized access. LADWP shall amend its existing lease with the State Lands Commission to allow for the improvement specified in this measure. The SPCC shall be in place throughout construction, operation, and maintenance of work specified in the Revised 2003 SIP.

Measure Hazards-3 To minimize impacts related to the unauthorized release of hazardous materials into the environment, the LADWP shall develop a business plan for emergency response for the routine transport, use, storage, handling, and disposal of hazardous materials. The business plan for emergency response shall address preparation for possible emergencies involving hazardous materials. The LADWP shall provide copies of the approved business plan for emergency response to the District and Inyo County. The City shall provide to the District and Inyo County an annual update to the approved business plan as required for the transport, use, storage, handling, and disposal of hazardous materials.

Measure Hazards-4 To minimize direct, indirect, and cumulative impacts to local residents from a potential increase in mosquito populations as a result of construction and operation of dust control measures as specified in the Revised 2003 SIP, the City of Los Angeles shall provide for the application of mosquito control measures on all dust control areas as deemed necessary by the Inyo County Mosquito Abatement District. The costs of the mosquito control efforts within project boundaries shall be borne by the City of Los Angeles. Mosquito control shall be implemented in compliance with all applicable state and federal regulations. Proof of compliance with this mitigation measure shall be submitted by the City of Los Angeles to the Abatement District and the Air Pollution Control District prior to construction of any new dust control areas. An annual report summarizing the mosquito control activities shall be submitted to the Abatement District and the Air Pollution Control District by December 31 of each year.

Measure Hazards-5 To minimize the direct, indirect, and cumulative impacts related to the occurrence of wildland fires during construction and operation of work specified in the Revised 2003 SIP, the LADWP shall provide for fire protection services for all dust control areas to the satisfaction of Inyo County. Fire protection services shall be provided prior to any further construction on the lake bed. Fire protection services shall include provision of adequate equipment and personnel as determined by the County. Proof of compliance with this mitigation measure shall be submitted by the City of Los Angeles to Inyo County and the District prior to construction of any additional dust control measures.

III.E Hydrology and Water Quality

Significant Impact:

Implementation of the project would have the potential to result in impacts related to hydrology and water quality.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to hydrology and water quality.

Facts:

Incorporation of the mitigation measures described in Section 3.5.6 would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Hydro-1 To mitigate for direct, indirect, and cumulative surface water quality impacts caused by construction pollutants contacting storm water, products of erosion moving off site into receiving waters, and unauthorized non–storm water discharges, the LADWP shall obtain and adhere to the requirements of the National Pollution Discharge Elimination System

(NPDES) General Permit for the 5.5 square miles of new work area specified in the Revised 2003 SIP. This includes the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which specifies best management practices (BMP) that shall prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters; the elimination or reduction of unauthorized non-storm water discharges; and inspections of BMP. The SWPPP shall also identify BMP for controlling temporary construction dewatering discharges and may include temporary sediment control measures such as the addition of low-flow dispersal methods for minimizing erosion. The LADWP shall additionally be required to comply with the Guidelines for Erosion Control as listed in the Water Quality Control Plan for the Lahontan Region. The LADWP shall submit the final SWPPP to the District after its approval by the Regional Water Quality Control Board for the Lahontan Region (RWQCB)

Measure Hydro-2 The LADWP, prior to issuing any Notices to Proceed for construction of work in the areas specified in the 1998 SIP and Revised 2003 SIP, shall implement a Water Quality Monitoring and Reporting Program to ensure that there is no substantial degradation of water quality and to mitigate direct, indirect, and cumulative impacts to surface and groundwater quality and off-site groundwater levels. The Water Quality Monitoring and Reporting Program shall monitor operational water volumes and flows, and analyze the quality of project surface waters and groundwater. The monitoring program shall ensure that the project is operating within the quality limitations specified by the waste discharge requirements (WDR) (Board Order No. R6V-2002-0011, WDID No. 6B140009003) adopted by the RWQCB for the Southern Zones Dust Control Project at Owens Lake.[6] The monitoring program shall be submitted to the District prior to the start of construction in the areas designated for dust control in the 1998 SIP and revised 2003 SIP. All chemical analyses shall be performed by a laboratory with National Environmental Laboratory Accreditation Program (NELAP) certification.

Monitoring reports shall be completed and submitted to the District and the RWQCB within 60 days of the end of the monitoring period as described in Table 3.5.6-1, *Water Quality Monitoring and Reporting Schedule*. The reports shall include a summary of monitoring results and any corrective actions proposed or undertaken for any observed violations of water quality limitations. The water quality limitations are defined as a substantial (statistically significant based on a statistical analysis of current and baseline data) variation from the long-term baseline water data collected by the District for surface and groundwater quality.[7] The District will continue to collect this baseline water data during project construction and operation. Periodic reductions in monitoring and reporting requirements, when justified by a documented review and evaluation of monitoring results, shall be implemented as authorized by the

[6] California Regional Water Quality Control Board, Lahontan Region, 9 November 2001. (Letter to Richard Harasick, City of Los Angeles Department of Water and Power, P.O. Box 5111, Los Angeles, CA 90051.) Subject: Order for Clean Water Act Section 401 Water Quality Certification for the Owens Lake Dust Mitigation Program, Southern Zones Dust Control Project, Inyo County.

[7] Great Basin Unified Air Pollution Control District, 2000a (Revised 2003). *Archive of Groundwater and Hydrology Data, Owens Lake*. Contact: 157 Short Street, Bishop, CA 93514.

RWQCB. Until monitoring results justify a reduction in monitoring requirements, monitoring shall be completed as follows:

- Flow rates and total volumes of flow to shallow flood and managed vegetation areas shall be monitored for each day and month for the first three years of work specified in the Revised 2003 SIP and thereafter as specified in Table 3.5.6-1.

- Surface water monitoring of shallow flood and managed vegetation and groundwater monitoring of perimeter project observation wells shall be completed as described in Table 3.5.6-1 for total dissolved solids (TDS), chloride, chlorine, dissolved oxygen (DO), pH, electrical conductivity (EC), ammonia, aluminum, arsenic, barium, boron, cadmium, calcium, iron, lead, magnesium, manganese, nitrate, nitrite, potassium, selenium, sodium, carbonate, bicarbonate, phosphate, sulfate, vanadium, total alkalinity, total organic carbon (TOC), copper, chromium, zinc, bromide, Treflan (or Trifluralin), and sulfur.

If after the completion of the monitoring in 2020, as described in Table 3.5.6-1, *Hydrology Monitoring and Reporting Schedule*, it is determined that there is no substantial (statistically significant based on a statistical analysis of current and baseline data) variation from the District's baseline water quality and groundwater level data, then the monitoring program may be discontinued. If at any time there is an observed substantial (statistically significant based on a statistical analysis of current and baseline data) variation in the District's baseline water data, the LADWP shall initiate consultation with the District and the RWQCB to determine if the observed variation is directly or indirectly related to the operations and maintenance of work specified in the 1998 SIP and Revised 2003 SIP. Where determined to be directly or indirectly related to the operation and maintenance of work specified in the 1998 SIP and Revised 2003 SIP, the City shall apply standard BMP, such as those described in the *California Stormwater Best Management Practices Handbook*, or comparable measures and water quality monitoring shall continue daily (with monthly reporting) in the area(s) of concern for the particular violated water quality constituent. When it has been determined that water quality and groundwater levels are within the normal range (less than statistically significant) of the District's baseline water data for three consecutive months, the monitoring shall continue as described in Table 3.5.6-1.

TABLE 3.5.6-1
HYDROLOGY MONITORING AND REPORTING SCHEDULE

Description	Monitoring Schedule							
	2007	2008	2009	2010	2011	2013	2015	2020
Flow rates and total volumes of flow to shallow flood and managed vegetation areas	daily (report monthly)	daily (report monthly)	daily (report monthly)	monthly	quarterly	annually (during DCM operation)	annually (during DCM operation)	annually (during DCM operation)
Surface water quality of shallow flood areas	quarterly	quarterly	quarterly	quarterly	quarterly	annually (during DCM operation)	annually (during DCM operation)	annually (during DCM operation)
Surface water quality of managed vegetation areas	quarterly	quarterly	quarterly	quarterly	quarterly	annually (during DCM operation)	annually (during DCM operation)	annually (during DCM operation)
Groundwater monitoring of perimeter project observation wells	quarterly	quarterly	quarterly	quarterly	quarterly	annually (during DCM operation)	annually (during DCM operation)	annually (during DCM operation)

It is the intent of this mitigation measure to ensure that the project does not cause any substantial degradation of water quality and to mitigate any direct, indirect, and cumulative impacts to surface and groundwater quality and off-site groundwater levels that may occur. The District recognizes that the RWQCB is the regulatory government agency responsible for ensuring that the project does not impact water quality. In addition, the District acknowledges that the water quality impacts of an unprecedented project like that of dust control on the Owens Lake bed are difficult to accurately predict. This mitigation measure sets an initial framework for monitoring water quality and mitigating water quality impacts. However, the District acknowledges that specifying long-term monitoring requirements and schedule may not be the most favorable method of preventing impacts to water quality. Therefore, the scope and schedule of water quality monitoring associated with this measure may change upon request by the LADWP, the RWQCB, or the District and approval by both the RWQCB and the District.

Measure Hydro-3 The LADWP shall construct berms along the lateral and downstream boundaries of all shallow flooding areas to mitigate for the potential surface water degradation caused by runoff from shallow flooding within the 5.5-square-mile dust control areas specified in the Revised 2003 SIP. The berms shall be sized to prevent normal operations water from leaving the dust control areas and shall be constructed to resist erosion from any wind and/or wave action and storm flows. Erosion control measures shall include, but are not limited to, flattened side slopes and the placement of riprap on the interior berm faces. The containment berms shall be constructed from compacted native soils and shall have a gravel top surface, as required, to provide all-weather access for maintenance vehicles and to ensure the berms remain in a non-wind-erosive condition. Final plans shall be submitted to the District for approval prior to the release of Requests for Bids for all areas specified in the Revised 2003 SIP to be controlled by shallow flooding.

III.F Land Use and Planning

Significant Impacts:

Implementation of the project would potentially result in impacts to land use and planning related to conflicts between construction, operation, and maintenance of DCMs and current hunting activities.

Implementation of the project would potentially result in impacts to land use and planning related to the potential for an increase in biting insects.

The District has added measure Land Use and Planning-3 to address the existing coordination taking place between the California State Lands Commission and City of Los Angeles Department of Water and Power (LADWP) regarding cattle grazing issues. The California State Lands Commission letter dated May 22, 2002, reviewing the City of Los Angeles's Memo on Cattle Use Monitoring Surveys and immediate/temporary cattle control options at Owens Lake, was used as a reference for this mitigation measure. This mitigation measure is not included to mitigate a new substantial environmental impact resulting from the project, but rather to provide the LADWP an alternative to the elimination of existing grazing leases.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to land use and planning.

Facts:

Incorporation of the mitigation measures described in Section 3.6.6 would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Land Use and Planning-1 To avoid conflicts related to safety to operation and maintenance staff in relation to social hunting that occurs in the Owens River Delta south of the historic shoreline, Sulfate Well, Dirty Socks Well, and the Cartago Springs areas by the construction, operation, and maintenance of all Owens Lake dry lake bed DCMs and hunting activities, prior to the construction and operation work specified under the revised 2003 SIP, the LADWP shall post "No Hunting" signs within 0.25 mile of the existing or proposed DCMs that are visible along access roads (Figure 2.6.2.4-1). The "No Hunting" signs shall be replaced annually as necessary at the beginning of September prior to the hunting seasons for dove, deer, elk, duck, and goose. The "No Hunting" signs will indicate that dogs must be on leash in the no hunting zone.

The LADWP will provide a request along with a map (similar to that shown in Figure 2.6.2.4-1) to the California Department of Fish and Game for designation of the DCM areas in the Revised 2003 SIP and all areas within 0.25 miles of the boundaries of the DCM areas as a no hunting zone to protect the LADWP's construction, operation, and maintenance personnel. A copy of the request shall be submitted to the District.

In addition, all access roads to the existing and new DCM areas shall be gated at the entrance. The new gates shall be designed to sufficiently prohibit vehicular access while providing for pedestrian access around the gates. Signs shall be placed on the existing and proposed gates prohibiting public vehicular access, unleashed dogs, and hunting (pedestrian access and leashed dogs would remain permissible). Gates will provide for access for the District and existing lessees, including U.S. Borax. Both the posting of signs and installation of new gates to the lake bed could be additional improvements outside of the terms of the existing lease with the SLC. Therefore, the lease between LADWP and the SLC shall be amended prior to construction work specified under the revised 2003 SIP to allow for these additional improvements, if the improvements are not within the terms of the existing lease. Both the posting of the "No Hunting" signs and the installation of the gates will ensure the safety of LADWP workers during the construction, operation, and maintenance of the project. The LADWP shall provide a written report to the District describing the implementation of this measure, and the District will monitor for the implementation of this measure. This report shall be submitted prior to the commencement of DCM construction and operation.

The installation of the gates and posting of the "No Hunting" signs will resolve the land use conflict related to the safety of the operation and maintenance staff in relation to social hunting on the Owens Lake bed by removing the risk of injury or death to the workers through the restriction of hunting to various areas of the lake bed. The current and historic public access to the lake bed would not be restricted. The public would still be able to access the lake bed on foot and enjoy the area for bird watching, hiking, photography, and other common recreational activities that occur on the lake bed.

Measure Land Use and Planning-2 To minimize potential impacts to local residents from an increase in mosquitoes and other biting insects as a result of DCM construction from the water-based DCMs, prior to the start of any additional water-based DCMs specified by the Revised 2003 SIP, the City of Los Angeles shall notify property owners within the community of Keeler of their eligibility to receive window and door screens or other insect control devices of comparable value to reduce nuisance insect populations in the vicinity of their residence. The LADWP shall give Keeler property owners at least three months to respond to the notice of eligibility. Insect control devices shall be provided and installed by the LADWP within nine months of the end of the notice of eligibility period. The City of Los Angeles shall provide, where written response is given, to the District documentation of the delivery of eligibility notices and compliance with the provision of insect control devices prior to the construction of any additional water-based DCMs. Residents shall provide proof of residence in Keeler prior to the provision of screening or insect control devices. The LADWP shall provide a written report to the District, within three months of the end of the installation period, describing the implementation of this measure, and the District will monitor for the implementation of this measure. All insect control device installation and reporting shall be completed prior to December 31, 2004.

Measure Land Use and Planning-3 In addition to the potential elimination of cattle grazing leases in Section 3.6.4, Impact Analysis, the California State Lands Commission has identified a process for potentially minimizing the incompatibility of DCMs and grazing through the construction of fencing at selected locations where DCMs are located within 0.25 mile of TAM that are used for cattle grazing. This approach has been summarized as a mitigation measure that could be undertaken by the LADWP as an alternative to the elimination of grazing leases. This mitigation measure would not generate new impacts beyond the scope of land use and planning as discussed in the Draft EIR.

LADWP shall implement a cattle survey period of at least one grazing period to determine if there is an impact from cattle on the project area; if the California State Lands Commission agrees that cattle grazing may be impacting the project area, LADWP previously agreed to coordinate with the cattle ranchers, landowners, and public agencies to develop strategies for cattle control measures. LADWP shall submit a report after the cattle survey period to the District and the California State Lands Commission to indicate the results of the cattle survey and the proposed course of action.

III.G Transportation and Traffic

Significant Impact:

Implementation of the project would potentially result in impacts from transportation and traffic related to traffic hazards.

Finding:

Changes or alterations have been required in, or incorporated into, the project, which mitigate or avoid the significant effects on the environment related to transportation and traffic.

Facts:

Incorporation of the mitigation measures described in Section 3.8.6 would eliminate or substantially lessen the significant impact to a level of insignificance.

Measure Transportation-1 To mitigate the transportation impact related to substantially increasing hazards during construction, which requires the definition of appropriate Traffic Work Safety Plan measures, the City of Los Angeles Department of Water and Power (LADWP) shall develop a Traffic Work Safety Plan. The Traffic Work Safety Plan shall specify the measures to be implemented and maintained by LADWP on each location on U.S. Highway 395, State Route (SR) 136, and SR 190 that would be affected by the construction phase of the project to ensure traffic safety. It is anticipated that the Traffic Work Safety Plan would include the use of warning lights, signs, traffic cones, signals, and the use of flag persons during peak traffic periods, or comparable measures as specified by the *Work Area Traffic Control Handbook*.[8] LADWP shall document to the District that Caltrans has approved the Traffic Work Safety Plan prior to the initiation of construction work specified by the 2003 Revised SIP, or related transportation and staging of equipment and materials.

Measure Transportation-2 To mitigate the transportation impact related to substantially increasing hazards during construction of work specified by the 2003 Revised SIP, the LADWP shall be responsible for funding, installing, and conforming to the measures specified in the approved Traffic Work Safety Plan prior to the use of U.S. Highway 395, SR 136, and SR 190 for gravel hauling or other heavy truck trips such as the delivery of materials, heavy equipment, and construction vehicles to the project site to ensure traffic safety during the construction operations. LADWP shall demonstrate conformance with the measures specified in the approved Traffic Work Safety Plan by submitting quarterly compliance reports to the District and Caltrans throughout the duration of the construction work specified by the 2003 Revised SIP, and related transportation and staging.

Measure Transportation-3 To mitigate the transportation impact related to substantially increasing hazards during construction, LADWP shall be required to repair damage to the regional transportation network: U.S. Highway 395, SR 136, and SR 190 from construction activities required for the 2003 Revised SIP to preproject conditions. Prior to initiating construction of work specified by the 2003 Revised SIP, or related transportation and staging of equipment and materials, LADWP shall retain a qualified pavement consultant engineer to document the existing condition of all regional transportation network roadways used for access, egress, and haul routes by the construction activities required for the 2003 Revised SIP. Following the completion of construction activities, LADWP shall retain a qualified pavement consultant engineer to revisit the documented roadway sections and delineate physical damages that are directly attributed to construction activities required for the 2003 Revised SIP. LADWP shall provide in lieu fees for remediation of construction-generated impacts on the regional transportation network. Within 12 months after construction activities for the 2003 Revised SIP is completed, LADWP shall provide written documentation to the District and Caltrans demonstrating that damage to the regional transportation network that resulted from the construction activities has been repaired.

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[8] BNi Books, Division of BNi Publications, Inc., 2001. *Work Area Traffic Control Handbook*. Available at: 3055 Overland Avenue, Los Angeles, CA 90034.

SECTION IV
SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS THAT CANNOT BE MITIGATED TO A LEVEL OF INSIGNIFICANCE

The analyses of those issue areas determined by the Initial Study: 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan to have the potential to result in significant environmental impacts were carried forward for further analysis in this 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report. As a result of those analyses, it was determined that there would be no significant unavoidable adverse impacts that cannot be mitigated to a level of insignificance. Incorporation of the mitigation measures for the seven environmental issues described in Section III, Potential Environmental Effects that Can Be Mitigated to a Level of Insignificance, would reduce all significant adverse impacts to below the threshold of significance.

SECTION V
FINDINGS REGARDING ALTERNATIVES

Alternatives were analyzed in the Environmental Impact Report (EIR) for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (project), consistent with the recommendations of Section 15126.6 of the State California Environmental Quality Act (CEQA) Guidelines, which require evaluation of a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant project effects, and evaluate the comparative merits of the alternatives. An environmentally superior alternative must be identified, in addition to the No Project Alternative. The analysis of alternatives is limited to those that the Great Basin Unified Air Pollution Control District (District) determines could feasibly attain most of the basic objectives of the project. Section 15126.6(f) of the State CEQA Guidelines describes feasibility as being dependent on site suitability, economic viability, availability of infrastructure, general plan consistency, consistency with other plans or regulatory limitations, jurisdictional boundaries, and the ability of the project proponent to gain access to or acquire an alternative site.

Alternatives addressed in the EIR were derived from work undertaken by the District, from comments that were received in response to the Notice of Availability, and from comments provided by interested parties that attended the public scoping meeting. The resulting range of alternatives considered in this EIR consists of the following:

1. No Project Alternative
2. Emissive Wetland Avoidance Alternative
3. Mosaic Alternative
4. Habitat Shallow Flooding Alternative (the environmentally superior alternative)

The ability of the project and four alternatives under consideration to meet the objectives of the project is summarized in these Findings as Table V-1, *Summary of Adequacy of Project and Alternatives to Attain Project Objectives*; Table V-2, *Project Alternative Elements;* and Table V-3, *Comparative Analysis of Impacts for Project and Alternatives*. As required by CEQA, evaluation of the No Project Alternative considered what would reasonably be expected to occur in the foreseeable future if the project were not approved; however, the No Project Alternative is not capable of meeting most of the project objectives. Three of the proposed alternatives were consistent with some of the basic project objectives and, for this reason, were carried forward for comparative analysis with respect to the determined environmental issues of the project.

TABLE V-1
SUMMARY OF ADEQUACY OF PROJECT AND ALTERNATIVES TO ATTAIN PROJECT OBJECTIVES

Objectives		Alternatives			
	Project	Emissive Wetland Avoidance	Mosaic	Habitat Shallow Flooding	No Project
1. Attain the NAAQS for PM_{10} (fine particulate matter) by December 31, 2006	Yes	No	No	Yes	No
2. Revise the approved November 16, 1998, Attainment SIP by December 31, 2003	Yes	Yes	Yes	Yes	No
3. Minimize (or compensate for) long-term, significant, adverse changes to sensitive resources within the natural and human environment	Yes	Yes	Yes	Yes	Yes
4. Provide a high technical likelihood of success without substantial delay	Yes	Yes	No	Yes	No
5. Minimize the long-term consumption of natural resources	Yes	Yes	Yes	No	No
6. Conform substantially to adopted plans and policies and existing legal requirements	Yes	No	Yes	Yes	No
7. Minimize the cost per ton of particulate pollution controlled	Yes	Yes	Yes	No	No
8. Be consistent with the State of California's obligation to preserve and enhance the public trust values associated with Owens Lake	Yes	Yes	Yes	Yes	Yes

TABLE V-2
PROJECT ALTERNATIVE ELEMENTS

Project	Emissive Wetland Avoidance	Mosaic	Habitat Shallow Flooding	No Project
Dust Control Measures (DCMs)				
Shallow Flooding Dust Control Measure: 2.9 square miles (approximately 1,871 acres) of the project area would be subject to shallow flooding. Managed Vegetation Dust Control Measure: 2.6 square miles (approximately 1,678 acres) of the project area would be subject to managed vegetation. Gravel Dust Control Measure There are no gravel dust control measure. Note: There are a total of 5.5 square miles of new DCMs.	Shallow Flooding Dust Control Measure: 2.05 square miles of the project area would be subject to DCMs. Managed Vegetation Dust Control Measure: 2.05 square miles of the project area would be subject to DCMs. Gravel Dust Control Measure There are no gravel dust control measure. Note: There would be a total of 2.05 square miles of new DCMs.	Shallow Flooding Dust Control Measure: Area designated for shallow flooding would decrease from 2.9 square miles (approximately 1,871 acres) to 2.8 square miles (approximately 1,789 acres). Managed Vegetation Dust Control Measure: Area designated for managed vegetation would increase from 2.6 square miles (approximately 1,678 acres) to 2.7 square miles (approximately 1,720 acres). Gravel Dust Control Measure There are no gravel dust control measure. Note: There would be a total of 5.5 square miles of new DCMs.	Same as the project	Shallow Flooding Dust Control Measure: 15.5 square miles of the project area would be subject to DCMs. Managed Vegetation Dust Control Measure: 15.5 square miles of the project area would be subject to DCMs. Gravel Dust Control Measure There are no gravel dust control measure. Note: 35 square miles of DCMs have been federally mandated for the 1998 SIP, which permits the City of Los Angeles to choose which DCM would be applied and where it would be applied.
Mainline and Drainwater (Brineline) Connections				
Water would be supplied for managed vegetation irrigation from new connections to the recently completed Lake-wide Mainline System (LMS) (irrigation system). In addition, new connections to the drainwater main line (brineline), running parallel to the LMS, would deliver saline water to exiting blending facilities.	Water would be supplied for managed vegetation irrigation from fewer new connections than the project to the recently completed LMS. In addition, fewer new connections than the project to the drainwater main line (brineline), running parallel to the LMS, would deliver saline water to exiting blending facilities.	Water would be supplied for managed vegetation irrigation from a greater number of new connections than the project to the recently completed LMS. In addition, a greater number of new connections than the project to the drainwater main line (brineline), running parallel to the LMS, would deliver saline water to exiting blending facilities.	Same as the project	Water would be supplied for managed vegetation irrigation from a greater number of new connections than the project to the recently completed LMS. In addition, a greater number of new connections than the project to the drainwater main line (brineline), running parallel to the LMS, would deliver saline water to exiting blending facilities.
Subsurface Drainage System				
Additional subsurface drainage piping would be placed beneath drip-irrigated fields, beneath shallow flooding areas, and around the perimeter of the DCMs, and connected to existing drainage systems to control groundwater conditions.	Additional, but less than the project, subsurface drainage piping would be placed beneath drip-irrigated fields, beneath shallow flooding areas, and around the perimeter of the DCMs, and connected to existing drainage systems to control groundwater conditions.	Additional, but more than the project, subsurface drainage piping would be placed beneath drip-irrigated fields, beneath shallow flooding areas, and around the perimeter of the DCMs, and connected to existing drainage systems to control groundwater conditions.	Same as the project	Additional, but more than the project, subsurface drainage piping would be placed beneath drip-irrigated fields, beneath shallow flooding areas, and around the perimeter of the DCMs, and connected to existing drainage systems to control groundwater conditions.

TABLE V-2
PROJECT ALTERNATIVE ELEMENTS

Project	Emissive Wetland Avoidance	Mosaic	Habitat Shallow Flooding	No Project
Power Supply and Control				
Power for the project will be supplied by connecting to an existing 35.4-kilovolt (kV) City of Los Angeles Department of Water and Power (LADWP) power line. Connections will be established through additional Electric Service Stations No. 3 and 4, and by moving the existing Electric Service Station No. 2.	Power for this alternative will be supplied by connecting to an existing 35.4-kV LADWP power line. Connections will be established through additional Electric Service Stations No. 3 and 4, and by moving the existing Electric Service Station No. 2; however, less power would be needed for the smaller area of DCMs required by this alternative.	Power for this alternative will be supplied by connecting to an existing 35.4-kV LADWP power line. Connections will be established through additional Electric Service Stations No. 3 and 4, and by moving the existing Electric Service Station No. 2; however, more power would be needed for the greater number of shallow flooding areas required by this alternative.	Same as the project	Power for this alternative will be supplied by connecting to an existing 35.4-kV LADWP power line. Connections will be established through additional Electric Service Stations No. 3 and 4, and by moving the existing Electric Service Station No. 2; however, more power would be needed for the greater number of DCMs likely required by this alternative.
Fertilizer Injection Systems				
These independent systems, established to deliver fertilizer through the irrigation system, include 72- to 97.5-inch-diameter tanks, 60- to 90-inches tall, established on a 48 x 28 feet concrete pad. Systems include four fertilizer (NPK) tanks, one chlorine (NaOCl) tank, one sulfuric acid (H_2SO_4) tank, one bromine (NaBr) tank, fill stations, water hydrants, and spill containment walls.	These independent systems, fewer than the project, would be established to deliver fertilizer through the irrigation system. They include 72- to 97.5-inch-diameter tanks, 60- to 90-inches tall, established on a 48 x 28 feet concrete pad. Systems include four fertilizer (NPK) tanks, one chlorine (NaOCl) tank, one sulfuric acid (H_2SO_4) tank, one bromine (NaBr) tank, fill stations, water hydrants, and spill containment walls.	These independent systems, greater in number than the project, would be established to deliver fertilizer through the irrigation system. They include 72- to 97.5-inch-diameter tanks, 60- to 90-inches tall, established on a 48 x 28 feet concrete pad. Systems include four fertilizer (NPK) tanks, one chlorine (NaOCl) tank, one sulfuric acid (H_2SO_4) tank, one bromine (NaBr) tank, fill stations, water hydrants, and spill containment walls.	Same as the project	These independent systems, greater in number than the project, would be established to deliver fertilizer through the irrigation system. They include 72- to 97.5-inch-diameter tanks, 60- to 90-inches tall, established on a 48 x 28 feet concrete pad. Systems include four fertilizer (NPK) tanks, one chlorine (NaOCl) tank, one sulfuric acid (H_2SO_4) tank, one bromine (NaBr) tank, fill stations, water hydrants, and spill containment walls.
Corridors for Utilities, Power Cables, and Access Roads				
Additional corridors (50, 65, or 100 feet wide) for utilities, power cables, and access roads will be established to service the additional DCMs: Access Roads/Utility Corridors = 16,143 feet (3.05 miles) Access Roads/Power Corridors = 8,417 feet (1.58 miles)	Additional corridors (50, 65, or 100 feet wide) for utilities, power cables, and access roads will be established to service the additional DCMs; however, fewer DCMs, and as a result, fewer corridors, are required by this alternative.	Additional corridors (50, 65, or 100 feet wide) for utilities, power cables, and access roads will be established to service the additional DCMs; however, due to a complex placement of DCMs, more corridors are required by this alternative.	Same as the project	Additional corridors (50, 65, or 100 feet wide) for utilities, power cables, and access roads will be established to service the additional DCMs; however, a greater area of DCMs, and as a result, more corridors, are required by this alternative.

TABLE V-3
COMPARATIVE ANALYSIS OF IMPACTS FOR PROJECT AND ALTERNATIVES

Resource	Project	Emissive Wetland Avoidance	Mosaic	Habitat Shallow Flooding	No Project
Air Quality	The project would allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10} with maximum efficiency, substantially benefitting air quality.	The Emissive Wetland Avoidance Alternative would not allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10} with maximum efficiency, resulting in greater operational air quality impacts from PM_{10} emissions. This alternative would eliminate proposed installation of DCMs on wetland areas that are currently not in compliance with the air quality standard. Operational air quality impacts from PM_{10} emissions would be greater than the project. Construction-related air quality impacts would be the same as under the project. *Comparative Impact:* Negative	The Mosaic Alternative includes managed vegetation DCMs that would be installed on incompatible soil types, typically sandy soils, and fail to be effective, resulting in greater operational air quality impacts from PM_{10} emissions. Thus, overall emission reductions would be reduced under this alternative, and the NAAQS would not be met. Construction-related air quality impacts would likely be more sever than under the project. *Comparative Impact:* Negative	The Habitat Shallow Flooding Alternative would have greater impacts to air quality. This alternative would reduce maintenance activities, contributing to equipment failure and loss of DCM effectiveness. It is possible that the NAAQS would not be met, resulting in greater operational air quality impacts from PM_{10} emissions. Construction-related air quality impacts would be the same as under the project. *Comparative Impact:* Negative	The No Project Alternative would not allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10} with maximum efficiency, resulting in greater operational air quality impacts from PM_{10} emissions. Under this alternative, DCMs would be installed at a relatively slower rate of 2 square miles per year until the NAAQS for PM_{10} emissions are met, according to the 1998 SIP. There would be no construction-related air quality impacts from this alternative. *Comparative Impact:* Negative
Biological Resources	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). These would pose potentially significant impacts to biological resources, which would be alleviated to levels below the threshold of significance through the implementation of the 14 mitigation measures.	The Emissive Wetland Avoidance Alternative attempts to reduce potential impacts to transmontane alkaline meadows that are currently not in compliance with federal air quality standards. This alternative would allow water to remain on the shallow flood panels from July 1 to approximately July 14 to allow nesting plovers to successfully complete their nesting cycle. *Comparative Impact:* Positive	The Mosaic Alternative attempts to ensure an adequate mix of both shallow flooding and managed vegetation DCMs to allow for a variety of habitats for biological resources within the project area. *Comparative Impact:* Neutral	The Habitat Shallow Flooding Alternative attempts to reduce potential impacts to nesting snowy plovers by keeping shallow flood areas active throughout the nesting cycle of the western snowy plover. *Comparative Impact:* Positive	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072acres) of DCMs. This alternative results in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative
Cultural Resources	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). These would pose potentially significant impacts to cultural resources, which would be alleviated to levels below the threshold of significance through the implementation of mitigation measures.	The Emissive Wetland Avoidance Alternative would have potentially fewer impacts to cultural resources due to the reduced amount of DCMs that would be installed. *Comparative Impact:* Positive	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative

TABLE V-3
COMPARATIVE ANALYSIS OF IMPACTS FOR PROJECT AND FEASIBLE ALTERNATIVES

Resource	Project	Emissive Wetland Avoidance	Mosaic	Habitat Shallow Flooding	No Project
Hazards and Hazardous Materials	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). Any impacts caused by the routine transport or disposal of hazardous materials, the release of hazardous materials into the environment, or the increased risk of wildland fires should be sufficiently reduced or eliminated through the implementation of mitigation measures.	The Emissive Wetland Avoidance Alternative would potentially utilize less fertilizer and other potentially hazardous materials due to the reduced coverage of DCMs. *Comparative Impact:* Positive	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative
Hydrology and Water Quality	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). These would pose potentially significant impacts to hydrology and water quality, which would be alleviated to levels below the threshold of significance through the implementation of mitigation measures.	The Emissive Wetland Avoidance Alternative may potentially utilize less water and have fewer associated impacts to water quality due to the reduced coverage of DCMs under this alternative. *Comparative Impact:* Positive	Same as the project. *Comparative Impact:* Neutral	The Habitat Shallow Flooding Alternative would require the consumption of greater freshwater resources than the project. *Comparative Impact:* Negative	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas under the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative
Land Use and Planning	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). These would pose potentially significant impacts to land use and planning, which would be alleviated to levels below the threshold of significance through the implementation of mitigation measures.	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative

TABLE V-3
COMPARATIVE ANALYSIS OF IMPACTS FOR PROJECT AND FEASIBLE ALTERNATIVES

Resource	Project	Emissive Wetland Avoidance	Mosaic	Habitat Shallow Flooding	No Project
Noise	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). Permanent increases in the ambient noise level would be generated from the operation of the DCMs. These impacts, however, would be below the level of significance.	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative
Transportation/ Traffic	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). These would pose potentially significant impacts to transportation and traffic, which would be alleviated to levels below the threshold of significance through the implementation of mitigation measures.	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	Same as the project. *Comparative Impact:* Neutral	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, thereby creating the potential need for additional traffic impacts over a longer period of time and creating the potential for greater impacts. *Comparative Impact:* Negative
Utilities and Service Systems	The project would install a total of 29.8 square miles (19,072 acres) of DCMs (19.5 existing square miles and 10.3 new square miles, 5.5 of which are analyzed in this EIR). These would pose potentially significant impacts to utilities and service systems, which would be alleviated to levels below the threshold of significance through the implementation of mitigation measures.	The Emissive Wetland Avoidance Alternative would incur fewer impacts to utilities by decreasing the total demands on utilities and service systems through the reduction of DCM coverage. This would incur fewer expenditures of electricity and water resources to meet the requirements of this alternative. *Comparative Impact:* Positive	The Mosaic Alternative would incur additional impacts to utilities by increasing the amount of infrastructure required for the more complex mosaic of DCMs within the project area. This would incur additional expenditures of electricity and water resources to meet the requirements of this alternative. *Comparative Impact:* Negative	The Habitat Shallow Flooding Alternative would incur additional impacts to utilities by increasing the time that shallow flood systems must remain operational. This would incur additional expenditures of electricity and water resources to meet the requirements of this alternative. *Comparative Impact:* Negative	The No Project Alternative would install up to 35 square miles (22,400 acres) of DCMs, whereas the project would install only 29.8 square miles (19,072 acres) of DCMs. This alternative would result in the installation of DCMs over a wider area, creating the potential for greater impacts. *Comparative Impact:* Negative

Based on the alternatives analysis provided in Section 4.0 of the Draft EIR, the District determined that the No Project Alternative does not accomplish most of the basic objectives of the project, and that it does not qualify as the environmentally superior alternative. The No Project Alternative includes continuing the implementation of the 1998 SIP, which would involve the construction of 2 square miles of DCMs per year until the National Ambient Air Quality Standards (NAAQS) for PM_{10} are met. Under the No Project Alternative, this standard would not be achieved by December 31, 2006, and dust control measures would not be installed in locations that the District now knows cause or contribute to NAAQS exceedances. In addition, the No Project Alternative would not benefit from air quality improvement measures that are part of the project. The Habitat Shallow Flooding Alternative was identified as the environmentally superior alternative due to its ability to minimize impacts to biological resources (especially western snowy plover). However, it failed to minimize the long-term consumption of natural resources due to its need for more water, and it failed to provide an adequate time interval to perform the site maintenance necessary to ensure reliable operation of the dust control facilities.

The project meets all project objectives without resulting in impacts that cannot be mitigated to a less than significant level. The alternatives analyzed in Section 4.0 of the Draft EIR are infeasible because they do not meet most of the project objectives, including the primary objective of attaining the NAAQS for PM_{10} by December 31, 2006, and a secondary objective of minimizing the long-term consumption of natural resources, as described below.

The alternatives to the project evaluated in Section 4 are as follows:

No Project Alternative
Emissive Wetland Avoidance Alternative
Mosaic Alternative
Habitat Shallow Flooding Alternative (the environmentally superior alternative)

V.A Alternative 1: No Project

Description of Alternative: Under the No Project Alternative, the 1998 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (1998 SIP) would continue to be implemented. In addition to the 19.5 square miles (12,457 acres) of dust control measures (DCMs) that have been completed or are currently under construction, up to an additional 15.5 square miles (9,943 acres) of DCMs have been authorized to be installed in two square mile per year increments until the National Ambient Air Quality Standards (NAAQS) are attained. Up to 35 square miles (22,400 acres) of DCMs were federally mandated under the 1998 SIP.

Effectiveness in Meeting Project Objectives: The No Project Alternative would involve the construction of 2 square miles of DCMs per year until the NAAQS for PM_{10} are met. This schedule would not achieve the primary project goal of attaining the NAAQS for PM_{10} by December 31, 2006. Although it is not capable of meeting many of the basic objectives of the project, as discussed in Section 2.2 of the EIR, this alternative was analyzed. The summary of this alternative's ability to meet the objectives is described in Table V-1.

Comparison of Effects of the Alternative to Effects of the Project: A summary comparison of this alternative to effects of the project is presented in Table V-3. The analysis presented in the table shows that this alternative differs from the project in area affected by DCMs and the efficiency with which they would be installed. This alternative differs from the project in the assessment of air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation and circulation, and utilities and service systems.

- **Air Quality**: As documented in Table V-3, the No Project Alternative would not allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10} with maximum efficiency, resulting in greater air quality impacts from PM_{10} emissions.

- **Biological Resources**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area than the project, creating the potential for greater impacts to biological resources. Any impacts to biological resources would be mitigated to a less than significant level.

- **Cultural Resources**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area than the project, creating the potential for greater impacts to cultural resources. Any impacts to cultural resources would be mitigated to a less than significant level.

- **Hazards and Hazardous Materials**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area than the project, creating the potential for greater impacts from hazards and hazardous materials. Any impacts from hazards and hazardous materials would be mitigated to a less than significant level.

- **Hydrology and Water Quality**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area than the project, creating the potential for greater impacts to hydrology and water quality. Any impacts to hydrology and water quality would be mitigated to a less than significant level.

- **Land Use and Planning**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area than the project, creating the potential for greater impacts to land use and planning. Any impacts to land use and planning would be mitigated to a less than significant level.

- **Noise**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area than the project, creating the potential for greater impacts from noise. Any impacts from noise would be mitigated to a less than significant level.

- **Transportation and Circulation**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area, thereby creating the potential need for additional traffic impacts over a longer period of time and creating the potential for greater impacts to transportation and circulation. Any impacts to transportation and circulation would be mitigated to a less than significant level.

- **Utilities and Utility Systems**: As documented in Table V-3, the No Project Alternative would provide for up to 35 square miles (22,400 acres) of DCMs to be installed. The No Project Alternative would result in the installation of DCMs over a wider area, creating the potential for greater impact to utilities and utility systems. Any impacts to utilities and utility systems would be mitigated to a less than significant level.

Feasibility: This alternative is not feasible.

Facts: The above feasibility finding is based on the following:

- Three of the eight objectives are met in the No Project Alternative (Table V-1).

- The primary goal of the project, to achieve NAAQS for PM_{10} by December 31, 2006, is not likely to be met by this alternative.

- A wider area will be impacted by DCMs.

V.B Alternative 2: Emissive Wetland Avoidance

Description of Alternative: Under the Emissive Wetland Avoidance Alternative, impacts to wetlands in the project area would be avoided. This project alternative would involve the installation of DCMs in the same areas as in the project, with the exception of any areas with existing wetlands. This would result in the installation of 6.85 square miles (4,383 acres) of DCMs, rather than the 10.3 square miles (6,601 acres) that would be installed under the project.

Effectiveness in Meeting Project Objectives: The Emissive Wetland Avoidance Alternative would not meet the primary goal of attaining the NAAQS for PM_{10} by December 31, 2006. By avoiding wetlands, emissive areas would continue to produce fugitive dust (PM_{10}), which would compromise meeting the standard. Although it is capable of meeting many of the basic objectives, it fails to meet this primary goal. The summary of this alternative's ability to meet the objectives is described in Table V-1.

Comparison of Effects of the Alternative to Effects of the Project: A summary comparison of this alternative to effects of the project is presented in Table V-3. The analysis presented in the table shows that this alternative differs from the project in avoiding wetlands with DCM installation. This alternative differs from the project in the assessment of air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation and circulation, and utilities and service systems.

- **Air Quality**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would not allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10}, resulting in greater air quality impacts from PM_{10} emissions.

- **Biological Resources**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would reduce impacts to wetlands and the western snowy plover nesting cycle. Any impacts to biological resources would be mitigated to a less than significant level.

- **Cultural Resources**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would reduce the area of DCMs to be installed, resulting in potentially fewer impacts to cultural resources. Any impacts to cultural resources would be mitigated to a less than significant level.

- **Hazards and Hazardous Materials**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would reduce the area of DCMs to be installed, resulting in potentially fewer impacts from hazards and hazardous materials. Any impacts from hazards and hazardous materials would be mitigated to a less than significant level.

- **Hydrology and Water Quality**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would reduce the area of DCMs to be installed, resulting in the use of less water and potentially fewer impacts to hydrology and water quality. Any impacts to hydrology and water quality would be mitigated to a less than significant level.

- **Land Use and Planning**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would have the same impacts to land use and planning as the project. Any impacts to land use and planning would be mitigated to a less than significant level.

- **Noise**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would have the same impacts to noise as the project. Any impacts from noise would be mitigated to a less than significant level.

- **Transportation and Circulation**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would have the same impacts to transportation and circulation as the project. Any impacts to transportation and circulation would be mitigated to a less than significant level.

- **Utilities and Utility Systems**: As documented in Table V-3, the Emissive Wetland Avoidance Alternative would reduce the area of DCMs to be installed, resulting in the use of fewer utilities and potentially fewer impacts to utilities and utility systems. Any impacts to utilities and utility systems would be mitigated to a less than significant level.

Feasibility: This alternative is not feasible.

Facts: The above feasibility finding is based on the following:

- Six of the eight objectives are met; however, the two objectives not met in the Emissive Wetland Avoidance Alternative (Table V-1) are primary objectives.

- The primary goal of the project, to achieve NAAQS for PM_{10} by December 31, 2006, is not likely to be met by this alternative.

V.C Alternative 3: Mosaic

Description of Alternative: Under the Mosaic Alternative, habitat areas would be more varied by regularly alternating the shallow flooding and managed vegetation DCMs every 0.25 miles. This project alternative would involve the installation of DCMs over the same areas as in the project; however, there would be an increase in the area to which the shallow flooding DCM would be applied.

Effectiveness in Meeting Project Objectives: The Mosaic Alternative would not meet the NAAQS for PM_{10} by December 31, 2006. By alternating DCMs, managed vegetation may be applied to poor soil conditions, which would cause the DCM to fail and allow emissive areas to remain productive. The summary of this alternative's ability to meet the objectives is described in Table V-1.

Comparison of Effects of the Alternative to Effects of the Project: A summary comparison of this alternative to effects of the project is presented in Table V-3. The analysis presented in the table shows that this alternative differs from the project in systematically placing DCM installation. This alternative differs from the project in the assessment of air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation and circulation, and utilities and service systems.

- **Air Quality**: As documented in Table V-3, the Mosaic Alternative would not allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10}, resulting in greater air quality impacts from PM_{10} emissions.

- **Biological Resources**: As documented in Table V-3, the Mosaic Alternative would provide a variety of habitats for biological resources. Any impacts to biological resources would be mitigated to a less than significant level.

- **Cultural Resources**: As documented in Table V-3, the Mosaic Alternative would have the same impacts to cultural resources as the project. Any impacts to cultural resources would be mitigated to a less than significant level.

- **Hazards and Hazardous Materials**: As documented in Table V-3, the Mosaic Alternative would have the same impacts from hazards and hazardous materials as the project. Any impacts from hazards and hazardous materials would be mitigated to a less than significant level.

- **Hydrology and Water Quality**: As documented in Table V-3, the Mosaic Alternative would have the same impacts to hydrology and water quality as the project. Any impacts to hydrology and water quality would be mitigated to a less than significant level.

- **Land Use and Planning**: As documented in Table V-3, the Mosaic Alternative would have the same impacts to land use and planning as the project. Any impacts to land use and planning would be mitigated to a less than significant level.

- **Noise**: As documented in Table V-3, the Mosaic Alternative would have the same impacts to land use and planning as the project. Any impacts from noise would be mitigated to a less than significant level.

- **Transportation and Circulation**: As documented in Table V-3, the Mosaic Alternative would have the same impacts to transportation and circulation as the project. Any impacts to transportation and circulation would be mitigated to a less than significant level.

- **Utilities and Utility Systems**: As documented in Table V-3, the Mosaic Alternative would increase the use of utilities to serve the systematically alternating DCMs and potential impacts to utilities and utility systems. Any impacts to utilities and utility systems would be mitigated to a less than significant level.

Feasibility: This alternative is not feasible.

Facts: The above feasibility finding is based on the following:

- Six of the eight objectives are met in the Mosaic Alternative (Table V-1).

- The primary goal of the project, to achieve NAAQS for PM_{10} by December 31, 2006, is not likely to be met by this alternative.

V.D Alternative 4: Habitat Shallow Flooding

Description of Alternative: Under the Habitat Shallow Flooding Alternative, the period of shallow flooding would be extended by two months. This project alternative would involve the installation of DCMs over the same areas as in the project; however, there would be an increase in the duration of shallow flooding.

Effectiveness in Meeting Project Objectives: The Habitat Shallow Flooding Alternative would likely meet the NAAQS for PM_{10} by December 31, 2006. However, this alternative does not provide for an extended period for site maintenance activities to occur. This would jeopardize the ability of the site to continually maintain the NAAQS for PM_{10}. The summary of this alternative's ability to meet the objectives is described in Table V-1.

Comparison of Effects of the Alternative to Effects of the Project: A summary comparison of this alternative to effects of the project is presented in Table V-3. The analysis presented in the table shows that this alternative differs from the project in the duration of the presence of water in the shallow flooding DCMs. This alternative differs from the project in the assessment of air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation and circulation, and utilities and service systems.

- **Air Quality**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would allow PM_{10} emissions to be brought into compliance with the NAAQS for PM_{10}, but degeneration of equipment and a lower degree of DCM effectiveness would occur more quickly than would likely occur under the project, resulting in greater air quality impacts from PM_{10} emissions.

- **Biological Resources**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would benefit the snowy plover nesting cycles with the extension of the presence of water through July. Any impacts to biological resources would be mitigated to a less than significant level.

- **Cultural Resources**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would have the same impacts to cultural resources as the project. Any impacts to cultural resources would be mitigated to a less than significant level.

- **Hazards and Hazardous Materials**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would have the same impacts from hazards and hazardous materials as the project. Any impacts from hazards and hazardous materials would be mitigated to a less than significant level.

- **Hydrology and Water Quality**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would consume greater fresh water resources. Any impacts to hydrology and water quality would be mitigated to a less than significant level.

- **Land Use and Planning**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would have the same impacts to land use and planning as the project. Any impacts to land use and planning would be mitigated to a less than significant level.

- **Noise**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would have the same impacts to land use and planning as the project. Any impacts from noise would be mitigated to a less than significant level.

- **Transportation and Circulation**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would have the same impacts to transportation and circulation as the project. Any impacts to transportation and circulation would be mitigated to a less than significant level.

- **Utilities and Utility Systems**: As documented in Table V-3, the Habitat Shallow Flooding Alternative would increase the use of utilities to serve the extended period of water present in the shallow flooding DCMs and increase the potential impacts to utilities and utility systems. Any impacts to utilities and utility systems would be mitigated to a less than significant level.

Feasibility: This alternative is not feasible.

Facts: The above feasibility finding is based on the following:

- Six of the eight objectives are met in the Habitat Shallow Flood Alternative (Table V-1).
- The primary goal of the project, to achieve NAAQS for PM_{10} by December 31, 2006, is not likely to be met by this alternative.

SECTION VI
FINDINGS REGARDING MITIGATION MONITORING PROGRAM

VI.A REQUIREMENTS OF MITIGATION MONITORING PROGRAM

Section 21081.6 of the Public Resources Code, the California Environmental Quality Act, requires that when a public agency is making the findings required by Sections 21081, the public agency shall adopt a reporting or monitoring program for the changes made to the project and/or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment.

The Great Basin Unified Air Pollution Control District Governing Board (Board) hereby finds that the Mitigation Monitoring Program meets the requirements of Section 21081.6 of the Public Resources Code by providing a monitoring program designed to ensure compliance with mitigation measures adopted by the Board. The Mitigation Monitoring Program identifies responsible agencies for the mitigation measures.

SECTION VII
FINDINGS REGARDING LOCATION AND CUSTODIAN OF DOCUMENTS

VII.A LOCATION AND CUSTODIAN OF DOCUMENTS

Section 10.0 of the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report (EIR) contains a list of all references used in the preparation of the environmental analysis. Unless otherwise noted, reference materials are located at the office of the Great Basin Unified Air Pollution Control District (District), which, pursuant to Section 15091(e) of the State California Environmental Quality Act (CEQA) Guidelines, shall also serve as the custodian of the documents constituting the record of proceedings on which the Great Basin Unified Air Pollution Control District Governing Board has based its decision related to the project. The designated location and custodian of documents is as follows:

Mr. Ted Schade, Senior Project Manager
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, CA 93514
(760) 872-8211

References not available from the District are located at Sapphos Environmental, Inc. and may be reviewed by contacting:

Mr. Dev Vrat, AICP
Senior Planner
Sapphos Environmental, Inc.
133 Martin Alley
Pasadena, CA 91105
(626) 683-3547

SECTION VIII
CERTIFICATION REGARDING INDEPENDENT JUDGMENT

Pursuant to Section 21082.1 (c) of the Public Resources Code, the Great Basin Unified Air Pollution Control District (District) certifies that the Great Basin Unified Air Pollution Control District Governing Board has independently reviewed and analyzed the Final 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report (EIR) on behalf of the District. District staff reviewed the Draft EIR prepared by the District and required changes to that document prior to circulation for public review. The Draft EIR circulated for public review reflected the independent judgment of District staff, acting on behalf of the District. The Final EIR similarly has been subject to review and revision by District staff. The Final EIR reflects the independent judgment of the District.

SECTION IX
STATEMENT OF OVERRIDING CONSIDERATIONS

The 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (project) will not result in significant adverse impacts to the environment; therefore, a statement of overriding considerations is not required.

The Final 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report (EIR) identified and analyzed potential significant impacts to air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation/traffic, and utilities and service systems that are expected as a result of implementing the project. With the implementation of the mitigation measures specified in the Final EIR, impacts to air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation/traffic, and utilities and service systems will be mitigated to less than significant levels.

The Final EIR determined that the project is not expected to result in significant unavoidable adverse impacts to any of the issue areas analyzed in support of the Final EIR. Also, as indicated in the Final EIR, short-term construction-related impacts to air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation/traffic, and utilities and service systems would cease with the completion of construction.

SECTION X
SECTION 15091 FINDINGS

Section 15091 of the State California Environmental Quality Act (CEQA) Guidelines requires the public agency to make one or more written findings for each significant environmental effect of the project prior to approving or carrying out a project for which an Environmental Impact Report has been certified that identifies one or more significant effects.

Based on the foregoing findings and the information contained in the record, the Great Basin Unified Air Pollution Control District (District) has made the following findings with respect to the significant impacts on the environment resulting from the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan pursuant to Section 15091 of the State CEQA Guidelines and hereby adopts the Mitigation Monitoring Program designed to ensure compliance with the mitigation measures adopted by the District Governing Board during project implementation.

- Changes or alterations have been required in, or incorporated into, the project, which avoid or substantially lessen the significant environmental effects as identified in the Final 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report.

- The changes and alterations are within the responsibility and jurisdiction of the District. The District may designate an official representative, agent, or authorized party to implement certain measures as part of preconstruction, construction, and postconstruction activities. Pursuant to Section 15091(c) of the State CEQA Guidelines, the Mitigation Monitoring Program identifies responsible agencies for the mitigation measures.

- The mitigation measures identified in the Final EIR are feasible and are being required as conditions of approval.

The following are based on the foregoing findings and the substantial evidence contained in the record, and as conditioned by the foregoing findings:

- All significant effects on the environment due to the project have been eliminated or substantially lessened per the mitigation measures to below the threshold of significance.

Great Basin Unified Air Pollution Control District

2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan

Mitigation Monitoring Program

State Clearinghouse Number 2002111020

Prepared For:

Great Basin Unified Air Pollution Control District
157 Short Street, Suite 6
Bishop, CA 93514-3537

Prepared By:

Sapphos Environmental, Inc.
133 Martin Alley
Pasadena, CA 91105

November 13, 2003

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SECTION I
INTRODUCTION

The California Environmental Quality Act (CEQA; Public Resources Code, Section 21000 et seq.) requires a Lead Agency or Responsible Agency that approves or carries out a project where an Environmental Impact Report (EIR) has identified significant environmental effects to implement a reporting or monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment (Pub. Res. Code Section 21081.6(a) 14 Cal. Code Regs. Sections 1591(d), 15097). Conditions of project approval may be set forth in referenced documents that address required mitigation measures. In the case of adoption of a plan, policy, regulation, or other public project, mitigation measures are incorporated into the plan, policy, regulation, or project design.

The Great Basin Unified Air Pollution Control District (District) is the Lead Agency for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (proposed project). The District shall provide measures to mitigate or avoid significant impacts to the environment; these measures shall be fully enforceable through permit conditions, agreements, or other legally-binding instruments.

SECTION II
PROJECT

The 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (proposed project) will mainly involve the following improvements.

II.1 PROJECT ELEMENTS

The proposed project involves the construction, operation, and maintenance of shallow flooding and managed vegetation dust control measures (DCMs). Gravel cover was analyzed in the 1998 Program Environmental Impact Report (EIR)[1] and Southern Zones Negative Declaration (ND).[2] Gravel cover DCM has previously been approved for 0.06 square mile (40 acres). Under the 2003 State Implementation Plan (SIP), additional gravel cover DCMs may be applied in the future. If so, a project-level analysis of the proposed measure will be prepared when information becomes available. In addition to the DCM areas, the project includes a number of water and brineline connections, sub-surface drainage systems, fertilizer injection systems,[3] and corridors for utilities, power cables and vehicular access. The total 2003 SIP impact area includes the DCMs, related project components and temporary construction disturbance zones. The construction and operation of DCMs and the infrastructure necessary to operate the DCMs will be developed on a schedule mandated by the proposed 2003 SIP in order to attain the National Ambient Air Quality Standards (NAAQS) for PM_{10} by 2006. Project monitoring will include shallow groundwater, vegetation, soils, subsurface drip irrigation system, shallow flooding system, drainage system, weather, DCM effectiveness, and performance. The Project consists of construction, operation, and maintenance of the following project elements:

- Dust control measures
- Mainline and drainline (brineline) connections
- Subsurface drainage system
- Power supply and control
- Fertilizer injection systems
- Corridors for utilities, power cables, and access roads

The Great Basin Unified Air Pollution Control District (District) may refine DCM performance standards to achieve the PM_{10} NAAQS. Such refinements may include the relative coverage of water, saturated soils, or vegetation. Also, selected areas may be operated according to altered specifications

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[1] Great Basin Unified Air Pollution Control District, 16 November 1998. Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan. Contact: Great Basin Unified Air Pollution Air District, 157 Short Street, Bishop, CA 93514.

[2] Great Basin Unified Air Pollution Control District, 16 November 1998a. Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Environmental Impact Report (SCH No. 96122077). Contact: Great Basin Unified Air Pollution Air District, 157 Short Street, Bishop, CA 93514.

[3] R. H. Follett, 27 April 2003. "Fertigation." Colorado State University Cooperative Expansion. Available at: www.ext.colostate.edu/pubs/crops/00512.html.

on a trial basis. Most of the anticipated changes will affect DCM effectiveness and efficiency, while maintaining essential characteristics of the DCM descriptions. Any refinement resulting in a physical change to the environment will be subject to California Environmental Quality Act (CEQA) review by the District. Such changes would include revisions in the dust control area depicted in Figure 2.3-7, *2003 SIP*, and to changes to the project description as presented in Section II of this EIR.

The sizes of project components, permanent easements, construction disturbance zones, and total anticipated 2003 SIP impact areas are depicted in Table II.1-1, *Project Element Impact Areas*.

TABLE II.1-1
PROJECT ELEMENT IMPACT AREAS

Project Component		**Project Component Area square miles (acres)**	**Construction Disturbance Zone square miles (acres)[1]**	**Impact Area square miles (acres)**
Dust Control Measures				
Shallow Flooding		2.9 (1,837)	–	–
Managed Vegetation		2.6 (1,672)	–	–
Total area		5.5 (3,509)	0.5 (325)	6.0 (3,834)
Project Component	**Project Component Distances**	**Permanent Easement acres[2]**	**Construction Disturbance Zone acres[3]**	**Impact Area acres**
Access Roads/Utility Corridors (includes freshwater line, brineline, road, power line (high and low voltage), and SCADA line (fiber optic cable)				
Access Road 1a	461 feet (0.09 miles)	0.7	0.4	1.1
Access Road 13	4,587 feet (0.87 miles)	6.9	3.7	10.6
Access Road 14	1,362 feet (0.26 miles)	2.1	1.1	3.2
Access Road 15	1,566 feet (0.30 miles)	2.4	1.3	3.7
Access Road 16	4,112 feet (0.78 miles)	6.1	3.3	9.4
Total area	12,088 feet (2.03 miles)	18.2	9.8	28
Access Roads/Power Corridors (includes power line, road)[4]				
Electric Service 2	7,319 feet (1.38 miles)	8.4	5.1	13.5
Electric Service 3	868 feet (0.16 miles)	1	0.6	1.6
Electric Service 4	230 feet (0.04 miles)	0.3	0.2	0.5
Total area	8,417 feet (1.58 miles)	9.7	5.9	15.6

TABLE II.1-1
PROJECT ELEMENT IMPACT AREAS, Continued

Project Component	Project Component Distances	Permanent Easement acres[2]	Construction Disturbance Zone acres[3]	Impact Area acres
Fertigation FN[5] and Water Treatment Systems				
48 feet x 28 feet concrete pad; 72.0–97.5 inch diameter tanks; 60–90 inches tall		N/A	N/A	N/A
TOTALS		**5.5 square miles (3,537 acres)**	**0.52 square miles (341 acres)**	**6.0 square miles (3,878 acres)**

NOTE:
[1] Construction disturbance zone for dust control measure = 50 feet from perimeters of project component areas
[2] Permanent easement widths for utility corridors = 65 feet and for power corridors = 50 feet
[3] Construction disturbance zone for utility corridors = 35 feet and for power corridors = 30 feet in addition to the respective permanent easement
[4] All three power corridors are partially buried cable (on lake bed portion) and power pole (off lake bed portion)
[5] R.H. Follett, 27 April 2003. "Fertigation." Colorado State University Cooperative Expansion. Available at: www.ext.colostate.edu/pubs/crops/00512.html.
* All numbers accurate to the nearest tenth.

II.1.1 Dust Control Measures (DCMs)

The Project includes the development, operation and maintenance of shallow flooding, managed vegetation, and gravel cover DCMs. The placement analyzed in this EIR of each type of DCM was determined by the Los Angeles Department of Water and Power (LADWP). The SIP allows the City to use any combination of the three approved DCMs: shallow flooding, managed vegetation, and gravel cover. Should the City choose to change the DCM placement analyzed in this EIR, further environmental impact analysis will be required prior to construction.

II.1.1.1 Shallow Flooding Dust Control Measure

Approximately 2.9 square miles (1,837 acres) of the new DCMs will consist of shallow flooding. An additional 1.43 square miles (898 acres), previously analyzed as pond and managed vegetation, will be analyzed as shallow flooding.

The primary project objective for shallow flooding will be dust control by maintaining surface wetness. Shallow flooding will be operated to meet the 2003 SIP dust control criteria by maintaining a minimum of 75 percent of the area with standing water or surface saturated soil from October 1 through June 30. As a result, ponding will be expected to occur in topographic lows and at downhill edges of shallow flooding areas. Based on actual water depths in existing shallow flood areas and predicted depths in areas to be constructed, after complete build-out of the shallow flooding, approximately 75 percent of the total shallow flood area would have water depths less than 4 inches, and more than 90 percent of the total shallow flooding area would have water depths less than 18 inches. Of the new shallow flooding area analyzed for this EIR, approximately 85 percent of the new area would be shallower than 18 inches. [Footnote: CH2MHill, 10 October 2003. *Depth of Shallow*

Flood Map. Contact: CH2M Hill 3 Hutton Centre Drive, Suite 200, Santa Ana, CA 92707.] The shallow flood areas will include some areas of standing water and exposed soil. Surface-water salinity in these areas will be expected to vary over a wide range (up to 450,000 mg/L total dissolved solids [TDS]).

Shallow flooding areas will generally be built in a block plan adjusted as necessary to accommodate irregularly shaped areas and local topography. The shallow flooding DCM will consist of a network of submain, lateral, and riser pipes that distribute water from the existing mainline to the shallow flooding area. Submain pipes would convey fresh and/or brinewater from mainline turnout locations to a set of laterals that feed vertical risers for each shallow flooding area. Lateral and riser spacing will be designed to provide adequate distribution of irrigation flows to meet SIP dust control requirements. Lateral and riser spacing will depend on surface slopes, soils, and field layout. Laterals will be approximately parallel to surface contours. Drip irrigation tubes or gated pipes may be used in place of riser pipes to provide necessary water spreading.

The primary source of water for the shallow flooding basins is the Los Angeles Aqueduct. In addition to this primary source, excess irrigation water will be collected in the subsurface drainage systems under managed vegetation DCMs. Based on historical groundwater and subsurface drainage analyses[4,5] and on expected changes to groundwater salinity due to irrigation, it is anticipated that water entering the shallow flood basins during long-term operation will have a minimum TDS of 0 milligrams per liter (mg/L) and a maximum TDS of 430,000 mg/L. Values as high as 430,000 mg/L have been reported in groundwater at single-point readings taken at piezometers on the lake; therefore, this is a conservative value to use as a maximum drainage concentration. Initial values will be the highest as salt is leached from naturally highly saline soils. Over time, as more freshwater is applied, drainwater salinity will be reduced.

Shallow flooding flow rate will be sufficient to meet evaporative demand and accommodate surface and subsurface flows down-gradient to a tailwater recycling facility in each DCM block. Tailwater flows will be recirculated in the shallow flood basin or directed to the mainwater drainline, (brineline) system for recirculation. Maximum flow rates will not be expected to exceed 15,000 gallons per day per acre of shallow flooding DCM during peak evaporative demand. Drains and pumps may not be installed in all shallow flooding areas.

Land-leveling and precision-grading activities could be conducted over the entire shallow flood surface area prior to construction of the shallow flood piping system. Land leveling may be necessary to allow for even water distribution and compliance with SIP requirements. Land-leveling activities could continue throughout operation to maintain efficient water distribution and to manage salt

[4] Great Basin Unified Air Pollution Control District, 1998b. *Survey of Aquatic Invertebrates Associated with Irrigation Waters on Owens Lake at the Agrarian Project Site and the South Flood Irrigation Project Site*. Contact: Great Basin Unified Air Pollution Air District, 157 Short Street, Bishop, CA 93514. Prepared by: Dr. David Herbst, 1130 Swall Meadows Road, Swall Meadows, CA 93514.

[5] Great Basin Unified Air Pollution Control District, 2001. *An Evaluation of Aquatic Habitats Formed by Irrigation and Drainage of Managed Vegetation Tracts and Shallow Flooding on the Owens Lake Playa, Inyo County, California*. Contact: Great Basin Unified Air Pollution Air District, 157 Short Street, Bishop, CA 93514. Prepared by: Dr. David Herbst, 1130 Swall Meadows Road, Swall Meadows, CA 93514.

deposits. These activities would be conducted in accordance with the maintenance practices described in Section 2.6.2.4 of the Final EIR. Land-leveling activities would only be permitted in the vicinity of snowy plover nesting areas during an emergency situation (a sudden, unexpected occurrence that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services [Public Resources Code, Section: 21060.3]).

Shallow flooding areas would be contained by perimeter berms approximately 3 to 5 feet in height and 6 to 16 feet in width, where necessary, to prevent surface flow from leaving the site. The tops of the berms could be used as permanent roads. Berms will be constructed to resist erosion from wind waves and storm flows. Erosion protection measures will include low side-slope angle and/or riprap on interior berm faces. These perimeter berms will be constructed from compacted native material and will have a gravel surface, where required, to accommodate vehicular access. Shallow flooding perimeter berms will most likely be used in combination with a subsurface perimeter drain system to minimize lateral subsurface leakage.

Shallow Flood areas will have the potential to generate high volumes of storm runoff after a precipitation event due to saturated antecedent conditions. Each shallow flood block will include a high capacity spillway. Spillways will likely take the form of culverts or broad low sections in a berm. Shallow flood areas could be expected to spill storm flow to the lake bed surface following significant precipitation events.

Tailwater Recycling Facilities

Shallow flooding areas may have tailwater recycling facilities located at the topographic low point in each area as necessary. The purpose of the tailwater recycling facilities will be to recirculate excess surface water and drainwater to the drain-water mainline or back to the shallow flooding irrigation system. These facilities will include intake structures, such as catch basins, screen vaults, buried piping, and a tailwater pump station. Tailwater pump stations will likely be equipped with either submersible or aboveground pumps and motors.

II.1.1.2 Managed Vegetation Dust Control Measure

A total of 2.6 square miles (1,672 acres) of new DCMs will consist of managed vegetation. In addition, 0.7 square miles (458 acres) previously analyzed as shallow flooding will be constructed as Managed Vegetation. According to the information provided to the District by the LADWP, managed vegetation will be constructed in seven discrete locations. Areas designated for managed egetation will be divided into numerous irrigation fields, typically 40 to 160 acres in size. Pursuant to the 2003 SIP performance standards, areas treated with managed vegetation will be required to achieve coverage of at least 50 percent of the land surface on each acre consisting of substantially evenly distributed live or dead vegetation. Each irrigation field will typically consist of four service blocks of approximately 10 to 40 acres in size. The exact size and shape of the blocks will be adjusted to fit site-specific conditions, including avoidance of sensitive resources. Each block will be cultivated with locally adapted native plant species approved by the District; or other species approved by both the District and the California State Lands Commission (CSLC). The managed vegetation DCMs installed by the City in 2002 are planted with salt grass (*Distichlis spicata*). Additional species, such as salt-tolerant Owens Valley native shrubs, have performed well in some conditions and could be effectively utilized in conjunction with managed vegetation DCMs, if approved by the District. The typical layout of a 40-acre block would consist of a typical irrigation pipe layout, drip tube laterals, furrows, and flush fields. The managed vegetation DCM areas will include a 16 foot wide perimeter service road. The service roads will typically be compacted with native material but will likely be surfaced with gravel, if necessary to reduce dust emissions or to improve accessability.

Turnout mainlines will convey water flow from the turnout connections to distribution manifolds to the managed vegetation areas. Turnout mainlines will be constructed of plastic pipes with diameters up to approximately 24 inches. Water will flow from the manifold to the field submains and then into a network of subsurface drip tubes, sprinklers or gated pipes, according to the irrigation plan used.

Where drip irrigation is used, flexible risers will convey water from the buried primary submains and secondary submains to the drip tubes. The drip system will consist of plastic submain lines and lateral tubing with inline drip emitters. Drip tubing will likely range from 0.5 to 1.5 inches in diameter. A typical drip system arrangement will likely consist of one emitter per 10 square feet, with a 2 foot emitter spacing along tubing laid at 5-foot lateral spacing intervals, although drip-tube alignments and emitter spacing will be expected to vary with site conditions and local needs.

Sprinkler irrigation will potentially be used in the managed vegetation fields as an alternative to drip systems. Sprinklers are able to wet the entire ground surface, providing greater flexibility in leaching and reclaiming difficult soils. Where sprinkler irrigation is used, water will be distributed from the turnout mainlines through 2-inch to 8-inch plastic piping. Field piping will be spaced 10 feet to 50 feet apart typically with risers and spray nozzles at 20 to 50 foot intervals. To minimize ground disturbance impact to sensitive areas or to implement managed vegetation in areas where belowground construction is difficult, aboveground piping will be used to deliver water to the sprinklers. Temporary aboveground piping will potentially be used in addition to permanent drip irrigation to reclaim difficult soils or to provide additional water for short-term plant establishment.

Surface irrigation will potentially be used as another alternative to drip systems in managed vegetation fields. In this option, water will be distributed to the blocks through 2 inch to 12 inch plastic piping. Actual introduction of the water into the fields will likely be accomplished through gated plastic pipe, through a series of risers similar to those used in shallow flooding, or by direct spillage from a pipe outlet. Where surface irrigation is used, the blocks will typically be surrounded by low berms to contain ponded water until it seeps into the soil. These berms will be constructed of local material and may be up to 2 feet in height. The temporarily ponded water in these surface-irrigated areas will generally be less than 4 inches deep but may be deeper in some limited areas due to variation in local topography.

Fertilizer Injection and Water Treatment Systems

An independent fertilizer injection or "fertigation" and water treatment system will supply each managed vegetation turnout. These systems deliver fertilizer through the irrigation system. Each system will be located at turnouts adjacent to the freshwater conveyance mainlines and will be placed on an approximately 48-foot by 28-foot concrete pad. Each system will service between 320 and 800 acres. An independent fertigation and water treatment system will include four 88-inch-diameter fertilizer (Nitrogen-Phosphorus-Potassium) tanks (typically 88 inches in diameter with a 1,600 gallon capacity), a chlorine (NaOCl) tank (typically 97.5 inches in diameter with a 1,900 gallon capacity), a sulfuric acid (H_2SO_4) tank (typically 88 inches in diameter with a 1,600 gallon capacity), and a sodium bromide (NaBr) tank (typically 72 inches in diameter with a 740 gallon capacity). Tanks will generally range between 60 and 96 inches in height. Chemical injection tanks would consist of a 1,600 gallon, DS-75 Descalent tank containing a product to prevent calcium carbonate ($CaCO_3$) lime scale formation in the drip tubes; a 1,600 gallon, 12 percent sodium hypochlorite (chlorine bleach) tank containing biocide; a 750 gallon, 40 percent sodium bromide tank used in conjunction with sodium hypochlorite to increase the biocidal effectiveness at high pH; and a 1,600 gallon, 93 percent sulfuric acid tank. The acid would be used as an agent to remove lime scale deposits in the irrigation filters and periodically reduce the pH of the irrigation water from pH 11 to pH 8. The fertilizer tanks would consist of three 1,600 gallon tanks (4,800 gallons total) containing liquid potassium nitrate (KNO_3) formulated to an NPK ratio of 3-0-11. One of these tanks may periodically be used for another fertilizer, 28 percent magnesium chloride ($MgCl_2$). The systems would also include fill stations, water hydrants, and concrete spill containment walls and secondary precautionary concrete containment walls.

II.1.1.3 Gravel Dust Control Measure

Gravel is one of the three potential DCMs allowed under the 1998 SIP and proposed as an option under the 2003 SIP. Gravel Cover DCM was analyzed in the 1998 Program EIR[6] and the Southern Zone Negative Declaration.[7] Gravel has previously been approved for installation on 0.06 square mile (40 acres) in the south. No additional gravel placement is proposed at this time. If gravel is selected to replace proposed shallow flooding or managed vegetation DCMs or for placement in other areas on the emissive playa, a project level environmental analysis will be required. An analysis of the gravel cover DCM is provided here because it is included as an optional DCM in the Proposed 2003 SIP Revision.

A four-inch layer of coarse gravel laid on the surface of the Owens Lake dry lake bed bed prevents PM_{10} emissions by: (a) preventing the formation of efflorescent evaporite salt crusts, because large spaces between the gravel particles interfere with the capillary forces that transport saline water to the surface where it evaporates and deposits salts; and (b) raising the threshold wind velocity required to lift the large gravel particles (i.e., larger than 0.5-inch diameter) so that transport of the particles is not possible by wind speeds typical in the Owens Lake area. Gravel blankets can work effectively on essentially any type of soil surface. The gravel placed onto the lake bed surface will be approximately the same color as the existing lake bed, and it will be durable enough to resist wind and water deterioration, physical or mechanical weathering by salts, and leaching.

Under certain limited conditions of sandy soils combined with high groundwater levels, it may be possible for some of the gravel blanket to settle into lake bed soils and thereby lose effectiveness in controlling PM_{10} emissions. To prevent the loss of any protective gravel material into lake bed soils, a permeable geotextile fabric may be placed between the soil and the gravel, where necessary. This will prevent the settling of gravel into lake bed soils.

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[6] Great Basin Unified Air Pollution Control District, 1997.

[7] City of Los Angeles Department of Water and Power, 2001a.

To prevent pore space infilling and possible capillary rise of emissive salts to the surface, gravel areas must be protected from water- and wind-borne soil and dust. The gravel blanket will be the last control measure to be installed to prevent graveled areas from becoming surrounded by non-emissive areas. This will minimize wind-borne depositions into the gravel blanket. Gravel areas will be protected from flood deposits with flood-control berms, drainage channels, and desiltation/retention basins. The large pore spaces between the coarse gravel particles must be maintained to ensure that the gravel blanket is and will continue to be an effective PM_{10} control measure for many years.

Once the gravel cover has been applied to the playa, limited maintenance will be required to preserve the gravel blanket. The gravel will be visually monitored to ensure that the gravel blanket has not filled with sand or dust or has not been inundated or washed out from flooding. If any of these conditions were observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface. Operation of gravel and an average ongoing maintenance amount of gravel of 7,000 cubic yards per square mile per year (this allows for complete gravel replacement once every 50 years).

II.1.2 Mainline and Drainwater (Brineline) Connections

Water will be supplied for managed vegetation irrigation from new connections to the recently completed Lake-wide Mainline System (LMS). In addition, a drainwater mainline (brineline), which runs parallel to the LMS, will deliver saline water to existing blending facilities. Although the generally less sensitive soils in the north will not require a zone-long brineline, some additional brineline will be constructed to serve the new DCM facilities in the north. These will link shallow flooded areas with nearby managed vegetation facilities. In particular, a brineline will be constructed along a portion of the western edge of Zone 2 adjacent to the area that will be converted to shallow flood and will connect with Zone 1 through the Zone1/Zone 2 connecting corridor. New brineline segments will also be developed adjacent to the mainline corridor north of Zone 1 and along the access corridors to the new northwestern managed vegetation areas, connecting these areas to Zone 1. This access road will be 100 feet wide for construction with a permanent easement width of 65 feet.

A new turnout facility is proposed along the LMS in Zone 2. One new turnout facility will be required in the LMS corridor north of Zone 1 at the point of intersection of the access corridors to the new northwestern managed vegetation area. Irrigation water will be diverted from the LMS into the turnout mainline and delivered to the managed vegetation fields. Turnout facilities are located at each LMS turnout. At the turnout facilities, recycled drainwater collected by the drainage lines under the managed vegetation areas and pumped to the brineline will be blended with fresh water from the LMS pipeline to achieve a target electrical conductivity (EC). The target EC of the managed vegetation irrigation water will likely vary from less than 1 to as much as 20 deciSiemens per meter (dS/m).

Blended water will be distributed to the managed vegetation areas through turnout mainlines. This blended water will maintain irrigation water salinity levels adequate to prevent damage to the underlying clay soil structure. Turnout mainlines will be plastic pipe up to 24 inches in diameter. A minimum of 2 feet of soil cover will be required over the turnout mainlines to prevent damage to the pipes by wheel loads from construction and maintenance equipment. Aboveground distribution manifolds will be located along the turnout mainlines at approximately one eighth to one-half mile intervals and will control flows to the irrigated fields. Distribution manifolds will generally serve between one and four managed vegetation blocks. The distribution manifold will also be constructed of plastic.

II.1.3 Subsurface Drainage System

Subsurface drainage piping may be placed beneath drip-irrigated fields and shallow flooding areas and around the perimeter of the DCMs, as necessary, to control subsurface water.

- Groundwater control to provide a drained root zone under drip-irrigated salt grass
- Groundwater control to provide a drained pipe zone under pipelines for protection against pipe floatation
- Perimeter groundwater control around shallow flooding facilities to capture shallow flooding water for recirculation within the shallow flooding systems
- Perimeter groundwater control to ensure no impact to offsite groundwater hydrology

The drainwater system will collect subsurface flows from irrigation water applied to leach salts from the plant root zone, shallow groundwater flowing away from the flooding areas, natural groundwater flowing into the lake bed, and infiltrated stormwater runoff.

The field drainage systems are separated into several Drainage Management Units (DMUs), generally ranging in size from 80 to 640 acres in size. The drainwater collection system within each DMU conveys drainwater to one outlet consisting of a sump and drain pump. DMU pumps will range from 5 hp to 100 hp in size. At each drain pump station, cabinets will be installed to house transformers, controls, pumps, and valves. Up to five cabinets up to 8-feet tall by 10-feet wide by 15-feet long will potentially be located at each drain pump station. Where used under managed vegetation, the field drainage system will be composed of a network of generally parallel drainliness, which will provide an adequate depth of unsaturated soil for plant rooting. Drainage piping will be perforated plastic pipe and will be installed in covered trenches placed between 5 and 12 feet below ground. The pipes will likely be wrapped in a porous fabric liner and enveloped by coarse material (fine gravel or sand) to prevent sediment from entering into the perforated pipe. The coarse drain envelope material will either be gathered from on-lake sand sources or trucked in from off-lake sources. Flow from the drainlines will be conveyed to centralized sumps and either recycled to the irrigation system or used in shallow flooding areas. Recycled drainage water will also be collected from Zones 1 and 2. The recycled drainage will be transported in the drainwater mainline, which runs parallel to the existing LMS. There will be connections to the freshwater LMS at the LMS turnouts.

The drainage recycling system is essential to the sustainable management of sensitive lakebed soils. Many lakebed soils are composed of fine, textured materials, such as silts and clays, and contain high levels of sodium (relative to calcium and magnesium) salts. When irrigated with dilute water, such as water from the Los Angeles Aqueduct, these soils change physically and may become unsuitable for managed vegetation. Therefore, recycled saline drainage water will provide a necessary salt source to prevent permanent soil degradation on sensitive soils during irrigation. South of Zone 2, recycled drainwater for blending with irrigation water will be transported along the route of the LMS in a separate drainwater mainline, which has been previously analyzed under the Southern Zones Negative

Declaration.[8] Some additional drainwater mainline piping (brinelines) will be constructed as part of new facilities in the north. These will link shallow flooded areas with nearby managed vegetation facilities. The brineline that will be constructed along a portion of the western edge of Zone 2 will be converted to shallow flood and will connect with Zone 1 through the Zone1/Zone 2 corridor. New brineline segments will also be completed adjacent to the mainline corridor north of Zone 1 and along the access corridors to the new northwestern managed vegetation areas, connecting these areas to Zone 1.

II.1.4 Power Supply and Controls

The previously approved location of Electric Service No. 2 will be moved approximately 2.5 miles north to improve construction and maintenance access of the upland portion of the power line. The previous location of Electric Service No. 2 was within a series of gullies, which hampered construction and maintenance of the upland portion of the line and subjected the facilities to impacts during flash flooding. Two additional electric service lines will be installed to provide power to the Owens Lake Dust Mitigation Program: (1) Electric Service No. 3, located between Highway 395 and the westernmost part of the dust control area (DCA), and (2) Electric Service No. 4, located west of State Route 136, which will provide electric service to the North Sand Sheet Shallow Flooding Project.

Power for the project will be supplied by an existing 34.5-kilovolt (kV) LADWP power line that runs along Highway 190, Highway 395, and State Route 136, on the southeast, west, and northeast sides of the Owens Lake dry lake bed, respectively. At the highways, transformers and regulators, located on approximately 14-foot by 20-foot pads and placed within approximately 20 foot by 30 foot fenced areas, will transform the power down to 4,800 volts. The 4,800 volt electric service will then extend overhead on a new pole line from the highway to the edge of the lake bed (historic shoreline) and then drop underground (within the historic shoreline) and connect to metering and distribution pad-mounted switchgears within the DCM areas. The aboveground portion of the services will be on 30- to 35-foot poles with a spacing of 250 to 275 feet. Each power pole will support 3 (half-inch-diameter) conductors that are located at the top of the pole and extend out by 3.5 feet on the sides and down by approximately 4 feet from the top of the pole. At the last pole, a pole mounted conduit riser will be used to facilitate the undergrounding of service cables. The project power supply and control systems would be constructed in accordance with the California Code of Regulations, including General Order 95 for overhead power lines.

On the lake bed (within the historic shoreline), the power distribution to and within the DCA will be direct-buried cables located 2 to 3 feet below grade. This distribution will feed transformers at various turnouts and DMUs, where the voltage will be transformed down to 480-, 240-, and 120-volts for further underground distribution and to power devices that operate or monitor the irrigation system.

The construction zone for the power-supply corridor between the highways and the DCA will be 80-feet wide, and the permanent easement for the corridor will be 50-feet wide. A 16-foot-wide permanent road would run through the permanent easement. The length of each corridor outside the

[8] Ibid.

DCA will be as follows: (1) Electric Service No. 2 – approximately 7,336 feet, (2) Electric Service No. 3 – approximately 3,915 feet, and (3) Electric Service No. 4 – approximately 1,950 feet.

It is anticipated that the electrical systems will include an underground 4.8-kV direct-buried cable distribution system routed through the project site to accommodate build-out demands. The distribution system will include pad-mounted transformers located at each turnout distribution manifold, and where required, at drain-pump stations.

When pad-mounted transformers, switchgears, and other enclosures will be used, they will be covered by removable fiberglass supplemental enclosures. The pad-mounted transformers will be used to convert a 4.8-kV, three-phase, distribution level, to a 480-volt (V), three-phase, distribution level. Small transformers will be provided for converting power to a 120/208-V utilization voltage. Panel boards will be provided for 480-V distribution and 120/208-V distribution.

All medium-voltage conductors around the site will be direct-buried cables. At each turnout and pump station, the cabling systems will transition to an underground raceway system after the transformer. All low-voltage conductors at the turnouts and pump stations will either be in underground or exposed raceways. Warning tape and cable markers will be provided to identify the underground power and control lines. New connections to an existing fiber optic or radio supervisory control and data acquisition (SCADA) line will be used to transmit data from monitoring equipment to the existing operations building in Keeler.

Access Roads

Access roads connecting the lake bed DCMs with off-lake transportation and power corridors will be installed in the new power corridors. A permanent access road for Electric Service No. 2 will connect State Route 190 to access roads within the DCA. The permanent access road for the majority of Electric Service No. 3 will be the existing Lake Mainline Road. As the connection point for Electric Service No. 4 is adjacent to the DCA, no access road is required. One short permanent access road spur for Electric Service No. 3 will be constructed north of the Lake Mainline Road to Highway 395. A second short permanent access road spur for Electric Service No. 3 will be constructed north of the Lake Mainline Road to the boundary of the westernmost DCA.

The access roads will be constructed in an 80 foot wide construction corridor, with a permanent easement of 50 feet. The approximate length of each permanent project access road outside the lake bed will be as follows: (1) Electric Service No. 2 permanent access road – approximately 7,336 feet, (2) Electric Service No. 3 permanent access road between Highway 395 and South Zonal Mainline Road – approximately 785 feet, and (3) Electric Service No. 3 permanent access road between South Zonal Mainline Road and westernmost DCA – approximately 485 feet. The proposed access road will be at least 250 feet from existing district air monitoring stations, and all roadway surfaces within 1,000 feet of these stations will be gravel capped to prevent roadway dust emissions.

Access road/utility corridors will connect new DCM areas to existing project roads and polygons. Each utility corridor will contain freshwater and drainwater pipelines, fiber optic SCADA lines, and underground power cables. A 16 foot wide permanent access road will be developed within the corridor at grade or up to 4 feet above grade, sloped at 3:1 or greater and surfaced with local material or gravel to control dust emissions if required. Access Road/utility corridors will involve a 100 foot construction corridor and a 65 foot permanent corridor width.

Stormwater Control Berms

Stormwater control berms will be constructed along upslope perimeter areas of the project site and will be located at or slightly above grade. It is anticipated that each control berm will be approximately 3,000 to 5,000 lineal feet. These berms will serve to disperse channeled stormwater across parts of the lake bed that are prone to overland flow, to reduce flow velocities, and to prevent damage to DCMs. The stormwater control berms will be located within approximately 24- to 50-feet of the DCM boundary in the construction zone, and they will be oriented approximately parallel to the boundary.

II.2 CONSTRUCTION SCENARIO

The 2003 SIP mandates that in order to achieve compliance with the NAAQS for PM_{10} the DCMs must be constructed and operational by December 31, 2006 (Table II.2-1, *Construction Schedule*).

TABLE II.2-1
CONSTRUCTION SCHEDULE

	2003	2004	2005	2006
Project Design				
Managed Vegetation & Shallow Flood Construction				
Soil Reclamation				
Managed Vegetation Planting				
Vegetation Growth				
Shallow Flood Construction				
Shallow Flood Operation				

In addition to the new 5.5 square miles of DCMs of the roject, an additional 4.7 square miles of DCMs (previously analyzed) will be constructed (10.3 square miles total). The construction that will be required to meet the 2006 NAAQS standard for PM_{10} emissions consists of eight primary activities:

- Site preparation (surface grading and earth moving)
- Berm construction and access road grading
- Irrigation and drainline construction (trenching, pipeline installation, trench backfilling)
- DCM area dewatering
- Irrigation system installation within the DCM areas
- Powerline and SCADA controls installation
- Managed vegetation DCM planting
- Shallow flood DCM flooding

Supporting activities will include fence installation, material delivery, and transportation of crews. All site preparation and construction activity will be undertaken in accordance with federal, state, and County of Inyo building codes.

A summary of the types of construction activities for each component of the project and construction labor and equipment requirements is provided in Table II.2-2, *Anticipated Construction Equipment and Work Crews*. It is anticipated that the peak construction period for the 2003 SIP will not exceed that experienced during installation of 1998 SIP DCMs. The peak period of construction experienced in conjunction with the 1998 SIP occurred in late spring and early summer of 2002, when approximately 250 pieces of equipment and 200 construction personnel were mobilized onsite. Similarly, it is anticipated that peak construction for the 2003 SIP DCMs will be expected between late spring 2004 and early summer 2005, during installation of plants for the managed vegetation DCMs. Construction activities are expected to occur 6 days a week for 12 hours a day. However, construction activities may occur 7 days a week for 24 hours a day to complete construction on schedule. It is anticipated that, at the end of each shift, construction crews who have just completed their shift will generally leave the site and return home; and the next crews will already be onsite and working when the shift changes.

TABLE II.2-2
ANTICIPATED CONSTRUCTION EQUIPMENT AND WORK CREWS

Construction Activity	Brief Description	Activity Length (Estimate)	Equipment Requirement Per Crew	Crew Composition (Estimate)	Number of Crews
Site Preparation	Clearing the proposed site of mainly existing surface features; leveling and clearing of minimal vegetation and other debris	30 days	1 bulldozer 1 front end loader 1 grader 2 dump trucks 1 scraper	4 operators 2 surveyors 4 laborers 1 foreman	1
Earth Moving/ Tillage	Excavation, grading for drainage, and ripping the project area. Tillage for managed vegetation	60 days	2 bulldozers w/ disc plows 1 scraper	3 operators 1 foreman	2
Storm Water Control Berms	Construction of earth berms along perimeter of project site, includes excavation, backfill, grading, and compaction	30 days	1 excavator 1 front-end loader 1 compactor 1 water truck 1 job pickup 1 scraper 2 haul trucks	6 operators 5 laborers 1 foreman	1

TABLE II.2-2
ANTICIPATED CONSTRUCTION EQUIPMENT AND WORK CREWS, Continued

Construction Activity	Brief Description	Activity Length (Estimate)	Equipment Requirement Per Crew	Crew Composition (Estimate)	Number of Crews
Shallow Flooding and Pond Berms	Construction of earth berms in shallow flood area includes excavation, backfull with soil, grading, and compaction and riprap placement	150 days	2 excavators 1 front-end loader 1 compactor 1 water truck 2 job pickups 4 scrapers 4 haul trucks	12 operators 1 foreman 6 laborers	2
Dewatering	Dewatering and discharge of onsite groundwater within and outside project limits	300 days	2 job pickups, pumps (see end of table for generators)	2 laborers 1 foreman	1
Turnout Mainline Pipelines	Excavation, pipeline delivery, pipeline excavation, installation, and backfilling	60 days	1 tracked excavator/trencher w/conveyor 1 tracked chain-machine trencher 1 bulldozer 1 front-end loader 1 crane/pipelayer 1 compactor 3 pipe delivery trucks 3 job pickups	5 operators 1 grade check 2 welders 3 laborers 1 foreman	1
Supply Submain Installation	Excavation, pipeline delivery, pipeline excavation, installation, and backfilling	90 days	1 tracked excavator/ trencher w/ conveyor 1 tracked chain-machine trencher 1 bulldozer 1 crane/pipelayer 1 compactor 2 pipe delivery trucks 2 job pickups	6 operators 1 grade checker 3 laborers 1 foreman	2
Lateral Drains Installation	Excavation, pipeline delivery, pipeline excavation, installation, and backfilling	120 days	1 tracked excavator/ trencher w/ conveyor 1 tracked chain-machine trencher 1 bulldozer 1 front-end loader 1 compactor 2 pipe delivery trucks 2 job pickups	5 operators 1 grade checker 4 laborers 1 foreman	4

TABLE II.2-2
ANTICIPATED CONSTRUCTION EQUIPMENT AND WORK CREWS, Continued

Construction Activity	Brief Description	Activity Length (Estimate)	Equipment Requirement Per Crew	Crew Composition (Estimate)	Number of Crews
Collector Drains Installation	Excavation, pipeline delivery, pipeline excavation, installation, and backfilling	90 days	1 tracked excavator/ trencher w/ conveyor 1 tracked chain-machine trencher 1 crane/pipelayer 1 bulldozer 1 compactor 2 material delivery trucks 2 job pickups	5 operators 3 laborers 1 foreman	2
Drip Tubes	Excavation, tube delivery, trenching, installation, and backfilling	75 days	2 tracked chained-machine trenchers 1 bulldozer 4 material delivery trucks 2 job pickups	3 operators 6 laborers 1 foreman	2
Shallow Flood Drains Installation	Excavation, pipeline delivery, pipeline excavation, installation, and backfilling	60 days	1 tracked excavator/ trencher w/ conveyor 1 tracked chain-machine trencher 1 crane/pipelayer 1 bulldozer 1 compactor 1 material delivery truck 2 job pickups	5 operators 3 laborers 1 foreman	1
Power Line and SCADA Line Installation	Site and area power and control distribution pole lines and/or underground conduits, service meter and switchboard, and distribution switchgear	75 days	1 post-hole digger/ crane truck 2 backhoes 1 come-a-long vehicle 2 cable reel trucks 1 delivery truck 1 job pickup truck	8 operators 4 laborers 1 foreman	1
Road Construction	Construction of elevated roads on berms using native materials, placement of soils, compaction, grading, and gravel placement	75 days	1 excavator 2 compactors 2 graders 3 haul trucks 1 water truck 1 job pickup 1 scraper	9 operators 4 laborers 1 foreman	1

TABLE II.2-2
ANTICIPATED CONSTRUCTION EQUIPMENT AND WORK CREWS, Continued

Construction Activity	Brief Description	Activity Length (Estimate)	Equipment Requirement Per Crew	Crew Composition (Estimate)	Number of Crews
Management Activities	Construction management and field inspection	312 days	10 job-site vehicles	2 contractor superintendents 3 field engineers 6 inspectors 4 office staff	1
Environmental Mitigation Crews	Environmental mitigation crews will conduct environmental surveys and mitigation monitoring activities	Ongoing	ATVs, 4-wheel drive passenger vehicles	2 to 6 people per survey	7
Planting	Installation of vegetation, including nighttime planting to minimize shock to plant material	45 days	1 planting machine 1 delivery truck 1 job pickup	1 operator 10 laborers 2 drivers 1 foreman	10

NOTE:
This table shows the approximate level of construction activity needed to install the project features in the 6.1 square mile impact area.

Trailer-mounted temporary lights will be used during the night to illuminate areas where there is substantial construction activity. Each illuminated construction area will be approximately 400 to 500 square feet. Other areas will be illuminated minimally and only as necessary to ensure adequate safety for access and egress. The existing construction staging areas will have minimal lighting at night associated with the contractor's trailers, repair work, and safety lighting. Approximately ten, 50-horsepower, diesel generators may be used to power lights used for nighttime construction activities. Additional lights will be mounted on heavy construction vehicles such as scrapers, loaders, tractors and dozers, and other equipment, as necessary. Construction lights will be directed away from roads and communities to the maximum extent practicable. With the exception of the delivery of plant material for managed vegetation, nighttime delivery of equipment and materials will be minimized.

All hazardous materials will be stored, handled, disposed, and transported in accordance with local ordinances and state and federal regulatory requirements. In compliance with existing chemical safety and storage regulations, chemicals used during construction and operations will be contained in tanks placed on concrete slabs within containment walls, double-wall tanks, or berms. LADWP will be required to obtain a Certified Unified Program Agency permit from the Inyo County Health Services Department and disclose to the local fire emergency services any stored/handled/disposed hazardous material wastes prior to construction. All combustible materials will be handled in accordance with fire and safety requirements. All unused construction materials will be removed from the project site upon completion of improvements. Solid waste generated during construction or operation of the project will be transported to a permitted solid waste disposal facility. The Project site will be monitored for excessive erosion. If such erosion is observed, LADWP will take immediate corrective action, including implementation of Best Management Practices (BMP). A typical construction crew will be composed of about 10 workers. The majority of construction activities will involve one to three work crews (Table II.2-2). Local construction crews will be used as much as possible to keep lodging and housing demands to a minimum; otherwise, nonlocal construction crews will be used. In the event that temporary housing is needed, lodging at local motels in Lone Pine will be arranged. Sanitation service will be provided by portable units. Medical treatment will be available at the Northern Inyo Hospital in Bishop or Southern Inyo Hospital in Lone Pine.

Site Preparation

After obtaining necessary environmental clearances and permit approvals, project construction will begin in approximately April 2004 (Table II.2-1). Initial site preparation will include both surface-grading and earth-moving activities. Materials will be borrowed from onsite areas within the DCM footprints for use in construction of drainage systems and road and berm construction. Some of this material will be moved with small scrapers or loaded by front-end loaders into low surface pressure (wide footprint) dump trucks and transported to construction areas as needed. In addition, up to approximately 500,000 cubic yards of sand will be imported from Ridgecrest or Bishop. Areas with rough surfaces will be smoothed to allow operation of construction equipment and proper flooding of the surface during operations. Smoothing involves flattening of rough areas along the lake bed to eliminate most closed depressions while maintaining existing slope or grade. The access roads will be constructed along new turnout mainlines, to provide access into the new project areas, and along power corridors. Periodically, some aggregate base material will be imported, as necessary, to carry out the road construction. Soil will be compacted in accordance with geotechnical specifications as defined by LADWP and approved by the District.

Dewatering of Project Area

Dewatering of project areas will be necessary to prevent pipe floatation and to protect other subsurface construction and managed vegetation root zones. An estimated maximum of 17.8 acre-feet per day of groundwater may be dewatered during installation of pipelines, drains, and other project elements. The first and most desirable option for disposing of this water is to discharge it into existing shallow flooding areas. Where this is not possible due to distance or other factors, construction dewatering may be completed through several methods.

- Some of this water will be moved into dewatering discharge areas. BMP, such as retention basins, will be installed in the dewatering discharge area, as necessary, based on coordination between the LADWP and the Regional Water Quality Control Board (RWQCB).

- Water may be discharged to the land surface within the construction zone and allowed to infiltrate and evaporate (e.g., road/berm surface stabilization).

- Where this is infeasible due to distance, constructibility issues, or other factors, water will be pumped to the land surface within the construction zone , allowed to infiltrate and evaporate, and flow overland or become discharged down the gradient of the construction area toward the brine pool over barren playa. Indirect discharge may occur to surface water and/or the brine pool or playa areas that have been surveyed and determined not to support wetlands.

Certain areas around the project construction zone contain resources that may be sensitive to dewatering discharges. No dewatering discharges will be allowed to result in impacts to existing vegetated wetlands, occupied western snowy plover nesting habitat, or other sensitive resources.

Discharges directly within the U.S. Borax property under lease with the California State Lands Commission will not be permitted. Temporary retention basins and/or other BMP will be located in construction dewatering discharge areas to minimize sediment transport and potential indirect discharge to U.S. Borax property and surface waters.

II.2.1 Dust Control Measures

II.2.1.1 Shallow Flooding DCM Construction

Shallow flooding DCMs will be constructed in 2004 to 2006 (Table II.2-1). Construction will generally include development of access roads, pipeline corridors, irrigation, collection and recirculation facilities, and electrical distribution lines. The primary differences between shallow flooding and managed vegetation are:

- Shallow flooding will likely release water through risers or surface pipes rather than buried drip tube networks.
- In shallow flooding, little or no vegetation is present.
- Shallow flooding areas will be surrounded by surface berms for water containment.
- In shallow flooding, the ground is surface saturated or is covered by standing water.

II.2.1.2 Managed Vegetation DCM

II.2.1.2.1 Managed Vegetation DCM Construction

Because it will take time for the managed vegetation to become established, construction of these DCMs will start earlier than shallow flooding DCMs (Table II.2-1). During 2004 and early 2005, soil in the managed vegetation DCM areas may be smoothed, loosened, and re-compacted with tractor-mounted equipment to facilitate plant growth. Smoothing will be accomplished with a large bucket, open at the front, which alternately gathers and deposits earth to create a smoother surface. Loosening will be accomplished with a disk or tined harrow. The soil will be loosened to about 12 inches in depth over the entire managed vegetation area and clods will be broken into smaller pieces. In general, managed vegetation DCMs have not been included in hardpan areas. However, some small or undetected hardpan areas will inevitably be included within the managed vegetation DCMs. In these areas, larger, stronger tines will likely be employed to loosen cemented soil layers. Additional work with disks may be required to break up large blocks of cemented soil. Re-compaction will be achieved with a cultipacker or flat roller. Shaping of raised planting beds will be done with shovels mounted on a drawbar.

Drip tubing will be fed through "shanks" (vertical teeth moved through soil at about 12 inches in depth) off of supply rollers or may be surface laid and secured with pins. Salt crust that forms on the bed surface during soil reclamation (leaching) will be either be "scalped" or removed with drawbar-mounted shovels and transported to the bed margins and furrows before planting. Soil crusts may develop before or after planting, potentially obstructing saltgrass spread. Rolling cultivators may be used to fracture these crusts several times each summer, facilitating saltgrass spread and emergence.

Tractor and backhoe excavation (tracked and/or wheeled) equipment will be used during construction of pipelines and drip irrigation systems, as well as for land tillage and planting. Intermittent tractor access will be required during the first few years of operation for crust fracturing and weed control activities. Primary access of the roads after the completion of construction will most likely be accomplished by passenger vehicles and small off-road vehicles such as 4-wheel ATVs.

II.2.1.2.2 Managed Vegetation Planting

Planting will begin after tillage and installation of drip lines. Soil leaching may or may not have been completed. Planting of vegetation will be scheduled for late March or early April 2005–after the last chance for frost–to take full advantage of the spring growth period (Table II.2-1). Planting should be completed before the end of May because planting after spring shortens the growing season and reduces the likelihood of achieving 50 percent cover within two growing seasons. However, planting will be conducted as necessary to meet construction or compliance schedules. During previous 1998 SIP project phases, plant material was successfully installed as early as January and as late as July.

Plant material may be installed at night to minimize shock. Plant material will be seeded or grown at offsite nurseries and transported to the site with standard commercial delivery trucks. It is anticipated that up to 24 trips will be made per night to deliver plants.

Planting will be mechanized to complete the operation within the planting window. Tractor-mounted transplanters or seeders may be used to plant most of the managed vegetation areas. Depending on soil factors, some areas may require wide-track equipment or may require hand planting. If suitable alternatives to mechanized transplanting of saltgrass plugs can be identified, such alternatives might be used to plant part or all of the managed vegetation area.

Where transplanters are used, each tractor-mounted planter will require a driver, personnel to feed the transplants into the planting wheel, and personnel following the planter to assure that the transplants are planted at a required depth and to help load the planter with transplant trays. For a conservative estimate, approximately 19 planters will be required. This estimate is based on a 12-hour workday and 6-day workweek. Double shifts for planters may be required to reduce the number of planters needed to complete the job. However, two shifts will require two sets of field personnel to operate; thus, personnel requirements will remain the same. Replanting in areas that experience high mortality will most likely be conducted by hand. If conditions require planting during the summer months, planting may be conducted at night to minimize stress on personnel and young plants.

II.2.2 Freshwater and Drainline Piping

Irrigation piping, drainage laterals, and collector-drain construction is expected to occur between June 2004 and May 2005 (Table II.2-1). Additional pipelines will be constructed during subsequent years if needed. Trenches for the irrigation submains and lateral pipelines will be excavated with tracked excavators. The width of the excavated trench at the existing ground surface is anticipated to be 2 to 4 feet. The trench will be approximately 4 to 5 feet deep. Pipes will be lifted and lowered into the trench with cranes or boom trucks (Figure II.1.1.2-1). Screened native material will be used for backfilling the trenches; the material will likely be screened onsite with portable screening boxes. The trenches will be backfilled with bulldozers or loaders, and materials will be compacted. Smaller trenches will be constructed for irrigation submains and drip-tube laterals requiring less excavation and backfilling. Smaller pipes could be hand lifted into trenches, reducing the use of cranes.

II.2.3 Power Supply and Control Facilities

It is expected that at least one truck with a post hole digger and crane, one cable reel truck, and one come-along rig will be needed for overhead pole line installations. Underground electrical raceways will be installed using a minimum of four cable line trucks, four trenchers and/or four backhoes. At a minimum, it is expected that a four-person crew will be needed for each pole installation truck and come-along. It is also expected that a minimum two-person crew will be needed for each cable line, truck, trencher, and backhoe for installation of underground lines. Additionally, it is expected that at least a dozen two-person crews will be required for installing surface equipment and conduit and wiring work.

SECTION III
MONITORING PROGRAM

The Mitigation Monitoring Program (MMP) contained herein satisfies the requirements of the California Environmental Quality Act (CEQA) taht relate to the Environmental Impact Report (EIR) for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan (proposed project). The Draft EIR, dated July 11, 2003, was circulated for a 46-day public review and comment period.

The EIR identifies mitigation measures that have been incorporated into the project to avoid, reduce, and mitigate significant impacts to seven CEQA environmental issue areas including air quality, biological resources, cultural resources, hazards and hazardous materials, hydrology and water quality, land use and planning, and transportation and traffic. This MMP has been designed to ensure compliance with mitigation measures defined in the Final EIR during implementation of the project. This MMP would be adopted by the County of Inyo, Board of Supervisors. Table III-1, *Mitigation Monitoring Plan for the 2003 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan*, lists those mitigation measures required by the Great Basin Unified Air Pollution Control District (District) to mitigate or avoid significant impacts anticipated in association with the EIR project description. It shall be the responsibility of the District to carry out the MMP by imposing the requirements of the mitigation measures throughout the implementation of the proposed project.

The Monitoring Program element of the MMP describes each required mitigation measure organized by impact area, with an accompanying delineation of the following:

- The agency or agencies (or private parties) responsible for implementation
- The period of the project during which implementation of the mitigation measure is to be monitored
- The Enforcement Agency (the agency with the power to enforce the mitigation measure)
- The Monitoring Agency (the primary agency to whom the reports are made and the primary agency responsible for monitoring the mitigation measure pursuant to CEQA)

As the indicated mitigation measures are completed, the Monitoring Agency will sign and date the MMP to indicate that the required mitigation measure has been completed for the subject period. The Monitoring Agency will also note the documentation (title of the monitoring report) that was submitted for each mitigation measure.

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Air quality						
Measure Air-1 To mitigate the air quality impact related to the violation of any air quality standard or a substantial contribution to an existing or projected air quality violation, LADWP shall apply BACM during construction to minimize fugitive dust emissions from unpaved roads and areas affected by the construction work specified in the 2003 Revised SIP, or related transportation and staging of equipment and materials to comply with District Rules 400 and 401. This may include, but shall not be limited to, use of chemical soil stabilizers, surface coverings, windbreaks, water trucks, and water sprays twice a day, or comparable measures that prevent visible dust from occurring. The District will monitor the application of BACM at least once a week on an ongoing basis and will maintain a monitoring log on file.	Los Angeles Department of Water and Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Weekly monitoring log	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Air-2 To mitigate the air quality impact related to cumulative net increase of fugitive dust (PM_{10}), LADWP shall submit a tilling and planting schedule as well as the installation techniques that shall minimize wind erosion for areas where managed vegetation shall be implemented as a DCM to the District for review and approval prior to final plans and specifications for managed vegetation. The schedule and techniques shall be approved by the District prior to initiating construction of managed vegetation required to achieve the performance standards specified in the 2003 Revised SIP, in order to ensure conformance with the project description.	Los Angeles Department of Water and Power	Preconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Tilling and planting schedule and installation techniques included in Final Plans and Specifications	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Biological resources						
Construction Measures ***Measure Bio-1*** To minimize potential direct impacts to western snowy plover from construction activities in the areas specified in the 2003 SIP revision to below the level of significance, the LADWP shall institute a lake bed worker education program. The program shall mirror the program instituted for workers for the 1997 EIR and shall focus on western snowy plover identification, basic biology and natural history, alarm behavior of the snowy plover, and applicable mitigation procedures required of the LADWP and construction personnel. The program shall be conducted by a biologist familiar with the biology of the western snowy plover at Owens Lake and familiar with special status plant and wildlife species of the Owens Lake basin. The biologist shall be approved by the District prior to implementation of the education program. The qualifications of the biologist shall be submitted to CDFG for review. The education program shall be based on the 1997 program EIR and shall include relevant updates by the biologist. The education program shall explain the need for the speed limit in the snowy plover buffer areas and the identification and meaning of buffer markers. All construction, operation, and maintenance personnel working within the project area shall complete the program prior to their working on the lake bed. A list of existing personnel who have completed the program shall be submitted to the District prior to the start of any work on the lake bed. A list of new personnel who have participated and completed the education program shall be submitted monthly to the District. A copy of the worker education program shall be provided to CDFG.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Worker Education Program Summary Report and Monthly Worker Education Program Reports for newly-trained personnel	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Bio-2 To minimize potential direct impacts to western snowy plover within the proposed project area due to construction activities in the areas specified in the 2003 SIP revision, the LADWP shall conduct a preconstruction survey for western snowy plover in all potential snowy plover habitat prior to any construction activity that is performed during the snowy plover breeding season (March 15 to August 15). Preconstruction surveys will be performed no more than seven days prior to the start of ground-disturbing activities. The LADWP shall place a 200-foot buffer around all active snowy plover nests that are discovered within the construction area. Green-colored stakes of less than 60 inches in height with yellow flagging will be used to mark buffer edges, with stakes spaced at eight approximately equidistant locations. The location of the nest (GPS coordinates) and current status of the nest shall be reported within 24 hours of discovery to the District. Maps of snowy plover nest locations shall be posted at the construction office and made available to all site personnel and District staff. The activity of the nest shall be monitored by a biological monitor approved by the District, as per existing guidelines for the North Sand Sheet and Southern Zones dust control projects and any revisions to the monitoring protocol that have been approved by CDFG. [Footnote: City of Los Angeles Department of Water and Power. 1 November 2002b. Environmental Impact Report and Environmental Impact Statement Lower Owens River Project. Contact: LADWP, 300 Mandich Street, Bishop, CA 93514.] Active snowy plover nests shall be monitored at least weekly. The qualifications of the biological monitor will be submitted to CDFG for review. The nest buffer shall remain in place until such time as the biological monitor determines that the nest is no longer active and that fledglings are no longer in danger from proposed construction or maintenance activities in the area. Buffers shall be more densely marked where they intersect project-maintained roads. Vehicles shall be allowed to pass through nest buffers on maintained roads at speeds less than 15 miles per hour, but shall not be allowed to stop or park within active nest buffers. Permitted activity within the nest buffer shall be limited to foot crews working with hand tools and shall be limited to 15-minute intervals, at least one hour apart, within a nest buffer at any one time. Compliance with this mitigation measure shall be confirmed by the District through issuance of a weekly written report by LADWP to the District.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Weekly monitoring reports (provided until construction is complete)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Bio-3 To minimize potential direct and cumulative impacts to western snowy plover and other sensitive biological resources from vehicles associated with construction activities in the areas specified in the 2003 SIP revision, the LADWP shall implement a speed limit within all active construction areas on Owens Lake during construction of dust control measures. Speed limits shall be 15 miles per hour within active snowy plover nest buffers. As specified in measure Bio-2, vehicles can only pass through active nest buffers and shall not be parked within active nest buffers. Designated speed limits for other construction areas outside of active nest buffers shall be maintained at the maximum speed that is determined to be safe according to vehicle capabilities, weather conditions, and road conditions. Site personnel and District staff shall be informed daily of locations where active nest buffers overlap with roads in the construction area. Signs shall be posted that clearly state required speed limits. The number of speed limit signs shall be kept at a minimum to reduce potential perches for raptors and other snowy plover predators and shall be outfitted with Nixalite or the functional equivalent if greater than 60 inches in height. Contractor education seminars as described in measure Bio-1 shall clearly explain the need for speed limits within the project area and the consequences for noncompliance. Compliance with this mitigation measure shall be confirmed by the District through issuance of a summary written report by LADWP to the District after completion of the education seminar and posting of speed limits. A copy of the summary report shall be provided to CDFG.	Los Angeles Department of Water and Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Compliance summary report (provided within 30 days of completion of education seminar and installation of speed-limit signs)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Bio-4 To minimize potential direct impacts to the sensitive upland bird species (loggerhead shrike, northern harrier, burrowing owl, and Le Conte's thrasher) found within the proposed project area due to construction activities in the areas specified in the 2003 SIP revision, any upland vegetation brushing or clearing required for construction shall be conducted outside of the breeding season for Le Conte's thrasher and loggerhead shrike (March 15 to August 15) and for northern harrier and burrowing owl (January 15 to July 15). Burrowing owl surveys will follow current CDFG Phase II burrow survey protocols. If brushing or other ground-disturbing construction activity is required between January 15 and August 15, a preconstruction survey shall be performed by a qualified biologist familiar with the special-status bird species within the proposed project area. The survey will be performed no more than seven days prior to the start of ground-disturbing activities. If an active nest or burrow being used as a nest site is found within 200 feet of proposed construction, the biologist shall flag mark a 200-foot buffer around the active nest or burrow, using the flag and stake coloring and placement pattern used for marking snowy plover nests (see measure Bio-3). Construction cannot proceed within this 200-foot buffer until the biologist determines that the nest is no longer active (i.e., the nest has been abandoned, or the fledglings have been out of the nest for 14 days), or owl nestlings are leaving the burrow on their own, or unless specifically authorized by the CDFG. The activity of the nest shall be monitored as per existing guidelines for the North Sand Sheet and Southern Zones dust control projects and any revisions to the monitoring protocol that have been approved by CDFG. The District and all lake bed workers shall be notified within 24 hours of finding any nest, with location (GPS coordinates), nest status, and buffer marker status provided. The District and all lake bed workers shall be updated weekly as to the current status of all nests. The fate of each active nest shall be documented in a written report that shall be submitted by the monitoring biologist to the District, the State Lands Commission, and the CDFG within 14 days after the biologist's determination that the nest is no longer active. Proof of compliance with this mitigation measure shall be performed by providing a copy of the monitoring report to the District, the State Lands Commission, and the CDFG.	Los Angeles Department of Water and Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Monitoring summary report Weekly status report (Reports provided until construction is complete)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Bio-5 To minimize potential direct and cumulative impacts to burrowing owls associated with dust control measures in the areas specified in the 2003 SIP revision and the 1998 SIP, the LADWP and its representative construction companies shall cover and maintain all pipe openings or other artificial structures suitable for burrow creation greater than 4 inches and less than 12 inches in diameter within the entire combined project area with screening or other material to prevent the use of pipes or structures by burrowing owls. Use of screening shall be limited to pipe that is stored within the proposed project area for at least two weeks without being used for construction activities or for openings suitable for burrowing owl use that remain after construction is complete. Screening or other suitable covering will be required for applicable pipe at ground level up to 5 feet above the ground. Any inactive pipe stacked higher than 5 feet above the ground does not require screening. Proof of compliance with this mitigation measure shall be sent to the District and CDFG in the form of monthly written reports.	Los Angeles Department of Water and Power	Construction and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Monthly monitoring reports (provided until deemed unnecessary by the District)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Bio-6 To minimize indirect impacts to nesting bird species associated with project lighting during construction activities in the areas specified in the 2003 SIP revision, the LADWP shall institute all best management practices to minimize lighting impacts on nocturnal wildlife. Previous construction has occurred during nighttime hours to complete construction schedules and to prevent personnel from working during times of high temperatures. If night work is deemed necessary, then construction crews shall make every effort to shield lighting on equipment downward and away from natural vegetation communities or playa areas, and especially away from known nesting areas for snowy plovers during the nesting season (March to August). All lighting on existing and newly built facilities shall be minimized to the greatest extent possible, while still being in compliance with all applicable safety requirements. Required lighting shall be shielded so that light is directed downward and away from vegetation or playa areas. Proof of compliance with this mitigation measure shall be confirmed by the District, and a copy of the compliance record shall be provided to CDFG.	Los Angeles Department of Water and Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Compliance summary report (provided until construction is complete)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Bio-7 To minimize the potential direct impacts to nonemissive wetland and upland scrub vegetation communities from construction activities in the areas specified in the 2003 SIP revision to below the level of significance, the LADWP shall clearly mark all nonemissive wetland areas and upland scrub communities in the proposed dust control areas and within 50 feet of the boundary of dust control areas to prevent construction activity from impacting these vegetation communities. Nonemissive areas shall be marked using stakes less than 60 inches high, spaced 10 feet apart, along the edges of spring mounds, and spaced 100 feet apart along other vegetated edges. Marking shall occur prior to the initiation of construction activities. GIS mapping of nonemissive vegetation limits shall be provided to the contractor during the bidding process. Construction buffer areas outside of the dust control boundaries shall be reduced as required to prevent construction activities from impacting adjacent vegetated areas. No temporary or permanent access routes through vegetated areas will be established, except those specified in the Project Description. Incursions into established vegetated areas that cause measurable loss of plant cover will require revegetation with suitable local, native plant species. Proof of compliance with this mitigation measure shall be verified by submitting a written report to the District and CDFG detailing the type and locations of delineated wetland and upland areas. This report shall be submitted prior to the start of construction activities. The mitigation plan must contain a schedule and protocol for achieving revegetation within two years of any impacts to vegetation caused by access routes or construction activities outside the areas specified in the Project Description.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Compliance summary report (provided to the District prior to the start of construction)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Operations and Maintenance Measures ***Measure Bio-8*** To minimize direct impacts to emissive transmontane alkaline meadow (TAM) wetland communities caused by installation of dust control measures as specified in the 2003 SIP revision on emissive TAM to below the level of significance, the LADWP shall institute a wetland mitigation program prior to the initiation of construction activities. The program shall be designed to emphasize restoration of equivalent functions and values of wetlands within the proposed project area as compared to preproject impacts. The wetlands mitigation program will include mitigation goals, target success criteria, an implementation plan, plant species and spacing, irrigation design, monitoring activities, and maintenance requirements. Managed vegetation is deemed to have equivalent functions and values to dry TAM that would be impacted by the proposed project at a ratio of 2 acres of managed vegetation created for every 1 acre of dry TAM impacted. The proposed project calls for creation of approximately 1,678 acres of managed vegetation. An estimated 102.47 acres of dry TAM are anticipated to be impacted by the proposed project. The creation-to-impact ratio for the proposed project would be approximately 16:1. A managed vegetation area of at least 205 acres shall be designated as the wetland mitigation area within the prescribed managed vegetation areas as proposed in the project description. LADWP shall designate the wetland mitigation area in a managed vegetation area that is either directly adjacent to, or in near proximity to, existing natural TAM areas. Examples of potential wetland mitigation areas would be within areas 18 and 19. A design for the designated wetland mitigation area shall be provided to the District for approval prior to construction of any managed vegetation. A copy of the map shall be provided to CDFG and the State Lands Commission. A TAM management plan shall be created by LADWP to monitor the designated wetland mitigation areas for appropriate coverage of native species, for change in extent of TAM over a five-year period postconstruction, and to conduct weed abatement in wetland areas in and within 500 feet of the proposed project area. The management plan shall monitor wetland mitigation areas for five years postconstruction with specific goals for native plant species coverage and management of invasive, nonnative plant species. The TAM management plan shall be approved by the District prior to the initiation of construction activities. A copy of the management plan and subsequent monitoring reports shall be provided to CDFG and to the State Lands Commission.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Designated Wetland Mitigation Map, TAM Management Plan (provided to the District prior to the start of construction of any managed vegetations), and monitoring reports (provided annually for 5 years postconstruction)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Calculations of dry TAM impacts from implementation of the proposed project are estimates based on the mapped extent of TAM areas within the proposed project area and a determination of whether an area is emissive or nonemissive based on dust monitoring data. The total acreage of wetland mitigation for dry TAM shall be two times the actual direct and indirect impact area caused to dry TAM by both construction and postconstruction activities. If any unanticipated direct or indirect postconstruction impacts to moist or saturated TAM communities occur as a result of project construction or operation, LADWP would be required to designate additional wetland mitigation areas and incorporate design parameters that would result in the replacement of equivalent functions and values to the impacted moist or saturated TAM wetlands within two years of the initiation of the replacement effort. Significant impacts would include loss of vegetative cover due to ground disturbance or change in species composition attributable to drying of springs or ponds, which does not self-repair within two years of detection. Managed vegetation would not be suitable mitigation for impacts to moist or saturated TAM communities. In addition to mitigating impacts to wetlands caused by the proposed project, LADWP shall fully compensate for the loss of 121 acres of TAM associated with implementation and operation of dust control measures mandated under the 1998 SIP. These impacts were predicted in the EIR and EIR Addendum associated with the 1998 SIP, but have yet to be mitigated by the LADWP. The 121 acres of wetland mitigation specified in the 1998 SIP may be adjusted to reflect the actual immediate or predicted long-term area of impact, if it is demonstrated to the satisfaction of the District and the U.S. Army Corps of Engineers that there has been a change in the acreage impacted (more or less than 121 acres). LADWP shall compensate for all loss of TAM that occurs. Mitigation for impacts to all TAM associated with construction and operation of dust control measures constructed between 1998 and 2003 (prior to the proposed project) will be replaced at a ratio of 1 acre of wetland replacement for every acre of wetland impact (1:1 replacement ratio). Replacement wetlands will consist of similar habitat function and values as the wetland that is lost. All wetland replacement described in this mitigation measure shall be approved by the District and the U.S. Army Corps of Engineers, and will be constructed and fully functional prior to December 31, 2006.						
Measure Bio-9 To avoid direct and cumulative impacts to native wildlife communities that may potentially result from bioaccumulation of toxic substances resulting from construction in the areas specified in the 2003 SIP revision and the 1998 SIP from naturally occurring heavy metals and other potential toxins in lake bed deposits to below the level of significance, the LADWP shall implement a toxicity monitoring program to investigate the potential of bioaccumulation of heavy metals and other potential toxins in wildlife from feeding in dust control areas throughout the Owens Lake dry lake bed. A copy of the long-term monitoring program shall be submitted to the District prior to the start of any construction. Monitoring shall take place in all dust control areas within the Owens Lake as well as at all spring and outflow areas within 500 feet of the construction boundaries. The purpose of the monitoring program shall be to determine if bioaccumulation of toxins is occurring within native wildlife populations. Procedures for bioaccumulation monitoring shall follow existing permits issued by the Lahontan Water Quality Control Board (LWQCB) and any subsequent water quality monitoring requirements deemed necessary by the LWQCB.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Long Term Toxicity Monitoring Program (provided to the District prior to the start of construction) and Annual Bio-accumulation Monitoring Reports (for postconstruction years 1 to 6, 9, and 14 unless deemed unnecessary by the District)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
All monitoring shall be conducted by individuals familiar with the native wildlife species of the Owens Lake dry lake bed. Monitoring personnel shall be approved by the District prior to implementation of the long-term monitoring. The monitoring plan shall include adaptive management procedures and mitigation procedures to follow in the instance that signs of toxicity do develop in native wildlife populations that are attributable to the Dust Control Mitigation Program. Management procedures would be implemented depending on the type and extent of impact that was observed and could potentially, but not necessarily, include covering of dust control areas to prevent wildlife utilization, hazing of wildlife to prevent utilization of dust control areas, or any other appropriate measures. Any adaptive management measures that would potentially be implemented shall be approved by the District, the CDFG, and the State Lands Commission prior to implementation. The monitoring shall be conducted as described in Table Bio-9, *Postconstruction Bioaccumulation Monitoring Schedule*. Monitoring shall be conducted on a semiannual basis (two times per year) during each year that monitoring is conducted. If, after the completion of the 14-year monitoring schedule as described in measure Bio-9, it is determined that there is no evidence of toxicity issues in native wildlife populations, then the monitoring program may be discontinued. If monitoring determines that impacts to native wildlife species are occurring, then the monitoring shall continue on a semiannual basis in every year until significant impacts are not detected, and the monitoring sequence shown in Table Bio-9 shall resume at the Year 3 monitoring event and shall continue at the intervals shown in Table Bio-9. Written monitoring reports shall be provided to the District, CDFG, LWQCB, and the State Lands Commission by the approved biological monitor within four months following the end of the monitoring year. Any changes in the existing monitoring requirements by the RWQCB shall be included into this mitigation measure.						
Measure Bio-10 To minimize indirect impacts to native vegetation communities that may result from the proposed project construction and operations in the areas specified in the 2003 SIP revision and 1998 SIP and to prevent creating an environment for weedy plant species to become established in native plant communities, the LADWP shall implement an ongoing and continuous exotic pest plant control program within the designated dust control areas after full build-out of the project (December 31, 2006). The spread of exotic, invasive plant species, such as salt cedar (*Tamarix* spp.), has detrimental effects on habitat quality for native plant and wildlife species and, in the case of species like salt cedar, can reduce the availability and quality of water within native vegetation areas for plant and wildlife species. The goals of the program shall be consistent with the goals specified in the County of Inyo General Plan [Footnote: County of Inyo Planning Department. July 2002c. *County of Inyo General Plan Update*. Contact: 168 North Edwards Street, Post Office Drawer L, Independence, CA 93526. Prepared by: Jones and Stokes, BRW, Mintier & Associates, and Applied Development Economics.] and the U.S. Fish and Wildlife Service Owens Basin Wetland and Aquatic Species Recovery Plan [Footnote: U.S. Fish and Wildlife Service. 1998. *Owens Basin Wetland and Aquatic Species Recovery Plan, Inyo and Mono Counties, California*. Portland, OR: U.S. Fish and Wildlife Service.] for the portion of the Recovery Plan included within the proposed project area. The program shall be written by a pest management specialist or other person familiar with exotic plant species management and shall be submitted to the District no later than December 31, 2006. Measures for control shall include all best management practices involving prudent and safe use of control measures such as herbicides, brushing, direct weed removal, and other control measures. The program shall include yearly monitoring to ensure that exotic plant species are being sufficiently controlled. The exotic plant species control program shall be submitted to and approved by the District and the State Lands Commission prior to the initiation of exotic plant control activities. Annual written monitoring reports documenting exotic plant location, type, pretreatment abundance, control type used, and control efficacy shall be delivered to the District within four months following the end of each calendar year. A copy of the control program and resulting monitoring reports shall be provided to the State Lands Commission and to the CDFG.	Los Angeles Department of Water and Power	Postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Annual monitoring report and Exotic Post Plant Control Program (provided until deemed unnecessary by the District)	_______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Bio-11 To minimize potential direct, indirect, and cumulative impacts to western snowy plover resulting from required maintenance within shallow flood dust control areas as specified by the 2003 SIP revision and the 1998 SIP during the western snowy plover breeding season (March to August), foot crews and all-terrain vehicles (ATVs) that must enter shallow flood panels within the entire Owens Lake dry lake bed during the snowy plover breeding season shall be briefed in plover identification, nest identification, and adult alarm behavior, and the identification and meaning of buffer markers. Crews shall receive this training from a biologist knowledgeable in western snowy plover biology at Owens Lake as part of the contractor education program as described in measure Bio-1. The qualifications of the biological monitor shall be submitted to CDFG for review. Maintenance crews shall utilize hand tools and ATVs only to conduct maintenance activities during this time period in shallow flood panels where snowy plovers may be present. Crews shall remain within 20 feet of existing panel infrastructure at all times to minimize disturbance of playa areas. Crews shall minimize time within the shallow flood areas to the greatest extent possible. If crews are working within an active nest buffer, they shall be limited to 15 minutes out of every hour within the buffer. If an unanticipated take to western snowy plovers or an active snowy plover nest occurs during any maintenance activities, a project biologist shall document the impact and report the incident to the District and CDFG within 48 hours of the event. A take in this case would be defined as a mortality to adults, chicks, or fledglings, or a modification in adults' behavior due to human pressure that results in a loss of a nest and its contents. Proof of compliance with this mitigation measure shall be verified by submitting copies of any incident reports to the District, the State Lands Commission, and the CDFG. Emergency repair activities are exempt from the requirements of this provision. An emergency is defined in the State CEQA Guidelines, Section 15269, as "a sudden, unexpected occurrence that presents a clear and imminent danger, demanding action to prevent or mitigate loss of or damage to life, health, property, or essential public services." Emergency repairs as defined under the 2003 SIP revision and the 1998 SIP are further defined as those repairs that must be completed immediately to protect human health and safety, ensure the project is in compliance with required air quality standards, or protect project infrastructure from significant and immediate damage that could result in the failure of a dust control measure to maintain compliance with required air quality standards. In the event that an emergency repair must be performed on a shallow flood panel during the snowy plover breeding season, a qualified biological monitor shall be present on site during the duration of the repair activity to document any impacts to western snowy plover adults, juveniles, or active nests. The District and CDFG shall be notified within 24 hours of the start of all emergency repair activities. A copy of the biological monitor's written report shall be provided to the District and CDFG within 48 hours of completion of the emergency repair activity. Any appropriate mitigation that may be required from impacts to western snowy plovers shall be negotiated between LADWP and CDFG based on the report provided by the biological monitor. A copy of the negotiated agreement between LADWP and CDFG shall be provided to the District.	Los Angeles Department of Water and Power	Postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Subsequent Incident Reports and Emergency Repair Activities Report	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Bio-12 To minimize potential direct, indirect, and cumulative impacts resulting from operation and maintenance of dust control measures in the areas specified in the 2003 SIP revision and 1998 SIP to western snowy plover, the LADWP shall implement a long-term snowy plover population monitoring program for the entire Owens Lake dry lake bed. Postconstruction surveys shall be conducted 1, 2, 3, 4, 5, 7, 9, and 14 years after full build-out of all construction specified under the 2003 SIP revision and the 1998 SIP. The final western snowy plover monitoring schedule for all DCM measures on Owens Lake dry lake bed shall be coordinated so that long-term monitoring for all DCMs covered within this document, as well as for preceding environmental documents for the North Sand Sheet and the Southern Zones, are conducted simultaneously. The long-term monitoring shall begin in 2007, or at such time that full build-out is completed. The goals of the monitoring are to confirm that overall numbers of snowy plovers within the dust control areas do not decrease due to implementation of the 2003 SIP relative to baseline plover population numbers prior to implementation of the 2003 SIP as shown by the 2002 plover report for Owens Lake, which found the population to be 272 plovers. [Footnote: CH2MHill. 2002. *Summary of Surveys for Snowy Plovers at Owens Lake, March 1 through April 30, 2002*. Prepared by: Point Reyes Bird Observatory (Ruhlen and Page), 4990 Shoreline Highway, Stinson Beach, CA 94970.] Monitoring shall be conducted by a qualified biologist familiar with the natural history and habitat requirements of western snowy plovers within the Owens Lake basin. The qualifications of the biological monitor shall be submitted to the CDFG for review. The monitoring methodology shall be consistent with the methodology used for the Owens Lake 2002 plover surveys. Annual summary reports for the monitoring efforts shall be filed with the District, the State Lands Commission, and CDFG by December 31 of each monitoring year. The District shall require adaptive management changes to operation and maintenance of DCMs if it determines that a decline in snowy plover numbers is occurring that is directly attributable to operation or maintenance procedures of the Owens Lake Dust Mitigation Program. The District shall consult with the LADWP, State Lands Commission, and CDFG prior to implementing adaptive management changes. At the time that adaptive management changes are implemented, monitoring shall continue for a minimum of five years after implementation of adaptive management procedures to ensure that the procedures are having the desired effect on the lakewide snowy plover population. If after the Year 5 monitoring event, but no earlier than 2012, it is determined that no adverse impacts to the western snowy plover population at Owens Lake are occurring as a result of the proposed project, then the long-term monitoring program and subsequent reporting shall be discontinued. Specified calendar years for conducting lakewide plover population surveys are provided in Table Bio-12. Proof of compliance with this mitigation measure shall be through issuance of a written monitoring summary report for each monitoring year specified in Table Bio-12, *Postconstruction Lakewide Plover Population Monitoring Schedule*. Reports shall be submitted to the District by December 31 of each monitoring year. The report will document survey locations and dates, the number of plovers observed, and an estimate of the total plover population. A copy of the yearly summary reports shall be provided to CDFG.	Los Angeles Department of Water and Power	Postconstruction	Great Basin Unified Air Pollution Control District or California Department of Fish and Game	Great Basin Unified Air Pollution Control District	Annual monitoring summary report (for years 1 to 5, 7, 9, and 14 and thereafter until determined to be unnecessary by the District)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Bio-13 To reduce potential direct and cumulative impacts to western snowy plover and other migratory shorebirds within the proposed project area due to increased predation on shorebird young and eggs from potential corvid population increases on Owens Lake resulting from construction of dust control measures specified in the 2003 SIP revision and 1998 SIP, the LADWP shall continuously implement a corvid management plan within the proposed project area. Components of the corvid management plan shall include lake bed trash management procedures associated with dust control measures, utilization of Nixalite or the functional equivalent on all structures greater than 60 inches in height to minimize perching of corvids and raptor species on dust control equipment where they can easily observe shorebirds during the nesting season, burial of power and communication lines on all lake bed areas below the elevation of 3,600 feet, and use of harassment techniques for corvids in specific instances where corvids are proving to be particularly harmful to nesting shorebirds. The corvid management plan shall be prepared and implemented by a wildlife biologist familiar with the sensitive shorebird populations within the proposed project area and familiar with corvid management techniques. The qualifications of the wildlife biologist shall be submitted to CDFG for review. Lethal methods of corvid control such as shooting or poisoning shall not be implemented initially due to public and government agency concerns in the project region for such control methods and to prevent putting workers at risk from such control measures. If it is later determined that corvids are having a significant impact on shorebird populations within the project area and direct removal of corvids is a viable alternative, proposed control methods would be presented to the District and CDFG for approval prior to implementation of the additional control measures. The corvid management plan shall include a yearly written report estimating the lake bed nesting and foraging corvid population size, documenting the results of the corvid management techniques, documenting the observed effectiveness of the techniques in minimizing corvid impacts on shorebirds within the lake bed, and any suggestions for improving corvid management within the lake bed. A copy of the corvid management plan shall be submitted to and approved by CDFG, the State Lands Commission, and the District prior to implementation of the plan. Copies of the yearly reports shall be submitted to the District and CDFG no later than December 31 of each corvid management year. If after five years of reporting, the District determines that the corvid management program is effective, and corvids are not impacting snowy plover populations, then the reporting schedule shall phase out in the same time frame as shown in Table Bio-12. However, the corvid management practices shall continue to be continuously implemented.	Los Angeles Department of Water and Power	Construction and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Corvid Management Plan and annual summary report (for five years and thereafter until deemed unnecessary by the District)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Bio-14 To minimize potential direct and cumulative impacts to nesting western snowy plover from shutdown of all shallow flood panels constructed as a result of the 2003 SIP revision and 1998 SIP on June 30, a habitat management program shall be implemented by the LADWP on all Owens Lake dry lake bed shallow flood areas to mimic the natural summer drying of seeps and springs in the area. Each year shallow flood lateral lines shall be slowly turned off from July 1 to July 21 to allow snowy plover broods to complete their nesting cycle. LADWP has the option of surveying within 0.5 mile of shallow flooding areas for snowy plovers, and if active snowy plover nests or young are not present on or within a 0.5-mile radius of shallow flooding areas, then the habitat flows described above would not be needed in those areas and those shallow flood panels may be shutdown as LADWP determines to be necessary. A final operations plan detailing the drying operations shall be submitted to the District for approval, and a copy shall be provided to CDFG prior to startup of new shallow flood operations.	Los Angeles Department of Water and Power	Construction and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Final Operations Plan/Habitat Management Program	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Cultural resources						
Measure Cul-1 The City of Los Angeles Department of Water and Power (LADWP) shall ensure that direct impacts to the 22 newly recorded archaeological sites and 33 isolated artifacts within the Area of Potential Effect (APE) of the Revised 2003 SIP are minimized to below the level of significance prior to the initiation of grading in those areas that contain sites and isolated artifacts within the sequence T-1 through T-33. Prior to the initiation of grading in those areas, the LADWP shall complete Phase II investigations and make a determination of significance for sites within the sequence T-1 through T-33. A Phase II evaluation program is recommended for all the prehistoric archaeological sites and isolated artifacts that have been identified as a result of the Phase I Survey undertaken in support of this EIR. Monitors from Owens Valley Native American Tribes shall be present at all Phase II investigations. This program would include: • Mapping and systematic collection of surface artifacts • Subsurface investigation through shovel test pits, surface scrapes, controlled 1 × 1 m units, or a combination of such methods • Analysis of recovered material • Preparation of a report, including evaluation of site significance and recommendations for mitigation, if appropriate • Full data recovery before grading Of the 22 archaeological sites within the project area, 7 have been identified by Ancient Enterprises as being located on BLM land. Should any additionally identified sites, prior to the implementation of Phase II, be determined to extend onto BLM property, coordination with the BLM shall be required to mitigate impacts consistent with BLM's adopted standards for the mitigation of archaeological sites that occur on BLM-owned land. Coordination shall include, but not be limited to: (1) BLM approval, with 90-day lead time, of District-administered testing and data recovery program; and (2) a qualified archaeologist must obtain a valid BLM permit prior to the implementation of the BLM- approved Phase II testing and data recovery program. The Phase II Data Recovery Program for these sites shall follow the BLM procedures and timeline and be completed concurrently with the other identified archaeological sites. If mitigation is required for sites on BLM land, it shall be necessary to follow the consultation procedures prescribed by the NHPA and 36 CFR 800. The results of the Phase II Data Recovery Program shall be detailed in a draft report and submitted to the District for review within three months of the completion of the Phase II Data Recovery Program. The LADWP shall respond to the comments of the District and the property owner and submit a final report for the District, the property owner, and the appropriate Archaeological Information Center. Those sites that are determined to be eligible for listing in the National Register of Historic Places or the California Register of Historical Resources shall be treated in accordance with one of the three feasible measures described in the "CEQA and Archaeological Resources," *CEQA Technical Advice Series*: capping or covering the site with a level of soil prior to construction over the site, incorporation into open space areas of the project site, or excavation and Phase II Data Recovery Program where the first two measures are not feasible. Prior to issuance of a Notice to Proceed for construction, LADWP shall submit the written results of the Phase II Data Recovery Program for the 22 archaeological sites and 33 isolated artifacts, identified in the numerical sequence T-1 through T-33, to the District. For those sites determined to be eligible for listing in the National Register of Historic Places	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Agreement for Disposition of Recovered Fossils Technical Report: Phase II Data Recovery Program Report (submitted within 3 months of completion of the Phase II program)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
or the California Register of Historic Resources, the LADWP, prior to the issuance of a Notice to Proceed for construction activities in the quarter section (referring to the identified 7.5' quadrant map) in which the eligible site is located, shall submit, in writing, the applicable treatment plan to the property owner and the District. Owens Valley Native American Tribes shall be consulted during the development of all treatments plans. The treatment plans shall consist of the following: • Plans and specifications for capping or covering the site with a level of soil • Plans and specifications for the incorporation of the site into an open space area of the project site • Preparation of a research design and data recovery plan and language specifying the deposition and curation of any artifacts collected • Report and research design shall be submitted to the appropriate Archaeological Information Center, curation facility, and the specified information repository that will be handling the curation of archaeological resources. In the event that the qualified archaeologist, who meets the Secretary of the Interior Standards of Qualification, determines that archaeological resources must be removed during any archaeological reconnaissance or monitoring, the ultimate deposition of the artifacts shall be specified in the Phase III Research Program. Any proposed Phase III Research Program must go through the same process as the Phase II Data Recovery Program specified above, including Native American participation.						

Measure Cul-2 This measure applies to the construction in Dust Control Area 18. The impact to cultural resources related directly to the destruction of a unique paleontological resource during implementation of the Revised 2003 SIP shall be reduced to below the level of significance through selective monitoring and the salvage of paleontological resources. The LADWP shall undertake the implementation of a salvage program for all ground-disturbing activities taking place on the lake bed within Dust Control Area 18, which is within 1 mile of the historic shoreline specified along the edge of the playa near Swansea (SIP DCM Area 18). Due to the deflation of sand and sediment, Pleistocene mammalian fossils are visible on the playa surface.
 	
Prior to final plans and specifications, the LADWP shall review the plans to determine if there are any anticipated ground-disturbing activities on the lake bed within 1 mile of the historic shoreline along the edge of the playa near Swansea, within the area surveyed for paleontological resources. Ground-disturbing activities include, but are not limited to, drilling, excavation, trenching, and grading. Where any such activity is anticipated in conjunction with the work specified in the Revised 2003 SIP, the District shall require that LADWP shall inform the contractor of the minimum requirements of the Paleontological Resource Management Program (PRMP), which will implement monitoring procedures as well as a salvage and recovery program near Swansea where previous surveys have observed and identified fossils. The following requirements shall be duly noted in the plans and specifications:
• **Retain a Qualified Paleontologist.** A qualified paleontologist shall meet the following criteria:
    • Has demonstrated formal education in the discipline of paleontology, preferably at the graduate level
    • Has demonstrated experience in the monitoring, identifying, and collection of vertebrate and invertebrate Pleistocene fauna
	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Monthly monitoring reports, final monitoring report, and Recovered Fossils Technical Report (submitted to the District within 90 days of completion of paleontological monitoring)	________________________
						Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
The qualified paleontologist shall be retained to prepare an PRMP, which addresses discovery and recovery procedures, and implementation of the salvage and recovery program. • **Preconstruction Briefing.** The selected paleontologist shall attend a preconstruction briefing to provide information regarding regulatory requirements for the protection of paleontological resources. Construction personnel shall be briefed on the role of the paleontological monitor and procedures to be followed in the event that a fossil site or fossil occurrence is encountered during construction. An information package shall be developed by the project paleontologist and, subsequent to review by LADWP, provided for construction personnel not present at the initial preconstruction briefing. The paleontologist shall be required to provide a telephone number where he or she can be reached by the construction inspector or construction contractor should a discovery arise. • **Construction Monitoring, Discovery, and Recovery.** Full-time paleontological monitoring of the entire project site shall not be necessary. However, ground disturbance and excavation on the eastern edge of the playa may impact sediments that, based on prior survey results, contain paleontological resources. Paleontological monitoring of ground disturbance shall therefore occur within that area as specified by the PRMP. Collections of fossils that would otherwise be impacted shall be performed by a qualified vertebrate paleontological monitor. The paleontological monitor should be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments that are likely to contain the remains of fossil vertebrates. Monitoring of ground disturbance to the eastern edge of the playa near Swansea shall consist of the surface collection of visible vertebrate and invertebrate fossils along the area of impact specified along the eastern edge of the playa by a qualified paleontological monitor as specified in the PRMP. If recovery of a large or unusually productive fossil occurrence is warranted, earthmoving activities shall be diverted temporarily around the fossil locality and a recovery crew shall be mobilized to remove the material as quickly as possible. The paleontological monitor will be permitted to photograph and/or draw stratigraphic profiles of exposed surfaces and take samples for analysis of microfossils, dating, or other specified purposes according to the research design. Recovery will include the removal of samples of sediments that are likely to contain the remains of small fossil vertebrates. • **Curation.** Recovered specimens shall be prepared to a point of identification, and bulk sediment samples, if collected, shall be washed to recover smaller fossil remains. According to the specifications of the PRMP, if the excavation reveals a fossil, the paleontologist shall be expected to divert the equipment and recover/salvage the fossil. Similarly, if microfossils are revealed during the washing of sediments, a sample shall be washed at a location established on the project site. If a test results in significant fossils, then the monitor shall request the backhoe to excavate and stockpile the selected sediments to a maximum of 60 cubic feet of loose sediment total so the project can continue. The sediment would be washed on days when monitoring is not required. The PRMP shall specify the amount of sediment to be removed, should it be shown through field testing to contain fossils. Specimens shall be identified and curated into a museum repository, as specified, with retrievable storage. Full-time paleontological monitoring of the project area shall not be necessary.						

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
• **Monitoring Report.** Daily logs shall be kept by the qualified paleontologist during recovery activities and shall be submitted monthly to LADWP and the District. A complete set of the daily monitoring logs shall be kept on site throughout the earthmoving activities and be available for inspection. The daily monitoring log shall be keyed to a location map to indicate the area monitored, the date, assigned personnel, and the results. Should a discovery occur, information that will be collected includes the nature of discovery and stratigraphic unit. Within 90 days of the completion of the paleontological monitoring, the mitigation report shall be submitted to the LADWP and the District with an appended, itemized inventory of the specimens. The report and inventory, when submitted to the LADWP and the District, signify the completion of the program to mitigate impacts to paleontological resources. • **Agreement for Disposition of Recovered Fossils.** The selected paleontologist shall be required to negotiate a written curation agreement with a recognized museum repository, such as the University of California at Berkeley or the Natural History Museum of Los Angeles County, regarding the final disposition and permanent storage and maintenance of any significant fossil remains and associated data on the specimen and its corresponding geologic and geographic setting that might be recovered as a result of discovery during the monitoring program. The selected museum would be equipped to support the completion of treatment and adequately curate the recovered specimens. The specimens may be loaned to the local Eastern California Museum for display. The fossils recovered shall be curated at the Natural History Museum of Los Angeles County, which may be loaned to the Eastern California museum, which was chosen for its exhibits on area history, anthropology, botany, and geology [Footnote: Lone Pine Chamber of Commerce and Tourist Information Center. 30 June 2003. "The Land of Recreation." Available at: www.lonepinechamber.org.], thereby providing the local community with the opportunity to view paleontological resources of scientific value from the Owens Valley. The written agreement shall specify the level of treatment (preparation, identification, curation, and cataloging) required and be subject to review by LADWP, before the fossil collection would be accepted for storage. In addition, a technical report shall be completed. • **Laboratory Analysis.** All significant fossil specimens recovered from the project site as a result of the paleontological mitigation program shall be treated (prepared, identified, curated, and cataloged) in accordance with designated museum repository requirements. Samples shall be submitted to a laboratory, acceptable to the selected museum for identification, dating, and microfossil and pollen analysis. Proof of compliance with mitigation measures shall be provided to the District in writing by LADWP at least 15 days prior to the initiation of construction activities.						

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Cul-3 The impact to cultural resources related directly to the destruction of unrecorded archaeological resources from the work specified in the Revised 2003 SIP shall be reduced to below the level of significance through the recovery or treatment of any archaeological resources encountered during construction monitoring should any unrecorded archaeological sites be encountered during mitigation monitoring activities. LADWP shall specify in the Plans and Specifications that a qualified archaeologist shall be required to monitor all ground-disturbing activities required, that is, associated with work specified in the Revised 2003 SIP. Specifically, the LADWP shall be responsible for implementation of a construction monitoring program that meets the minimum scientific standards. Where one of the respective elements of the project is expected to require earthmoving in soils at depths of up to 5 feet below the existing surface, LADWP shall require that the following program be implemented and that the requirement be duly noted in the plans and specifications: • **Retain a Qualified Archaeologist.** A qualified archaeologist who meets the Secretary of the Interior's definition as a qualified archaeologist shall be retained to implement a monitoring and recovery program in any area identified as having the potential to contain unique archaeological resources. The qualified archaeologist shall coordinate with local tribes regarding the recovery of archaeological resources. Specifically, the LADWP shall be responsible for implementation of a construction monitoring program that meets the minimum specified standards. • **Retain a Native American Monitor(s).** Native American consultation shall be undertaken as part of the proposed project. Local tribes shall be contacted by the qualified archaeologist specified for the project, and a Native American monitor(s) shall be retained to be present on site during all ground-disturbing activities associated with the work specified in the Revised 2003 SIP, including but not limited to: construction activities, archaeological evaluation, excavation, and the Phase II and Phase III (if implemented) assessments. The Native American monitor(s) shall coordinate with the qualified project archaeologist, the District, and LADWP to ensure responsible remediation of Native American sites and sacred materials. • **Agreement for Disposition of Recovered Artifact.** The selected archaeologist shall be required to secure a written agreement with a recognized museum repository, such as the San Bernardino County Museum, Los Angeles County Museum of Natural History, or the Maturango Museum regarding the final disposition and permanent storage and maintenance of any unique archaeological resources recovered as a result of the archaeological monitoring, as well as corresponding geographic site data that might be recovered as a result of the specified monitoring program. The written agreement shall specify the level of treatment (preparation, identification, curation, and cataloging) required before the collection would be accepted for storage. Representatives from Owens Valley Native American Tribes will be consulted during the development of all disposition agreements. • **Preconstruction Briefing.** The selected archaeologist shall attend a preconstruction briefing to provide information regarding regulatory requirements for the protection of unique archaeological resources. Construction personnel shall be briefed on procedures to be followed in the event that a unique archaeological resource is encountered during construction. In addition, the archaeologists shall ensure that the participants in the preconstruction briefing shall be informed of the requirement to notify the coroner of the County within 24 hours of the discovery of human	Los Angeles Department of Water and Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Daily monitoring log, quarterly monitoring report, and final monitoring report	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
remains. Upon discovery of human remains, there shall be no further excavation or disturbance of the site or any reasonably nearby area reasonably suspected to overlie adjacent human remains until the following conditions are met: The Inyo County Coroner has been informed and has determined that no investigation of the cause of death is required. If the remains are of Native American origin, the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code, Section 5097.98. An information package shall be provided for construction personnel not present at the initial preconstruction briefing. The archaeologist shall be required to provide a telephone number where they and the Native American monitor can be reached by the construction contractor, as necessary. • **Construction Monitoring.** A qualified archaeologist shall monitor earthmoving activities in areas that are likely to contain unique archaeological resources. The archaeologist shall be authorized to halt construction, if necessary, in the immediate area where buried cultural remains are encountered. Prior to the resumption of grading activities in the immediate vicinity of the cultural remains, the project proponent shall provide the archaeologist with the necessary resources to identify and implement a program for the appropriate disposition (as specified by Section 15064.5 (e) of the State CEQA Guidelines). • **Monitoring Report.** The monitor shall maintain daily monitoring logs that shall be submitted quarterly to LADWP. A complete set of the daily monitoring logs shall be kept on site throughout the earthmoving activities and be available for inspection. The daily monitoring log shall be keyed to a location map to indicate the area monitored, the date, assigned personnel, and the results of monitoring, including the recovery of archaeological material, sketches of recovered materials, and associated geographic site data. Within 90 days of the completion of the archaeological monitoring, a monitoring report shall be submitted to the LADWP, the District, and the Eastern Information Center at the University of California, Riverside. The report, when submitted to the LADWP, the District, and the Eastern Information Center, signifies the completion of the program to mitigate impacts to archaeological resources. Should an unrecorded archaeological resource be discovered as a result of construction monitoring, the LADWP shall complete Phase II investigations in the areas that have been identified as those that contain significant archaeological sites. Where Phase II investigations identify unique archaeological resources as defined in Section 21083.2 of the Public Resources Code, the site shall be subject to specified requirements for treatment. Any area where unique archaeological resources are not identified, but the materials recovered from shovel test pits indicate the potential presence of unique archaeological resources, shall be reported to LADWP and the District.						

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Hazards and hazardous materials						
Measure Hazards-1 To minimize impacts related to the unauthorized release of hazardous materials during routine transport, use, or disposal of hazardous materials, prior to construction work specified in the Revised 2003 SIP, the LADWP shall ensure through its construction permitting process, or through enforcement of contractual obligations for its own projects, that all contractors transport, store, and handle construction-required hazardous materials in a manner consistent with relevant regulations and guidelines established by the California Code of Regulations (Title 13, Division 2, Chapter 6), the California Department of Transportation (Caltrans), and the California Regional Water Quality Control Board, Lahontan Region, prior to construction. The City shall submit proof of incorporation of this requirement in all construction contracts related to work specified in the Revised 2003 SIP to the District and Inyo County. The City shall submit an Operation Plan for the routine transport, use, storage, handling, and disposal of hazardous materials to the District and Inyo County prior to the operation of dust control measures specified in the Revised 2003 SIP. The City shall provide to the District and Inyo County an annual update as required for the transport, use, storage, handling, and disposal of hazardous materials.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Operation Plan Report and annual updates	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Hazards-2 To minimize impacts related to the unauthorized release of hazardous materials into the environment, the LADWP shall prepare a Spill Prevention Control and Countermeasure (SPCC) program applicable to all statutes and regulations. LADWP shall submit an SPCC to Inyo County for review and approval. LADWP shall demonstrate approval of the SPCC by Inyo County to the District prior to the use, storage, and handling of hazardous materials in conjunction with construction or operation of work specified in the Revised 2003 SIP. The SPCC shall address all above-ground storage tanks within the fertilizer injection and water treatment systems in accordance with all federal, state, and local laws and regulations. The LADWP shall enclose all the fertilizer injection and water treatment systems with a minimum 6-foot-high barb-wire-topped chain-link fence or equivalent enclosure and locked gate to prevent unauthorized access. LADWP shall amend its existing lease with the State Lands Commission to allow for the improvement specified in this measure. The SPCC shall be in place throughout construction, operation, and maintenance of work specified in the Revised 2003 SIP.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Spill Prevention Control and Counter-measure Program	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Hazards-3 To minimize impacts related to the unauthorized release of hazardous materials into the environment, the LADWP shall develop a business plan for emergency response for the routine transport, use, storage, handling, and disposal of hazardous materials. The business plan for emergency response shall address preparation for possible emergencies involving hazardous materials. The LADWP shall provide copies of the approved business plan for emergency response to the District and Inyo County. The City shall provide to the District and Inyo County an annual update to the approved business plan as required for the transport, use, storage, handling, and disposal of hazardous materials.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Business Plan for Emergency Response and annual updates	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Hazards-4 To minimize direct, indirect, and cumulative impacts to local residents from a potential increase in mosquito populations as a result of construction and operation of dust control measures as specified in the Revised 2003 SIP, the City of Los Angeles shall provide for the application of mosquito control measures on all dust control areas as deemed necessary by the Inyo County Mosquito Abatement District. The costs of the mosquito control efforts within project boundaries shall be borne by the City of Los Angeles. Mosquito control shall be implemented in compliance with all applicable state and federal regulations. Proof of compliance with this mitigation measure shall be submitted by the City of Los Angeles to the Abatement District and the Air Pollution Control District prior to construction of any new dust control areas. An annual report summarizing the mosquito control activities shall be submitted to the Abatement District and the Air Pollution Control District by December 31 of each year.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Annual Mosquito Control Measures Compliance Report (submitted to the District by December 31 of each year)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Hazards-5 To minimize the direct, indirect, and cumulative impacts related to the occurrence of wildland fires during construction and operation of work specified in the Revised 2003 SIP, the LADWP shall provide for fire protection services for all dust control areas to the satisfaction of Inyo County. Fire protection services shall be provided prior to any further construction on the lake bed. Fire protection services shall include provision of adequate equipment and personnel as determined by the County. Proof of compliance with this mitigation measure shall be submitted by the City of Los Angeles to Inyo County and the District prior to construction of any additional dust control measures.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Fire Protection Services Compliance Report	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Hydrology and water quality						
Measure Hydro-1 To mitigate for direct, indirect, and cumulative surface water quality impacts caused by construction pollutants contacting storm water, products of erosion moving off site into receiving waters, and unauthorized non–storm water discharges, the LADWP shall obtain and adhere to the requirements of the National Pollution Discharge Elimination System (NPDES) General Permit for the 5.5 square miles of new work area specified in the Revised 2003 SIP. This includes the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which specifies best management practices (BMP) that shall prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters; the elimination or reduction of unauthorized non-storm water discharges; and inspections of BMP. The SWPPP shall also identify BMP for controlling temporary construction dewatering discharges and may include temporary sediment control measures such as the addition of low-flow dispersal methods for minimizing erosion. The LADWP shall additionally be required to comply with the Guidelines for Erosion Control as listed in the Water Quality Control Plan for the Lahontan Region. The LADWP shall submit the final SWPPP to the District after its approval by the Regional Water Quality Control Board for the Lahontan Region (RWQCB).	Los Angeles Department of Water And Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Storm Water Pollution Prevention Plan and National Pollution Discharge Elimination System General Permit	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Hydro-2 The LADWP, prior to issuing any Notices to Proceed for construction of work in the areas specified in the 1998 SIP and Revised 2003 SIP, shall implement a Water Quality Monitoring and Reporting Program to ensure that there is no substantial degradation of water quality and to mitigate direct, indirect, and cumulative impacts to surface and groundwater quality and off-site groundwater levels. The Water Quality Monitoring and Reporting Program shall monitor operational water volumes and flows, and analyze the quality of project surface waters and groundwater. The monitoring program shall ensure that the project is operating within the quality limitations specified by the waste discharge requirements (WDR) (Board Order No. R6V-2002-0011, WDID No. 6B140009003) adopted by the RWQCB for the Southern Zones Dust Control Project at Owens Lake. [Footnote: California Regional Water Quality Control Board, Lahontan Region. 9 November 2001. (Letter to Richard Harasick, City of Los Angeles Department of Water and Power, P.O. Box 5111, Los Angeles, CA 90051.) Subject: Order for Clean Water Act Section 401 Water Quality Certification for the Owens Lake Dust Mitigation Program, Southern Zones Dust Control Project, Inyo County.] The monitoring program shall be submitted to the District prior to the start of construction in the areas designated for dust control in the 1998 SIP and revised 2003 SIP. All chemical analyses shall be performed by a laboratory with National Environmental Laboratory Accreditation Program (NELAP) certification.	Los Angeles Department of Water And Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Water Quality Monitoring Reports (submitted to the District and RWQCB within 60 days of end of monitoring period; and monitoring and reporting continued until monitoring completion in 2020 unless deemed unnecessary by the District)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Monitoring reports shall be completed and submitted to the District and the RWQCB within 60 days of the end of the monitoring period as described in Table 3.5.6-1, *Water Quality Monitoring and Reporting Schedule*. The reports shall include a summary of monitoring results and any corrective actions proposed or undertaken for any observed violations of water quality limitations. The water quality limitations are defined as a substantial (statistically significant based on a statistical analysis of current and baseline data) variation from the long-term baseline water data collected by the District for surface and groundwater quality. [Footnote: Great Basin Unified Air Pollution Control District. 2000a (Revised 2003). *Archive of Groundwater and Hydrology Data, Owens Lake*. Contact: 157 Short Street, Bishop, CA 93514.] The District will continue to collect this baseline water data during project construction and operation. Periodic reductions in monitoring and reporting requirements, when justified by a documented review and evaluation of monitoring results, shall be implemented as authorized by the RWQCB. Until monitoring results justify a reduction in monitoring requirements, monitoring shall be completed as follows: • Flow rates and total volumes of flow to shallow flood and managed vegetation areas shall be monitored for each day and month for the first three years of work specified in the Revised 2003 SIP and thereafter as specified in Table 3.5.6-1. • Surface water monitoring of shallow flood and managed vegetation and groundwater monitoring of perimeter project observation wells shall be completed as described in Table 3.5.6-1 for total dissolved solids (TDS), chloride, chlorine, dissolved oxygen (DO), pH, electrical conductivity (EC), ammonia, aluminum, arsenic, barium, boron, cadmium, calcium, iron, lead, magnesium, manganese, nitrate, nitrite, potassium, selenium, sodium, carbonate, bicarbonate, phosphate, sulfate, vanadium, total alkalinity, total organic carbon (TOC), copper, chromium, zinc, bromide, Treflan (or Trifluralin), and sulfur. If after the completion of the monitoring in 2020, as described in Table 3.5.6-1, *Hydrology Monitoring and Reporting Schedule*, it is determined that there is no substantial (statistically significant based on a statistical analysis of current and baseline data) variation from the District's baseline water quality and groundwater level data, then the monitoring program may be discontinued. If at any time there is an observed substantial (statistically significant based on a statistical analysis of current and baseline data) variation in the District's baseline water data, the LADWP shall initiate consultation with the District and the RWQCB to determine if the observed variation is directly or indirectly related to the operations and maintenance of work specified in the 1998 SIP and Revised 2003 SIP. Where determined to be directly or indirectly related to the operation and maintenance of work specified in the 1998 SIP and Revised 2003 SIP, the City shall apply standard BMP, such as those described in the *California Stormwater Best Management Practices Handbook*, or comparable measures and water quality monitoring shall continue daily (with monthly reporting) in the area(s) of concern for the particular violated water quality constituent. When it has been determined that water quality and groundwater levels are within the normal range (less than statistically significant) of the District's baseline water data for three consecutive months, the monitoring shall continue as described in Table 3.5.6-1.						

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
It is the intent of this mitigation measure to ensure that the proposed project does not cause any substantial degradation of water quality and to mitigate any direct, indirect, and cumulative impacts to surface and groundwater quality and off-site groundwater levels that may occur. The District recognizes that the RWQCB is the regulatory government agency responsible for ensuring that the proposed project does not impact water quality. In addition, the District acknowledges that the water quality impacts of an unprecedented project like that of dust control on the Owens Lake bed are difficult to accurately predict. This mitigation measure sets an initial framework for monitoring water quality and mitigating water quality impacts. However, the District acknowledges that specifying long-term monitoring requirements and schedule may not be the most favorable method of preventing impacts to water quality. Therefore, the scope and schedule of water quality monitoring associated with this measure may change upon request by the LADWP, the RWQCB, or the District and approval by both the RWQCB and the District.						
Measure Hydro-3 The LADWP shall construct berms along the lateral and downstream boundaries of all shallow flooding areas to mitigate for the potential surface water degradation caused by runoff from shallow flooding within the 5.5-square-mile dust control areas specified in the Revised 2003 SIP. The berms shall be sized to prevent normal operations water from leaving the dust control areas and shall be constructed to resist erosion from any wind and/or wave action and storm flows. Erosion control measures shall include, but are not limited to, flattened side slopes and the placement of riprap on the interior berm faces. The containment berms shall be constructed from compacted native soils and shall have a gravel top surface, as required, to provide all-weather access for maintenance vehicles and to ensure the berms remain in a non-wind-erosive condition. Final plans shall be submitted to the District for approval prior to the release of Requests for Bids for all areas specified in the Revised 2003 SIP to be controlled by shallow flooding.	Los Angeles Department of Water and Power	Preconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Final Plans and Specifications	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Land use and planning						
Measure Land Use and Planning-1 To avoid conflicts related to safety to operation and maintenance staff in relation to social hunting that occurs in the Owens River Delta south of the historic shoreline, Sulfate Well, Dirty Socks Well, and the Cartago Springs areas by the construction, operation, and maintenance of all Owens Lake dry lake bed DCMs and hunting activities, prior to the construction and operation work specified under the revised 2003 SIP, the LADWP shall post "No Hunting" signs within 0.25 mile of the existing or proposed DCMs that are visible along access roads. The "No Hunting" signs shall be replaced annually as necessary at the beginning of September prior to the hunting seasons for dove, deer, elk, duck, and goose. The "No Hunting" signs will indicate that dogs must be on leash in the no hunting zone. The LADWP will provide a request along with a map to the California Department of Fish and Game for designation of the DCM areas in the Revised 2003 SIP and all areas within 0.25 miles of the boundaries of the DCM areas as a no hunting zone to protect the LADWP's construction, operation, and maintenance personnel. A copy of the request shall be submitted to the District.	Los Angeles Department of Water and Power	Preconstruction, construction, and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Compliance Summary Report	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
In addition, all access roads to the existing and new DCM areas shall be gated at the entrance. The new gates shall be designed to sufficiently prohibit vehicular access while providing for pedestrian access around the gates. Signs shall be placed on the existing and proposed gates prohibiting public vehicular access, unleashed dogs, and hunting (pedestrian access and leashed dogs would remain permissible). Gates will provide for access for the District and existing lessees, including U.S. Borax. Both the posting of signs and installation of new gates to the lake bed could be additional improvements outside of the terms of the existing lease with the SLC. Therefore, the lease between LADWP and the SLC shall be amended prior to construction work specified under the revised 2003 SIP to allow for these additional improvements, if the improvements are not within the terms of the existing lease. Both the posting of the "No Hunting" signs and the installation of the gates will ensure the safety of LADWP workers during the construction, operation, and maintenance of the proposed project. The LADWP shall provide a written report to the District describing the implementation of this measure, and the District will monitor for the implementation of this measure. This report shall be submitted prior to the commencement of DCM construction and operation. The installation of the gates and posting of the "No Hunting" signs will resolve the land use conflict related to the safety of the operation and maintenance staff in relation to social hunting on the Owens Lake bed by removing the risk of injury or death to the workers through the restriction of hunting to various areas of the lake bed. The current and historic public access to the lake bed would not be restricted. The public would still be able to access the lake bed on foot and enjoy the area for bird watching, hiking, photography, and other common recreational activities that occur on the lake bed.						
Measure Land Use and Planning-2 To minimize potential impacts to local residents from an increase in mosquitoes and other biting insects as a result of DCM construction from the water-based DCMs, prior to the start of any additional water-based DCMs specified by the Revised 2003 SIP, the City of Los Angeles shall notify property owners within the community of Keeler of their eligibility to receive window and door screens or other insect control devices of comparable value to reduce nuisance insect populations in the vicinity of their residence. The LADWP shall give Keeler property owners at least three months to respond to the notice of eligibility. Insect control devices shall be provided and installed by the LADWP within nine months of the end of the notice of eligibility period. The City of Los Angeles shall provide, where written response is given, to the District documentation of the delivery of eligibility notices and compliance with the provision of insect control devices prior to the construction of any additional water-based DCMs. Residents shall provide proof of residence in Keeler prior to the provision of screening or insect control devices. The LADWP shall provide a written report to the District, within three months of the end of the installation period, describing the implementation of this measure, and the District will monitor for the implementation of this measure. All insect control device installation and reporting shall be completed prior to December 31, 2004.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Insect Control Device Compliance Summary Report (provided to the District within three months of end of installation period)	________________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Land Use and Planning-3 In addition to the potential elimination of cattle grazing leases in Section 3.6.4, Impact Analysis, the California State Lands Commission has identified a process for potentially minimizing the incompatibility of DCMs and grazing through the construction of fencing at selected locations where DCMs are located within 0.25 mile of TAM that are used for cattle grazing. This approach has been summarized as a mitigation measure that could be undertaken by the LADWP as an alternative to the elimination of grazing leases. This mitigation measure would not generate new impacts beyond the scope of land use and planning as discussed in the Draft EIR. LADWP shall implement a cattle survey period of at least one grazing period to determine if there is an impact from cattle on the proposed project area; if the California State Lands Commission agrees that cattle grazing may be impacting the proposed project area, LADWP previously agreed to coordinate with the cattle ranchers, landowners, and public agencies to develop strategies for cattle control measures. LADWP shall submit a report after the cattle survey period to the District and the California State Lands Commission to indicate the results of the cattle survey and the proposed course of action.	Los Angeles Department of Water and Power	Construction and postconstruction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Cattle Survey Period Summary Report	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Transportation and traffic						
Measure Transportation-1 To mitigate the transportation impact related to substantially increasing hazards during construction, which requires the definition of appropriate Traffic Work Safety Plan measures, the City of Los Angeles Department of Water and Power (LADWP) shall develop a Traffic Work Safety Plan. The Traffic Work Safety Plan shall specify the measures to be implemented and maintained by LADWP on each location on U.S. Highway 395, State Route (SR) 136, and SR 190 that would be affected by the construction phase of the project to ensure traffic safety. It is anticipated that the Traffic Work Safety Plan would include the use of warning lights, signs, traffic cones, signals, and the use of flag persons during peak traffic periods, or comparable measures as specified by the *Work Area Traffic Control Handbook*. [Footnote: BNi Books, Division of BNi Publications, Inc., 2001. *Work Area Traffic Control Handbook*. Available at: 3055 Overland Avenue, Los Angeles, CA 90034.] LADWP shall document to the District that Caltrans has approved the Traffic Work Safety Plan prior to the initiation of construction work specified by the 2003 Revised SIP, or related transportation and staging of equipment and materials.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Traffic work safety plan	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency
Measure Transportation-2 To mitigate the transportation impact related to substantially increasing hazards during construction of work specified by the 2003 Revised SIP, the LADWP shall be responsible for funding, installing, and conforming to the measures specified in the approved Traffic Work Safety Plan prior to the use of U.S. Highway 395, SR 136, and SR 190 for gravel hauling or other heavy truck trips such as the delivery of materials, heavy equipment, and construction vehicles to the project site to ensure traffic safety during the construction operations. LADWP shall demonstrate conformance with the measures specified in the approved Traffic Work Safety Plan by submitting quarterly compliance reports to the District and Caltrans throughout the duration of the construction work specified by the 2003 Revised SIP, and related transportation and staging.	Los Angeles Department of Water and Power	Construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	A Quarterly Compliance Summary Report (submitted until construction is complete)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency

TABLE III-1
MITIGATION MONITORING PROGRAM
2003 OWENS VALLEY PM_{10} PLANNING AREA DEMONSTRATION OF ATTAINMENT STATE IMPLEMENTATION PLAN, Continued

Mitigation Measure	Responsible Implementation Party	Monitoring Period	Enforcement Agency	Monitoring Agency	Documentation of Compliance	
					Source	Signature/Date
Measure Transportation-3 To mitigate the transportation impact related to substantially increasing hazards during construction, LADWP shall be required to repair damage to the regional transportation network: U.S. Highway 395, SR 136, and SR 190 from construction activities required for the 2003 Revised SIP to preproject conditions. Prior to initiating construction of work specified by the 2003 Revised SIP, or related transportation and staging of equipment and materials, LADWP shall retain a qualified pavement consultant engineer to document the existing condition of all regional transportation network roadways used for access, egress, and haul routes by the construction activities required for the 2003 Revised SIP. Following the completion of construction activities, LADWP shall retain a qualified pavement consultant engineer to revisit the documented roadway sections and delineate physical damages that are directly attributed to construction activities required for the 2003 Revised SIP. LADWP shall provide in lieu fees for remediation of construction-generated impacts on the regional transportation network. Within 12 months after construction activities for the 2003 Revised SIP is completed, LADWP shall provide written documentation to the District and Caltrans demonstrating that damage to the regional transportation network that resulted from the construction activities has been repaired.	Los Angeles Department of Water and Power	Preconstruction and construction	Great Basin Unified Air Pollution Control District	Great Basin Unified Air Pollution Control District	Compliance Summary Report (submitted to the District within 12 months of completion of construction)	______________________ Great Basin Unified Air Pollution Control District Signature/Date of Monitoring Agency