DRAFT
OZONE MONITORING
SALMON-CHALLIS NATIONAL FOREST
SALMON, IDAHO
1996-1999
November 5, 2001

The Salmon-Challis National Forest is located in the Northern Rocky Mountain Province, with-in the Salmon River Basin. The City of Salmon is located about mid-way between Missoula, Montana and Sun Valley, Idaho, along the Salmon River. On August 18, 1996 the Salmon-Challis National Forest installed a U.V. Photometric Ambient Ozone Instrument (TECO 49) that is capable of measuring the ambient (local surrounding air) level of ozone concentration on a continuous, real-time basis. Also installed was a Campbell Scientific 21 X micro-logger and storage module 192. The U.V. photometer determines ozone concentration by measuring the intensity of light due to ozone in the absorption cells. The instrument was located west of Salmon, approximately 5 miles, on North Baldy Mountain, with-in the Northern portion of the Salmon River Mountains, at an **elevation** of about **9,000 feet**, along with the IMPROVE Module A sampler. The intake filter was located about 6 feet above the second story roof, away from any obstructions.

The area consists of subalpine fir (Abies lasiocarpa), Rocky Mountain lodgepole pine (Pinus contorta) and low growing common juniper (Juniperus communis). The area to the west a short distance is talus rock along the ridge top. The area to the north, about 100 feet drops into a cirque basin. The east and south areas consists of the above listed vegetation.

Estimated average annual precipitation (rain and snow) at the site is about 25 to 30 inches, which includes about 2 to 4 feet of snow. Predominate winds come from the west. During the summer, the winds are from the southwest that include (California, Nevada, Southwest Idaho) and west (Oregon). In the winter, the winds are from the northwest (Northern Oregon, Washington, Western Canada), west (Oregon) and north (Montana, Canada). During low pressure, the winds are from the east (Wyoming) and south (Utah, Nevada). A normal reading of ozone, according to Research should be between 30-70 ppb (parts per billion).

The following is a monthly average, based on the highs and lows of each 15 minutes, Not the hour averages, which will require more time to determine.

1996

August	ave. 57	low 25	high 80	ppb
September	ave. 59	low 39	high 94	ppb
October	ave. 50	low 28	high 70	ppb
November	ave. 45	low 20	high 69	ppb
December	ave. 43	low 26	high 54	ppb

1997

January	ave. 47	low 33	high 59	ppb
February	ave. 52	low 42	high 62	ppb
March	ave. 51	low 19	high 81	ppb
April	ave. 55	low 38	high 72	ppb
May	ave. 53	low 31	high 74	ppb
June	ave. 51	low 25	high 76	ppb
July	ave. 53	low 30	high 76	ppb
August	ave. 46	low 26	high 66	ppb
September	ave. 39	low 26	high 53	ppb (pump stopped)
October	No data			
November	ave. 49	low 39	high 59	ppb (part month)
December	ave. 50	low 37	high 63	ppb

1998

January	ave. 53	low 44	high 63	ppb
February	ave. 57	low 48	high 65	ppb
March	ave. 55	low 42	high 69	ppb
April	ave. 59	low 39	high 80	ppb
May	ave. 65	low 42	high 89	ppb
June	ave. 53	low 29	high 76	ppb
July	ave. 51	low 16	high 86	ppb
August	ave. 47	low 25	high 70	ppb
September	ave. 43	low 36	high 49	ppb
October	ave. 53	low 38	high 67	ppb
November	ave. 47	low 35	high 59	ppb
December	ave. 50	low 39	high 61	ppb

1999

January	ave. 52	low 40	high 63	ppb
February	ave. 51	low 37	high 65	ppb
March	ave. 63	low 47	high 80	ppb
April	ave. 59	low 40	high 78	ppb
May	ave. 65	low 45	high 85	ppb
June	ave. 56	low 28	high 84	ppb
July	ave. 62	low 40	high 83	ppb
August	ave. 57	low 38	high 76	ppb
September	ave. 56	low 36	high 75	ppb
October	ave. 42	low 16	high 69	ppb

Machine removed from site for repairs

SEASONS

FALL 1996:

September	1996	ave. 59	low 39	high 94	ppb
October	1996	ave. 50	low 28	high 70	ppb
November	1996	ave 45	low 20	high 69	ppb
AVERAGES:		AVE= 51	LOW=29	HIGH= 78	ppb

WINTER 1996-97:

December	1996	ave. 43	low 26	high 54	ppb
January	1997	ave. 47	low 33	high 59	ppb
February	1997	ave. 52	low 42	high 62	ppb
AVERAGES:		AVE= 47	LOW= 34	HIGH= 58	ppb

SPRING 1997:

March	1997	ave. 51	low 19	high 81	ppb
April	1997	ave. 55	low 38	high 72	ppb
May	1997	ave. 53	low 31	high 74	ppb
AVERAGES:		AVE= 53	LOW= 29	HIGH= 76	ppb

SUMMER 1997:

June	1997	ave. 51	low 25	high 76	ppb
July	1997	ave. 53	low 30	high 76	ppb
August	1997	ave. 46	low 26	high 66	ppb
AVERAGES:		AVE= 50	LOW= 27	HIGH= 73	ppb

FALL 1997:

September	1997	ave. 39	low 26	high 53	ppb
October	1997	No Data			
November	1997	ave. 49	low 39	high 59	ppb
AVERAGES:		AVE= 44	LOW= 32	HIGH= 56	ppb

WINTER 1997-98:

December	1997	ave. 50	low 37	high 63	ppb
January	1998	ave. 53	low 44	high 63	ppb
February	1998	ave. 57	low 48	high 65	ppb
AVERAGES:		AVE= 53	LOW= 43	HIGH= 64	ppb

SPRING 1998:

March	1998	ave. 55	low 42	high 69	ppb
April	1998	ave. 59	low 39	high 80	ppb
May	1998	ave. 65	low 42	high 89	ppb
AVERAGES:		AVE= 60	LOW= 41	HIGH= 79	ppb

SUMMER 1998:

June	1998	ave. 53	low 29	high 76	ppb
July	1998	ave. 51	low 16	high 86	ppb
August	1998	ave. 47	low 25	high 70	ppb
AVERAGES:		AVE= 50	LOW= 23	HIGH= 77	ppb

FALL 1998:

September	1998	ave. 43	low 36	high 49	ppb
October	1998	ave. 53	low 38	high 67	ppb
November	1998	ave. 47	low 35	high 59	ppb
AVERAGES:		AVE= 48	LOW= 36	HIGH= 58	ppb

WINTER 1998-99:

December	1998	ave. 50	low 39	high 61	ppb
January	1999	ave. 52	low 40	high 63	ppb
February	1999	ave. 51	low 37	high 65	ppb
AVERAGES:		AVE= 51	LOW= 39	HIGH= 63	ppb

SPRING 1999:

March	1999	ave. 63	low 47	high 80	ppb
April	1999	ave. 59	low 40	high 78	ppb
May	1999	ave. 65	low 45	high 85	ppb
AVERAGES:		AVE= 63	LOW= 44	HIGH= 81	ppb

SUMMER 1999:

June	1999	ave. 56	low 28	high 84	ppb
July	1999	ave. 62	low 40	high 83	ppb
August	1999	ave. 57	low 38	high 76	ppb
AVERAGES:		AVE= 58	LOW= 35	HIGH= 81	ppb

FALL 1999:

September	1999	ave. 56	low 36	high 75	ppb
October	1999	ave. 42	low 16	high 69	ppb
AVERAGES:		AVE= 49	LOW= 26	HIGH= 72	ppb

After 38 months of collecting data; the **OZONE average is 52 parts per billion**, the low average is 34 ppb and the high average is 70 ppb. Therefore, our forests average of 52 parts per billion, at 9,000 feet elevation, is within the range of 30-70 ppb.

Problems that occurred with the machine was the breakdown of a small vacuum pump, which needed replacing. It was calibrated in August 1996, when installed, and again in August 1997, by Ted Hehn with the USFS. The second small vacuum pump stopped on September 18, 1997, at which time the machine was sent to Mr. Owen Houston of OBE in

Pahrump, Nevada for cleaning, calibration and the installation of new vacuum pump and an extra pump. In the Fall of 1999, the machine was not working as expected. It was removed from the site and sent to the Thermo Electron Corporation at San Dimas, California for checking. The cells, detectors and all contacts were cleaned, adjusted intensities and calibrated. It was very close to the proper calibration requirements. It was returned to the Salmon Forest Service, but not re-installed at the site.

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