

UTAH

2009 AIR MONITORING NETWORK PLAN

Addendum - Lead (Pb) Monitoring Proposal

Prepared by the Division of Air Quality

Utah Department of Environmental Quality



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1.0 Changes in Lead Monitoring Rules

In November 2008, EPA dramatically lowered the National Ambient Air Quality Standard (NAAQS) for lead (Pb), bringing the attainment margin of $1.5 \mu\text{g}/\text{m}^3$ averaged over a calendar quarter down to $0.15 \mu\text{g}/\text{m}^3$ averaged over any three consecutive months. Additionally, the new lead monitoring regulation requires source directed monitoring near sources emitting more than 1 ton of lead or lead compounds a year by January 1, 2010; and non-source oriented monitoring in Core Base Statistical Areas with a population exceeding 500,000 by January 1, 2011. EPA will also discard the use of calendar quarter averaging and replace it with a rolling 3-months average evaluated over a 3-year period. This averaging method tends to slightly increase the reported concentrations when compared to the current method.

1.1 Current Lead Sources in Utah

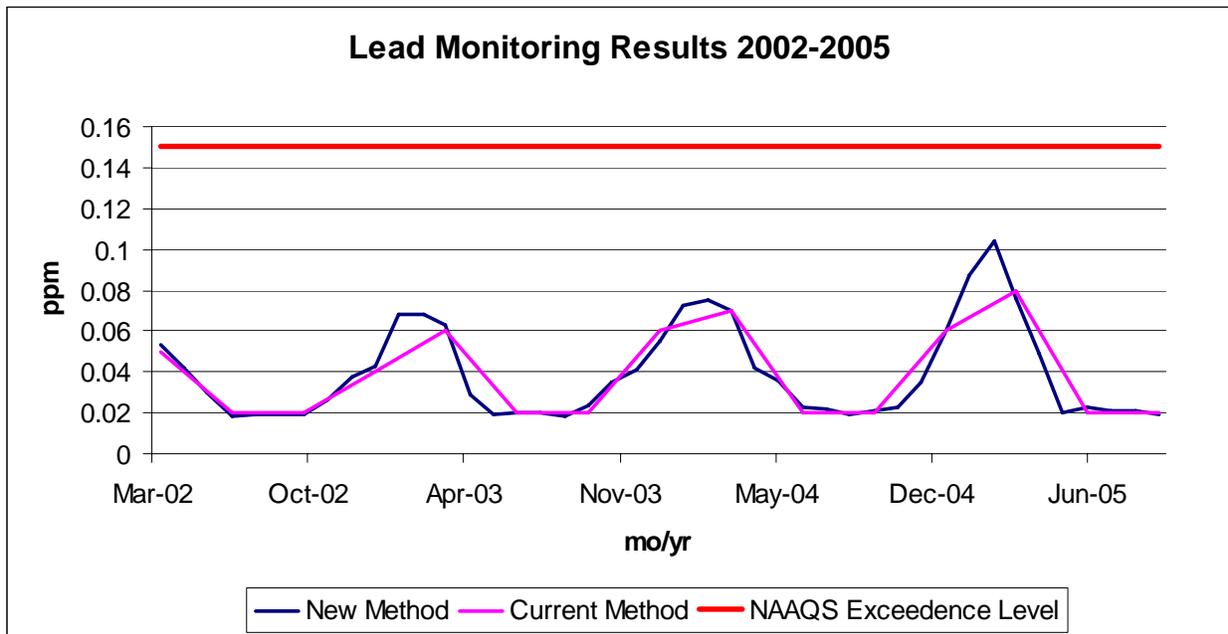
Presently, the only point source of lead in the State of Utah that necessitates the source monitoring is Rio Tinto – Kennecott Copper Smelter. The smelter is located on the north end of the Oquirrh Mountains near the border between Salt Lake and Tooele Counties. The smelter's high stack is the main source of lead pollution with an estimated 9,905 lbs/year emissions. The next most significant source of lead emission is the roof vents of the anode furnace building located immediately next to the stack and emitting an estimated 1040 lbs/year.

According to modeling studies, Pb monitoring at the current Magna site (located at Brockbank Junior High School 5.5 miles from the Kennecott main stack) would underestimate the emissions from the main stack and the anode furnace by 29% and 75% respectively compared to the western border of the city.

1.2 Modeling Discussion

Modeling studies were conducted in order to ascertain the proper location of maximum expected concentration for ambient Pb. Siting requirements for point source ambient Pb monitoring calling for placement of lead monitors in areas of highest expected concentrations are meaningful and logistically justifiable. Complete results, discussion, and conclusion to modeling studies can be found in DAQE-027-09, attached to this document.

Some previous Pb sampling was conducted at the Magna site. Figure 1 shows the Pb observed at the Magna site between 2002 and 2005.



The spikes are mostly associated with winter months. Values expected from the model for Pb pollution generated by Kennecott's anode furnace and the stack are expected to be approximately 0.0016 ppm. The disparity between the modeled data and the Pb concentrations observed on site may suggest the existence of a source unaccounted for or another significant process by which lead is introduced into PM.

1.3 Monitoring Site Discussion

Source monitoring for Pb will be conducted at the current Magna monitoring station. Pb sample collection will be conducted on a one-in-six day schedule with a high-volume TISCH Environmental TSP monitor, model TE-HiVol + BL. Another identical co-located monitor will be placed at the station for quality assurance and will collect Pb samples on a one-in-twelve day schedule. Figure 2 shows the location of the Kennecott stack and the anode furnace in relation to the Magna sampling site.

Figure 2.



Site Information:

Site: Magna

Station Type: SLAMS

AQS#: 49-035-1001

MSA: Salt Lake City- 1,128,684

Address: 2935 South 8560 West, Magna, UT

Longitude: 112.0945 **Latitude:** 40.70678 **Elevation (M):** 1289

Sampling Method: High Volume TSP

Sample Analysis Method: Pb-TSP (73 FR 67020)

Operating Schedule: Once every six days and once every twelve days for data QA

Monitoring Objective: Point source oriented monitoring

Figures 3 through 6 show the view from the Magna site in each cardinal direction. Figure 7 shows the projected placement of Pb monitors.

Fig. 3 Magna North



Fig. 4 Magna East



Fig. 5 Magna South



Fig. 6 Magna West

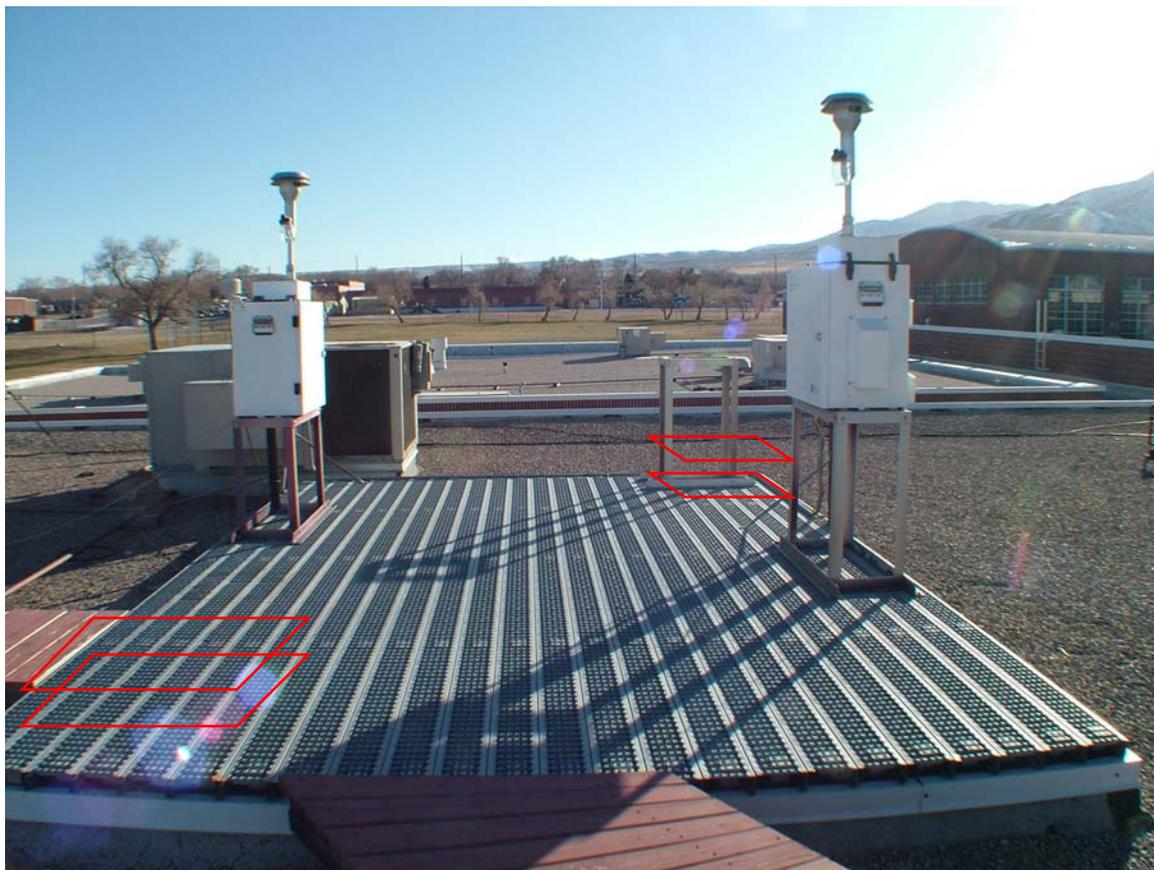


1.4 Monitor Siting Criteria

The station complies with the requirements for proper placement of the lead sampler at lead monitoring sites (40 CFR 58, Appendix E). The proposed sampler location provides the required distance of at least two meters between the high-volume samplers, unrestricted airflow in an arc of at least 270° around the samplers, the absence of nearby incinerator flues, furnaces, or trees, and a sufficient elevation for neighborhood scale sampling. Figure 7 shows the proposed locations of the two high-volume Pb-TSP samplers.

When selecting for a Pb monitoring site, EPA allows the consideration of logistical and population exposure factors to override placement of Pb monitors at the expected maximum concentration locations. The current Magna site is located directly in the middle of Magna community, where the population exposure would be the highest. Additionally, historical values of Pb recorded at the Magna monitoring site were two orders of magnitude larger than those derived from the model, suggesting either the overestimation of plume dispersion or an incomplete inventory of Pb sources near the site. Thus, in case of additional unregistered sources of lead, relocating the Pb monitors to the area of the highest expected modeled concentration may not be representative of the actual population exposure.

Fig. 7 Pb Sampler Locations



1.5 Network Modification Process

The Network modification process (adding a parameter to an existing site) is done according to a process outlined in the Code of Federal Regulations, Title 40, Part 58 (40 CFR, Part 58). Utah DEQ informs the Region VIII Air Monitoring contact, proposing a modification by submitting a Network Modification Request Form. Region VIII reviews and approves or denies the pending request. If approved, DEQ continues with site modification and submits an AIRS-AQS Site form which is reviewed by Region VIII for completeness and compliance.

1.6 Proposed Network Modifications

At the present time there are no active Pb monitoring sites in the State of Utah. EPA's regulation, as of 2008, (see 73 FR 66934) calls for source directed monitoring near sources emitting more than 1 ton of lead a year by January 1, 2010 and non-source oriented monitoring in Core Base Statistical Areas with a population exceeding 500,000 by January 1, 2011. Utah DEQ intends to begin source oriented Pb monitoring using a Pb-TSP method at Magna monitoring site to observe population exposure to the emissions originating from Kennecott facilities near the city. Additional non-source oriented monitors will be deployed in Salt Lake City, Ogden, and Provo-Orem areas by January 1, 2011.

1.7 Network Modification Forms

**REGION VIII AMBIENT AIR MONITORING
NETWORK MODIFICATION REQUEST FORM
(VERSION 1, 5/20/94)**

DATE: 10/21/09 CITY: Magna STATE: Utah AIRS #: 49-035-1001
 SITE NAME: Magna PROPOSED MODIFICATION/REASON WHY: Add two Hi-Vol particulate samplers to monitor for lead. The Magna site was computer modeled as the best site, from current sites, to receive the most exposure to smelter emissions. | **CHECK ONE**

OR MORE BOXES BELOW |

AIR QUALITY PARAMETER	MONITOR TYPE	MAX CONC	SOURCE POPULATION IMPACT EXPOSURE	BACKGROUND	EQUIPMENT
12128	4 Industrial	X			

PROPOSED SAMPLING START OR REMOVAL DATE/DATE STARTED OR REMOVED: 1/1/2010

ESTIMATED MEASUREMENTS FOR AIR QUALITY PARAMETERS:

LOCATION(LAT./LONG. OR UTM's) Northing 4506436 Easting 407544 SITE ELEVATION(M. MSL): 1315 PROBE HEIGHT(M. AGL): 3 DISTANCE |
 TO TREE |DIRECTION|DISTANCE TO|DIRECTION |OBSTACLE HEIGHT|OBSTACLE
 DRIPLINE(M)|TO TREE |OBSTACLE(M)|TO OBSTACLE|ABOVE PROBE(M) |COMMENTS

No Trees					

UNRESTRICTED AIR FLOW: >270 DEG. x >180 DEG. ___ <CRITERIA ___ DEG.

DISTANCE TO FLUES/INCINERATORS(M):

DISTANCE TO INTERSECTIONS(M):

DISTANCE TO EDGE | DAILY TRAFFIC | TYPE OF
 OF NEAREST ROADWAY(M) | DIRECTION | ESTIMATES | ROADWAY|COMMENTS

NORTH		231
EAST	13815	Local Road
SOUTH		
WEST		

DISTANCE FROM SUPPORTING STRUCTURES(M): VERT. ___ HORIZ.

DISTANCE TO | DISTANCE TO |
 NEAREST POINT | DIRECTION TO | NEAREST AREA | DIRECTION TO|
 SOURCE(MILES) | POINT SOURCE | SOURCE(MILES) | AREA SOURCE |COMMENTS

5.5	West			

CERTIFICATION:

I certify the site or network modification proposed above meets all 40 CFR 58, Appendix E siting criteria, except as noted with submittal.

Signature

AQNMF1.94

FOR METEOROLOGICAL PARAMETERS ONLY:

MONITORING

PURPOSE/OBJECTIVES: _____

WILL DATA BE USED FOR MODELING: YES __ NO
 IS SITE REQUIRED FOR SIP PURPOSES: YES __ NO
 PROPOSED MONITORING SCHEDULE/DURATION: _____ PROPOSED START OR
 REMOVAL DATE/DATE STARTED OR REMOVED:

EQUIPMENT MANUFACTURE/MODEL: _____
 DATA ACQUISITION SYSTEM: PRIMARY _____ BACKUP
 PARAMETERS: WIND SPEED/DIRECTION _____ SIGMA THETA _____ PRESSURE _____
 TEMPERATURE _____ PRECIPITATION _____ RELATIVE HUMIDITY _____
 SOLAR RADIATION _____ OTHER _____

WS/WD	TEMP.	PRECIP.	SOLAR RAD.	OTHER	SENSOR HEIGHT (M)

DISTANCE TO TREE DRIPLINE(M):__ UNRESTRICTED AIRFLOW: Y __ N

OBSTACLE	DISTANCE TO OBSTACLE	HEIGHT OF OBSTACLE	DIRECTION TO OBSTACLE (N, E, S, W)	COMMENTS

NEARBY TERRAIN: SMOOTH __ ROLLING __ ROUGH
 TOPOGRAPHIC FEATURES(E.G. HILLS, MOUNTAINS, VALLEYS, RIDGES,
 BODIES OF WATER, ETC.):
 COMMENTS: _____

METNMFMI.94

FORM KEY:

PAGE 1:

MONITOR TYPE: NAMS = 1, SLAMS = 2, SPM = 3, TRIBAL = A
 SITE ELEVATION = GROUND LEVEL ELEVATION
 PROBE HEIGHT (M. AGL) = PROBE HEIGHT METERS ABOVE GROUND LEVEL

1.8 Summary and Conclusions

EPA has adopted a new national ambient air quality standard (NAAQS) for lead, lowering it from the former $1.5 \mu\text{g}/\text{m}^3$ to $0.15 \mu\text{g}/\text{m}^3$. In addition, to further protect the general population from high pollution episodes, reporting of ambient Pb requires a three-month rolling average form as opposed to the former calendar quarter average. The new regulation also requires source oriented monitoring near facilities emitting more than 1 ton of Pb a year by January 1, 2010. Non-source oriented monitoring is required to be implemented in CBSA's larger than 500,000 by January 1, 2011.

The only Pb source in Utah emitting more than 1 ton of lead per year is the Rio Tinto - Kennecott copper smelter located at the northern edge of the Oquirrh mountains. The source oriented monitoring for that plant will be carried out at the Magna monitoring station located at Brockbank Junior-High School at Magna, Utah. Although the modeling studies suggest that the highest expected concentration from the smelter would be along the western edge of the city (~1 mile west from the sampling site), discrepancies between the modeled and historical data, population concentration, and local meteorological and topographic conditions justify conducting Pb monitoring at the current site.

A.0 APPENDIX A - PUBLIC COMMENTS ON MONITORING PLAN

The comments received during the public review of the monitoring plan will be evaluated and the plan will be modified if determined to be appropriate.

