

**AIRBORNE URANIUM MONITORING
U. S. ARMY POHAKULOA TRAINING AREA
ISLAND OF HAWAII**

Summary Report - March 2009

**Contract No. W9128A-04-D-0019
Task Order 0040**

Prepared for

**U. S. Army Corps of Engineers
Honolulu District
Fort Shafter, Hawaii**

and

**U. S. Army Garrison, Hawaii
Schofield Barracks, Hawaii**

Prepared by:

**J. W. Morrow, DrPH
Environmental Management Consultant
Honolulu, Hawaii**

ACRONYMS AND ABBREVIATIONS

ATSDR	Agency for Toxic Substances and Disease Registry
EPA	U. S. Environmental Protection Agency
ICP-MS	inductively coupled mass spectrometry
IDL	instrument detection limit
lpm	liters per minute
µg	micrograms
µg/m ³	micrograms per cubic meter
MRL	minimal risk level
N	number of samples
ppm	parts per million
PRL	practical reporting limit
PTA	Pohakuloa Training Area
TSP	total suspended particulate matter
U	uranium
²³⁸ U	uranium-238 isotope
²³⁴ U	uranium-234 isotope
²³⁵ U	uranium-235 isotope
WHO	World Health Organization

INTRODUCTION

An airborne uranium monitoring project at the U. S. Army's Pohakuloa Training Area (PTA) commenced on 4 February 2009. Portable samplers operating at a nominal 5 liters per minute (lpm) are located at three (3) sites on PTA (Figure 1). The samplers collect total suspended particulate matter (TSP) from midnight to midnight on sample days. The EPA's published once-every-six-days schedule is generally being followed, but sampling is also performed on days when heavy weapons firing is scheduled for the PTA ranges.

The 47-mm Teflon filters with the collected TSP are sent to laboratories for gravimetric and then uranium analysis. The analysis method for uranium is inductively coupled plasma - mass spectrometry (ICP-MS), a method capable of detecting uranium down to the picogram (10^{-12} gram) level.

Fifteen (15) samples were collected and analyzed during March 2009, and the results are presented herein.

RESULTS AND DISCUSSION

The analysis results for each of the three (3) monitoring stations are summarized in Table 1 and Figures 2 - 4. There was no heavy weapons, i.e., artillery, bombs, rockets, employment on the PTA ranges during this reporting period.

FIGURE 1
MONITORING SITES



TABLE 1
DAILY TSP & AIRBORNE URANIUM CONCENTRATIONS
MARCH 2009

Station No.	N	TSP Range ($\mu\text{g}/\text{m}^3$)	U Range ($\mu\text{g}/\text{m}^3$)	U Mean ($\mu\text{g}/\text{m}^3$)	ACTIVITY
1	5	5.3 - 29.2	0.000011 - 0.000019	0.000014	No heavy weapons activity
4	5	4.6 - 12.4	0.000010 - 0.000018	0.000013	No heavy weapons activity
14	5	2.7 - 9.5	0.000010 - 0.000014	0.000012	No heavy weapons activity

Figures 2 - 4 also indicate the World Health Organization (WHO) and U. S. Agency for Toxic Substances and Disease Registry (ATSDR) guidelines for uranium exposure protection. The WHO guideline is an annual average while the ATSDR guideline is based on chronic exposure (365 days or longer) to highly soluble uranium compounds. It is clear that the uranium concentrations found at PTA in March 2009 are well below both those health guidelines.

It should be noted that the total mass of uranium found on each filter was well above, i.e., 7 to 13 times, the laboratory's instrument detection level (IDL) for the ICP-MS method but below the practical reporting level (PRL). This means that the measured value is clearly less than the PRL but has an unspecified degree of uncertainty about its true value. At a nominal sampler flow rate of 5 lpm, the laboratory's PRL of 0.00025 microgram (μg) corresponds to an airborne uranium concentration of 0.000035 $\mu\text{g}/\text{m}^3$. Uranium isotopes ^{234}U and ^{235}U were below the IDL and thus could not be quantified.

FIGURE 2

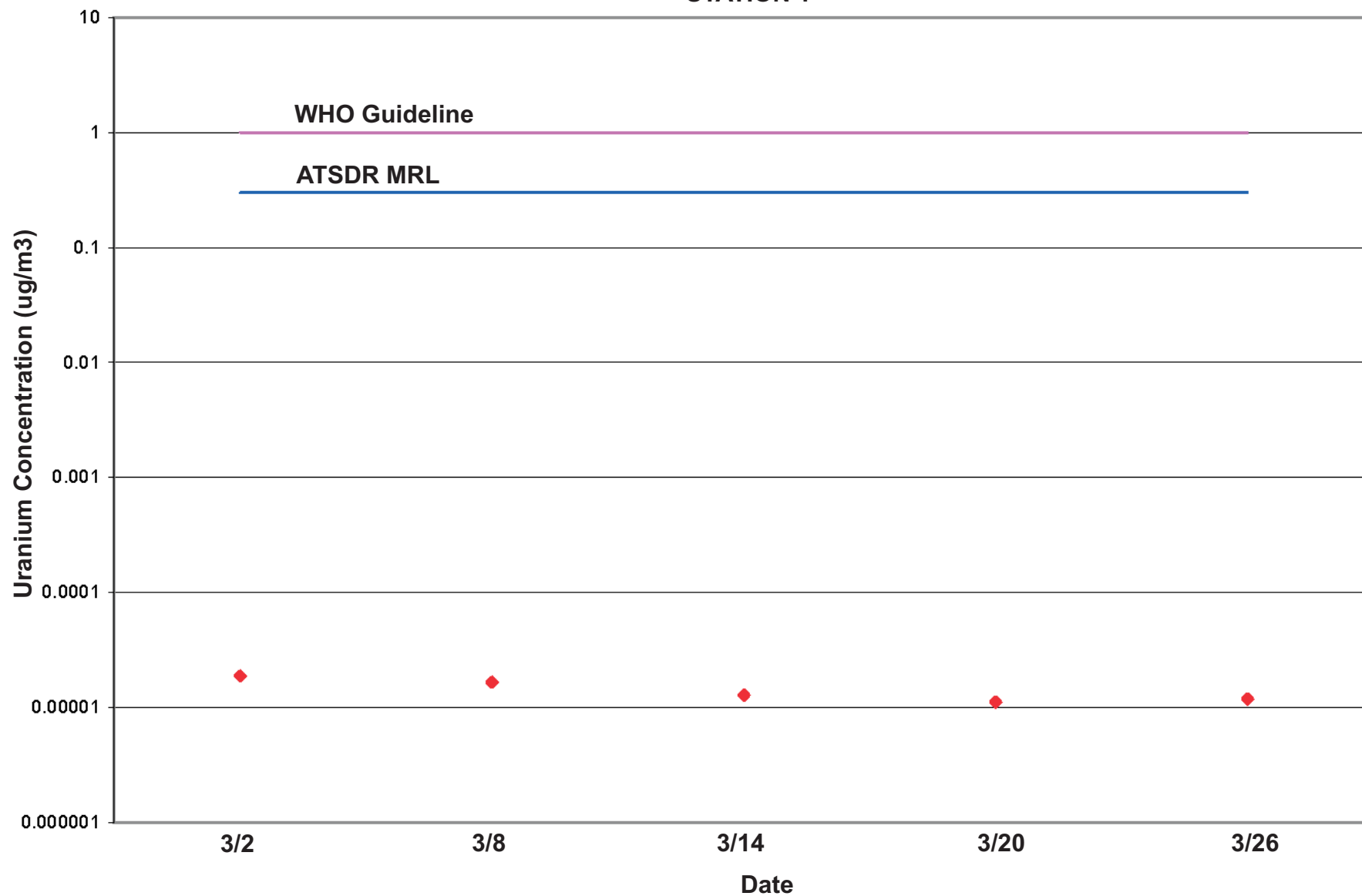
24-HOUR URANIUM CONCENTRATIONS
STATION 1

FIGURE 3

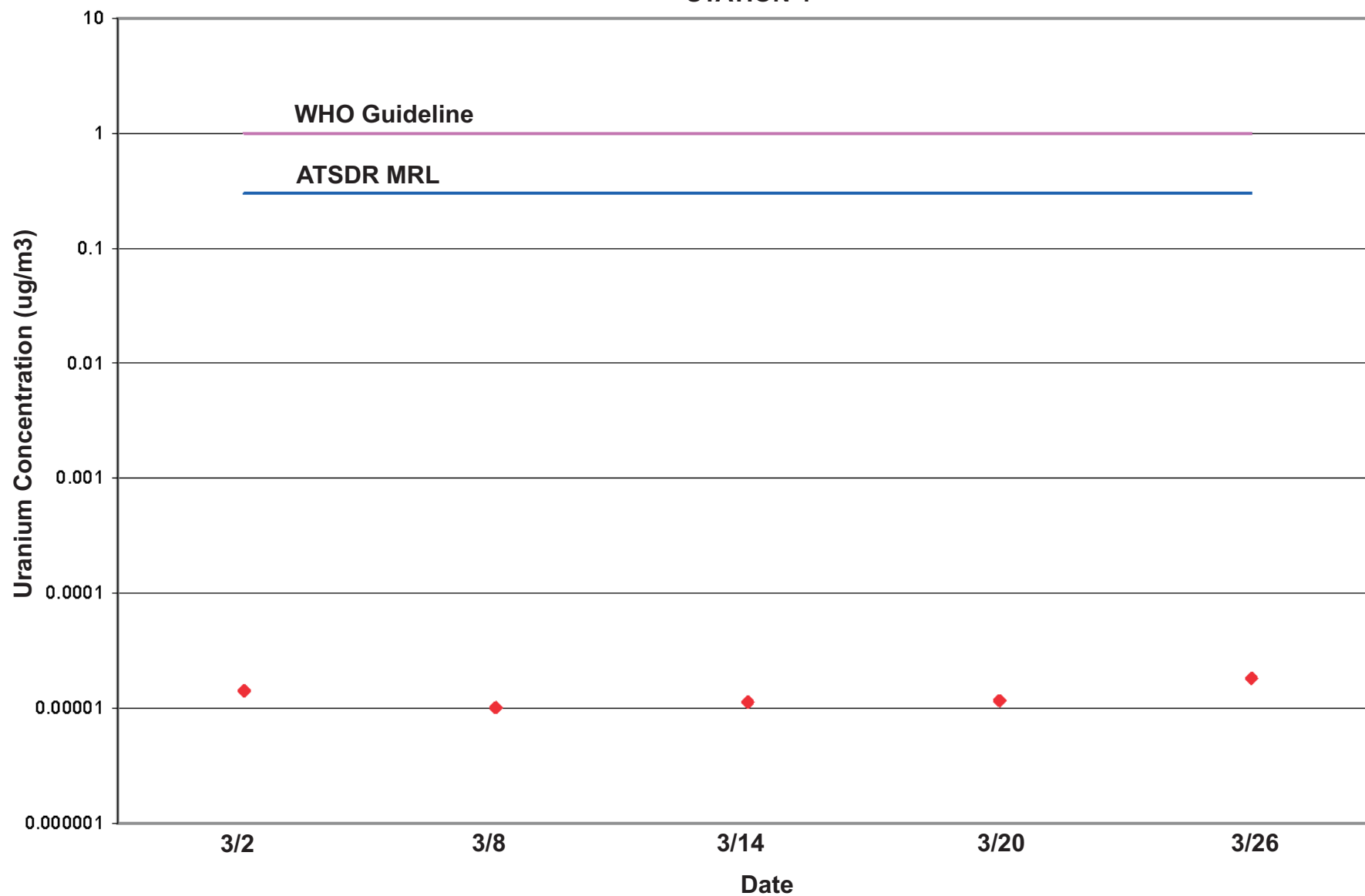
24-HOUR URANIUM CONCENTRATIONS
STATION 4

FIGURE 4

24-HOUR URANIUM CONCENTRATIONS
STATION 14