

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

**Summary Report - February 2010**

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

**Prepared for**

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

**and**

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**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 <sup>3</sup>	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
<sup>238</sup> U	uranium-238 isotope
<sup>234</sup> U	uranium-234 isotope
<sup>235</sup> U	uranium-235 isotope
WHO	World Health Organization

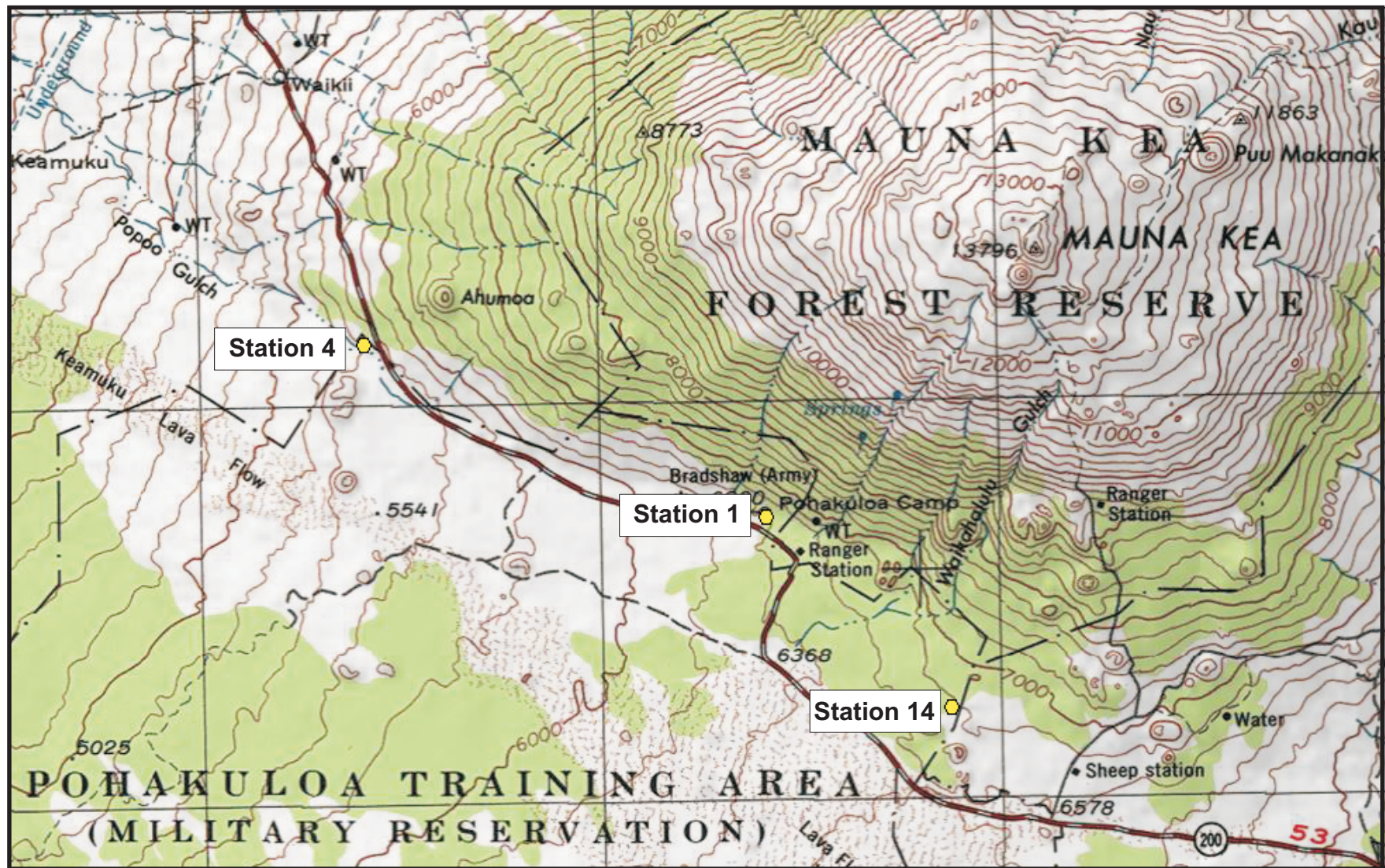
## INTRODUCTION

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 were originally set to collect total suspended particulate matter (TSP) from midnight to midnight on sample days. However, due to the very low uranium content of the TSP samples, the run time was increased to 72 hours on 19 Apr 09 and has continued at that rate in an effort to raise the collected uranium mass above the practical reporting level (PRL). There was no heavy weapons firing activity on PTA ranges during February.

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.

Twelve (12) samples were collected and analyzed during February 2010, and the results are presented herein.

FIGURE 1  
MONITORING SITES



## RESULTS AND DISCUSSION

The analysis results for each of the three (3) monitoring stations are summarized in Table 1 and Figures 2 - 4.

The figures 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. The total airborne uranium concentrations found at PTA in February 2010 are well below both those health guidelines.

**TABLE 1**  
**TSP & AIRBORNE URANIUM CONCENTRATIONS**  
**FEBRUARY 2010**

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	4	11.4 - 26.6	0.000008 - 0.000017	0.000013	No heavy weapons activity
4	4	11.1 - 25.6	0.000005 - 0.000009	0.000008	No heavy weapons activity
14	4	5.9 - 9.8	0.000004 - 0.000007	0.000005	No heavy weapons activity

The total uranium mass found on all filters in February was well above, i.e., 19 to 86 times, the laboratory's latest determined instrument detection level (IDL) for the ICP-MS method. The scheduled 19 - 21 February sample run at Station 1 only ran 24 hours due to a timer error. The 25 - 27 February filter at Station 1 contained total uranium above the practical reporting limit (PRL) of 0.00025 microgram ( $\mu\text{g}$ ); all other samples were below the PRL. Uranium isotopes  $^{234}\text{-U}$  and  $^{235}\text{-U}$  continued to be undetectable.

Total uranium values in the vicinity of the PRL are significant in determining the potential for public health impacts. At a nominal sampler flow rate of 5 lpm, the laboratory's PRL of 0.00025 microgram ( $\mu\text{g}$ ) corresponds to a 24-hour airborne uranium concentration of 0.000035  $\mu\text{g}/\text{m}^3$ , a value several orders of magnitude below health effects guidelines.

FIGURE 2

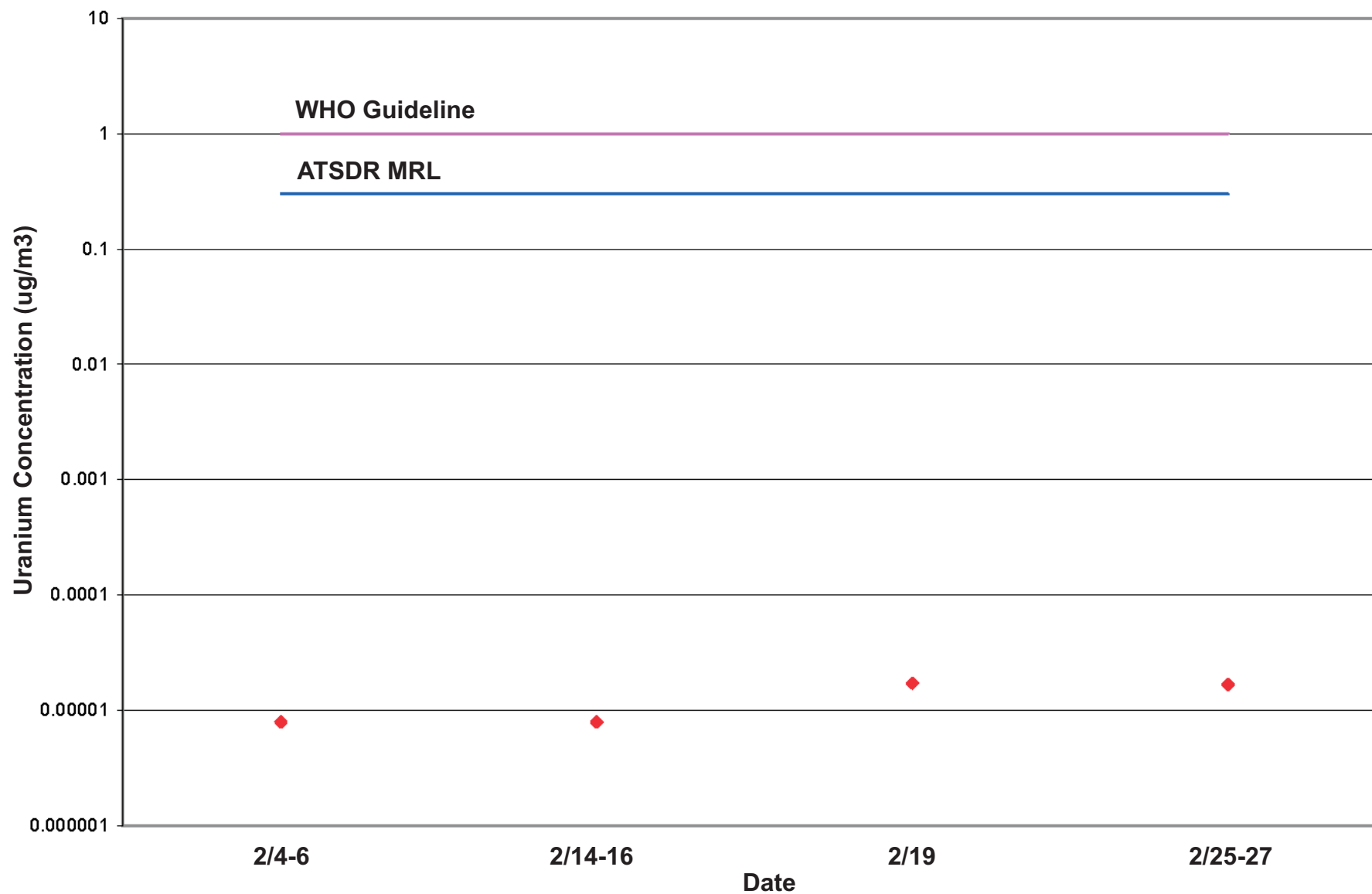
AIRBORNE URANIUM CONCENTRATIONS  
STATION 1

FIGURE 3

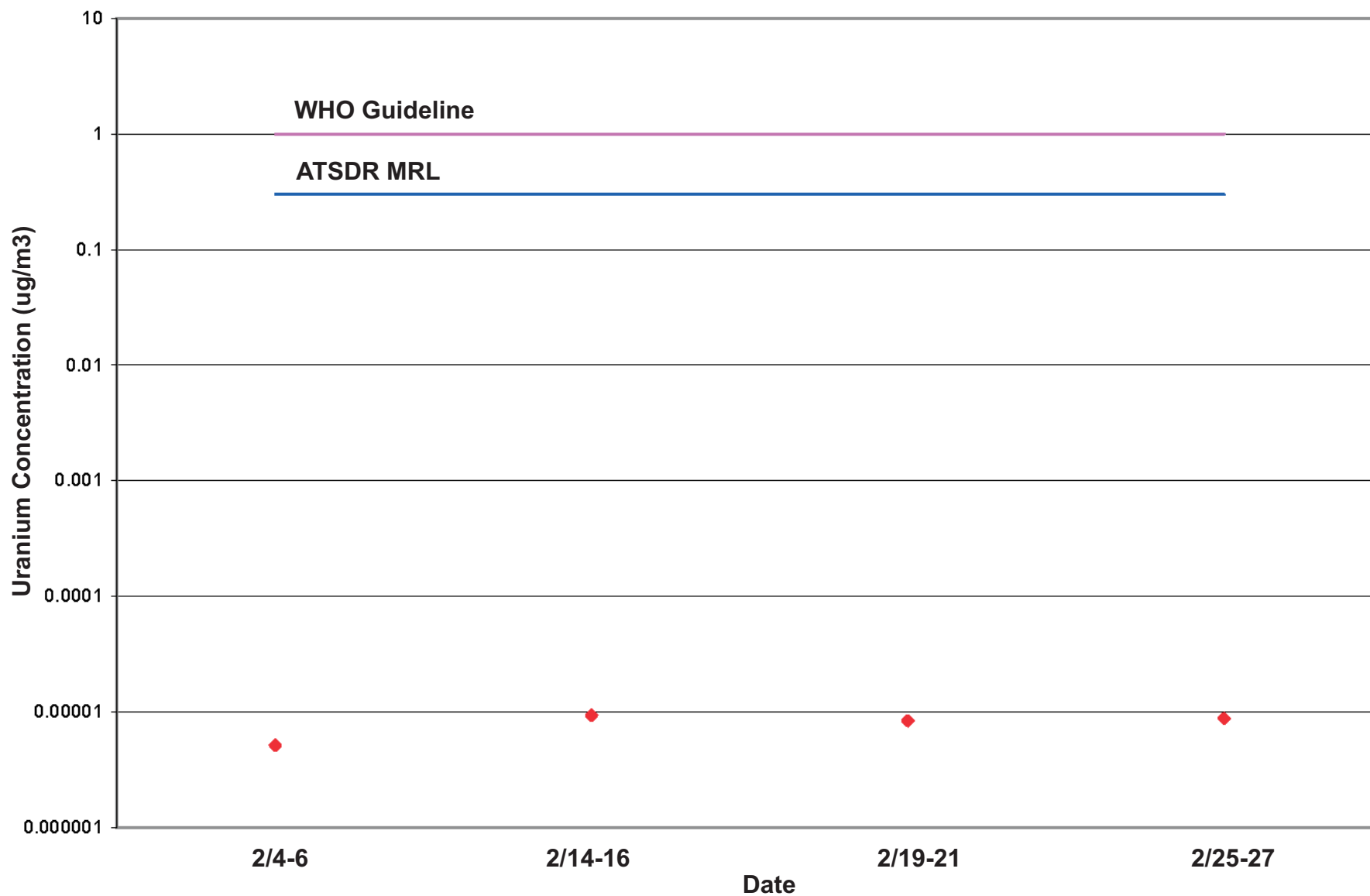
AIRBORNE URANIUM CONCENTRATIONS  
STATION 4



FIGURE 4

AIRBORNE URANIUM CONCENTRATIONS  
STATION 14