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

Summary Report - January 2010

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Prepared for

U. S. Army Corps of Engineers
Honolulu District
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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
$\mu g/m^3$	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

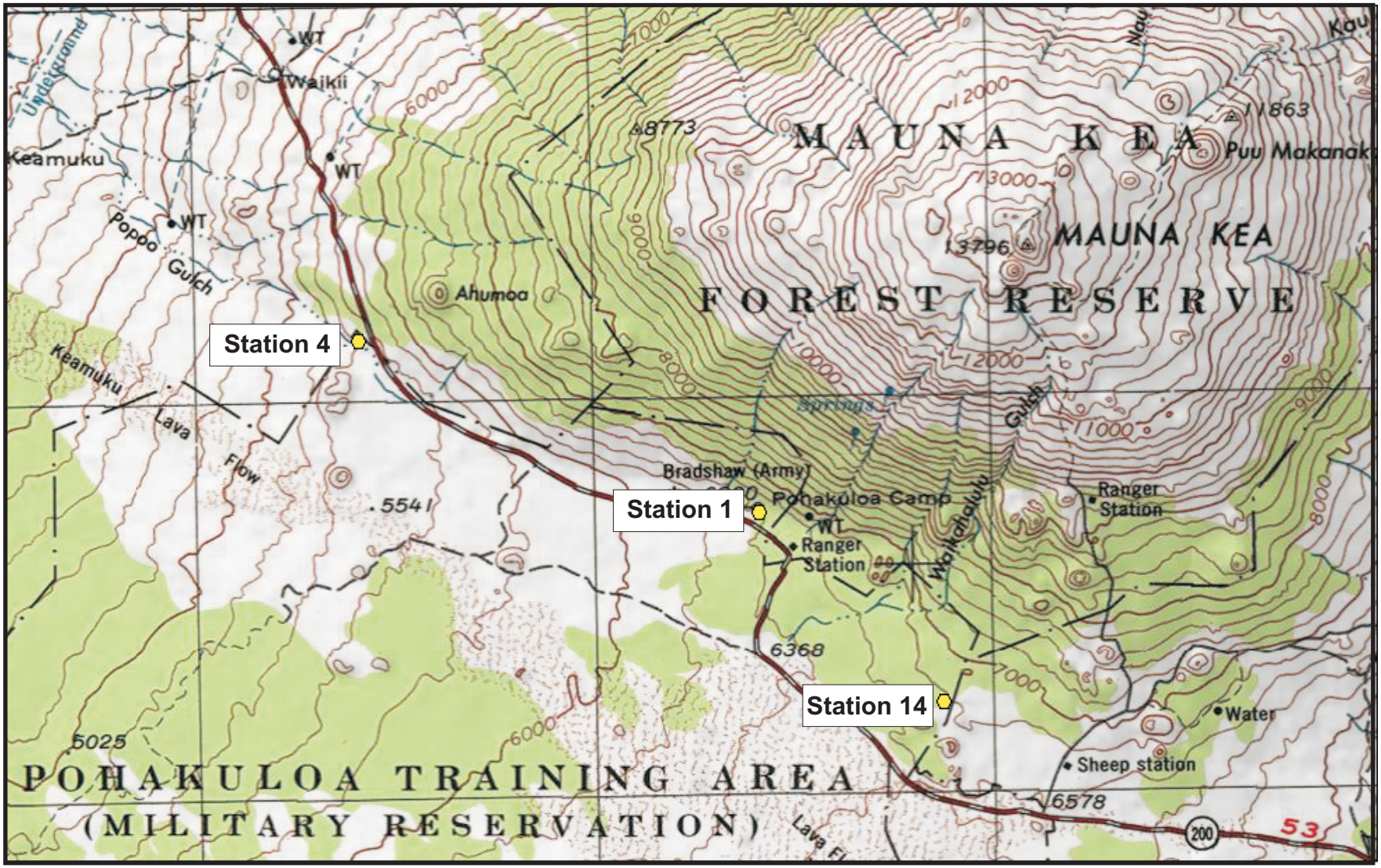
An airborne uranium monitoring project at the U. S. Army's Pohakuloa Training Area (PTA) commenced on 4 February 2009. Portable samplers operating at a nominal 5 liters per minute (lpm) are located at three (3) sites on PTA (Figure 1). The samplers were originally set to collect total suspended particulate 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 mortar, artillery and rocket firing activity on PTA ranges during the latter half of January and the 72-hour sampling periods were scheduled during this activity.

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.

Eighteen (18) samples were collected and analyzed during January 2010, and the results are presented herein. One filter from Station 4 (25-27 Jan 10) was invalidated due to damage during the final weighing process at the first laboratory.

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 January 2010 are well below both those health guidelines.

TABLE 1

TSP & AIRBORNE URANIUM CONCENTRATIONS
JANUARY 2010

Station No.	N	TSP Range ($\mu g/m^3$)	U Range* ($\mu g/m^3$)	U Mean* ($\mu g/m^3$)	ACTIVITY
1	6	9.7 - 28.9	0.000005 - 0.000017	0.000012	Mortar, artillery & rocket fire
4	5	13.5 - 33.3	0.000005 - 0.000015	0.000010	Mortar, artillery & rocket fire
14	6	3.6 - 12.2	0.000004 - 0.000012	0.000006	Mortar, artillery & rocket fire

The total uranium mass found on all filters in January was well above, i.e., 18 to 84 times, the laboratory's latest determined instrument detection level (IDL) for the ICP-MS method. Nine (9) of the 17 valid filters contained uranium at or above the practical reporting limit (PRL) of 0.00025 microgram (μg). Uranium isotopes ^{234}U and ^{235}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 (μg) corresponds to a 24-hour airborne uranium concentration of $\underline{0.000035\ \mu g/m^3}$, a value several orders of magnitude below health effects guidelines.

FIGURE 2

AIRBORNE URANIUM CONCENTRATIONS
STATION 1

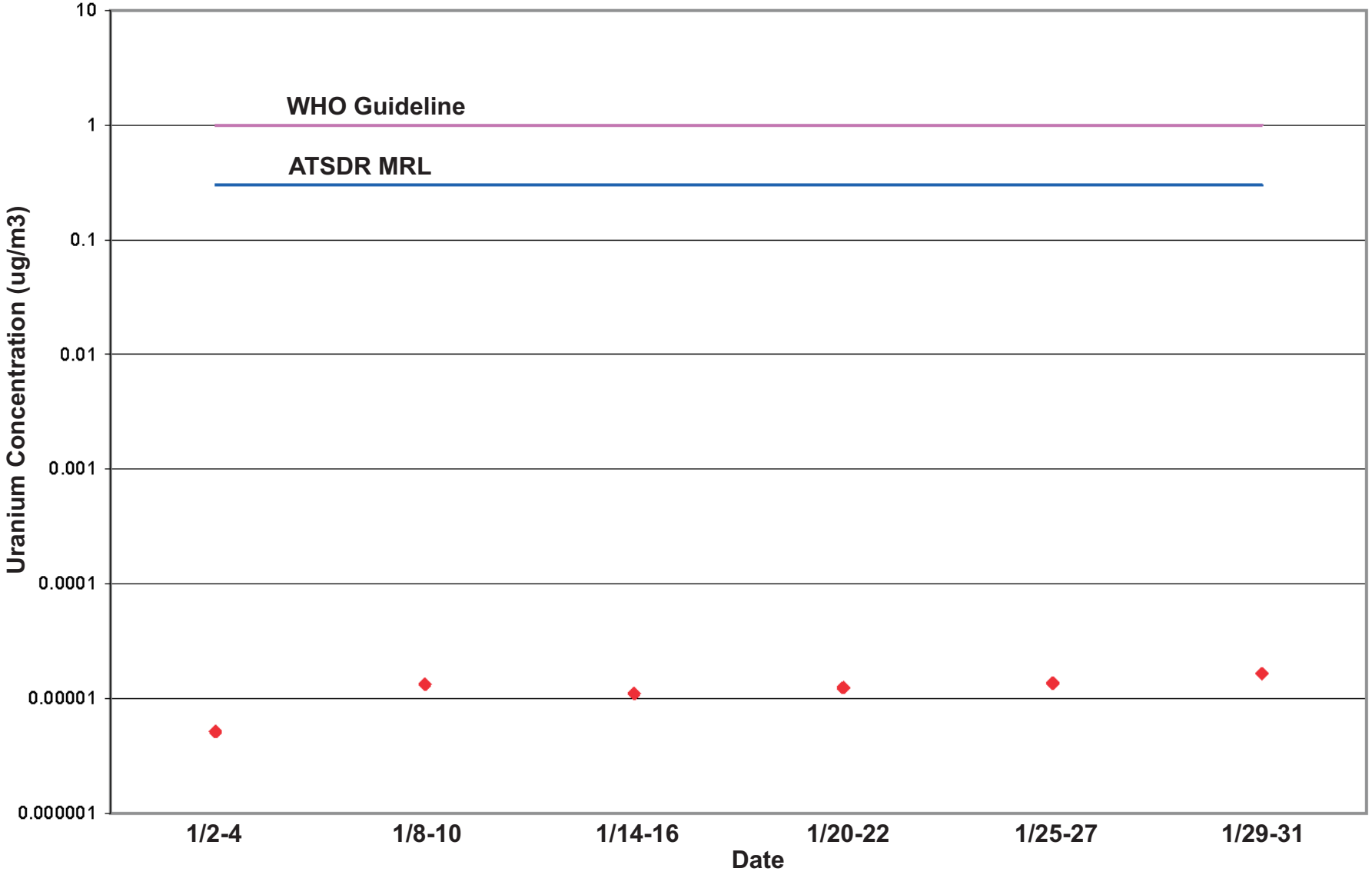


FIGURE 3

AIRBORNE URANIUM CONCENTRATIONS
STATION 4

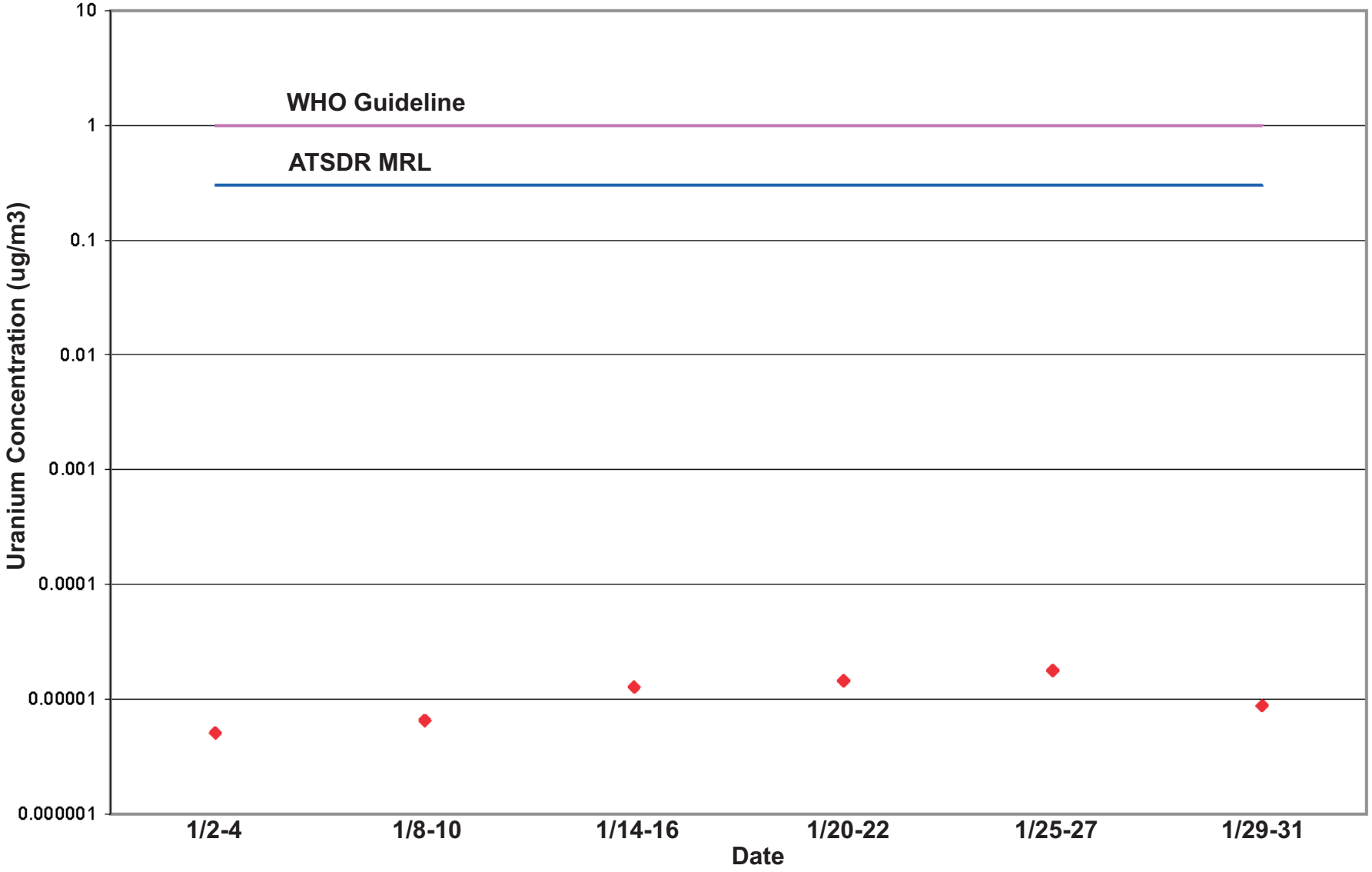


FIGURE 4

AIRBORNE URANIUM CONCENTRATIONS
STATION 14