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

Summary Report - September 2009

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Prepared for

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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

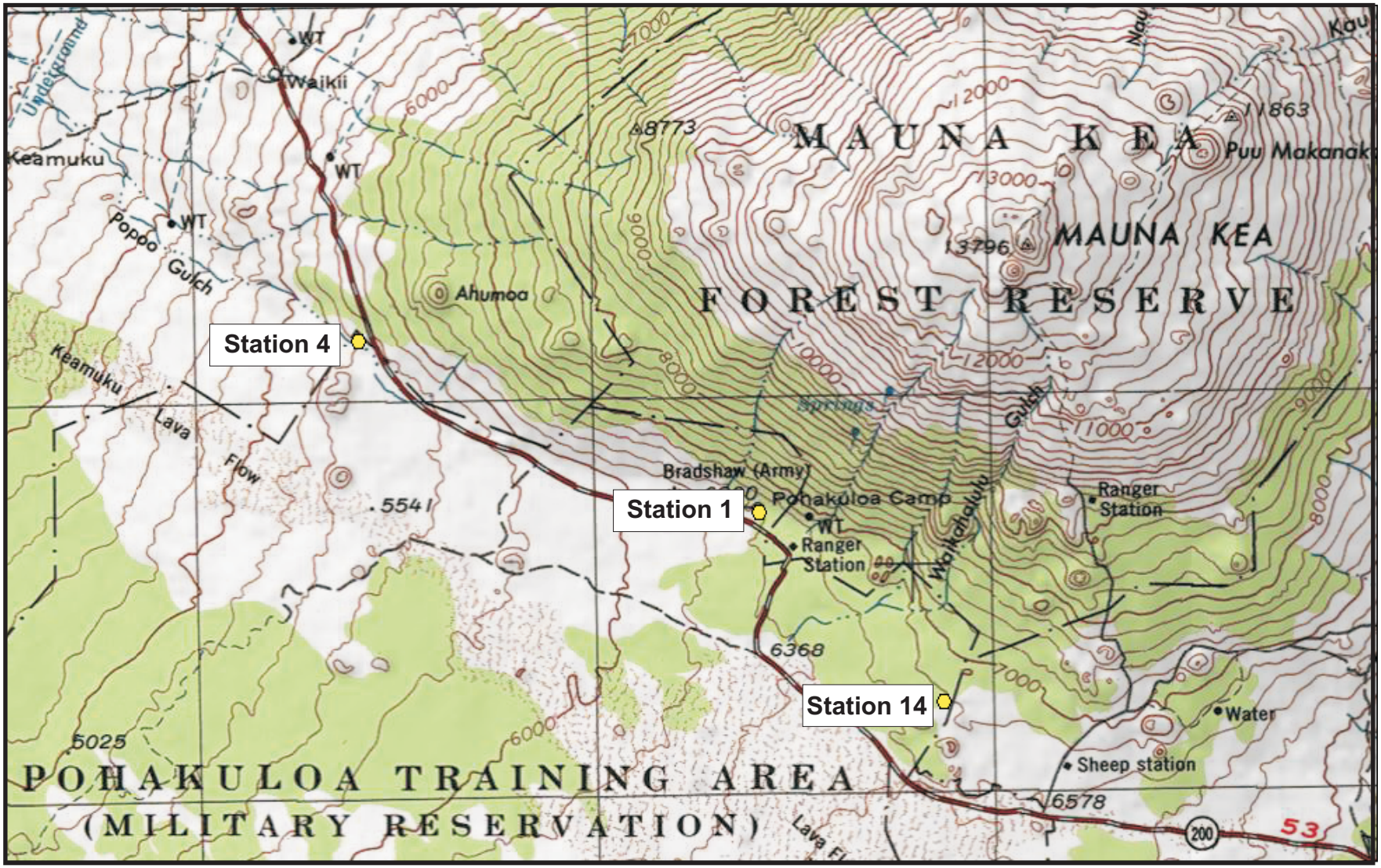
An airborne uranium monitoring project at the U. S. Army's Pohakuloa Training Area (PTA) commenced on 4 February 2009. Portable samplers operating at a nominal 5 liters per minute (lpm) are located at three (3) sites on PTA (Figure 1). The samplers were originally set to collect total suspended particulate 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). Since there was no heavy weapons firing activity on PTA ranges until the end of September, each 72-hour sampling period proceeded in accordance with EPA's published once-every 6-day schedule.

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.

Thirteen (13) samples were collected and analyzed during September 2009, 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. There was no heavy weapons, i.e., artillery, bombs, rockets, employment on the PTA ranges until the last three sample days in September. Two scheduled sampling periods (10-12 Sep 09 and 16-18 Sep 09) at Stations 4 and 1, respectively, did not run due to timer errors. It should also be noted that two of the sample runs at Station 4 were less than 72 hours. The 4 Sep 09 run was 42.7 hours and the 28 Sep 09 run was 65 hours, both due to battery failure.

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 September 2009 are well below both those health guidelines.

TABLE 1

TSP & AIRBORNE URANIUM CONCENTRATIONS
SEPTEMBER 2009

Station No.	N	TSP Range ($\mu g/m^3$)	U Range* ($\mu g/m^3$)	U Mean* ($\mu g/m^3$)	ACTIVITY
1	4	5.4 - 16.3	0.000007 - 0.000235	0.000068	Mortar fire 28-30 Sep
4	4	10.1 - 18.4	0.000005 - 0.000033	0.000013	Mortar fire 28-30 Sep
14	5	2.1 - 10.1	0.000003 - 0.000006	0.000004	Mortar fire 28-30 Sep

As was the case and noted in previous reports, the total uranium mass found on most filters in September was well above, i.e., in this data set 11 to 836 times, the laboratory's latest determined instrument detection level (IDL) for the ICP-MS method but below the practical reporting level (PRL) of 0.00025 microgram (μg). However, the uranium mass collected on three (3) of the filters at Station 1 and one (1) filter at Stations 4 was above the PRL.

The fact that most total uranium values continue to be less than the PRL remains significant from a public health perspective. 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 $\mu g/m^3$, a value several orders of magnitude below health effects guidelines. While uranium isotopes ^{234}U and ^{235}U on most filters continued to be undetectable, the 4 Sep 09 filter from Station 1 which had a higher total uranium mass also had a detectable, but not reportable, level of ^{235}U.

FIGURE 2

AIRBORNE URANIUM CONCENTRATIONS
STATION 1

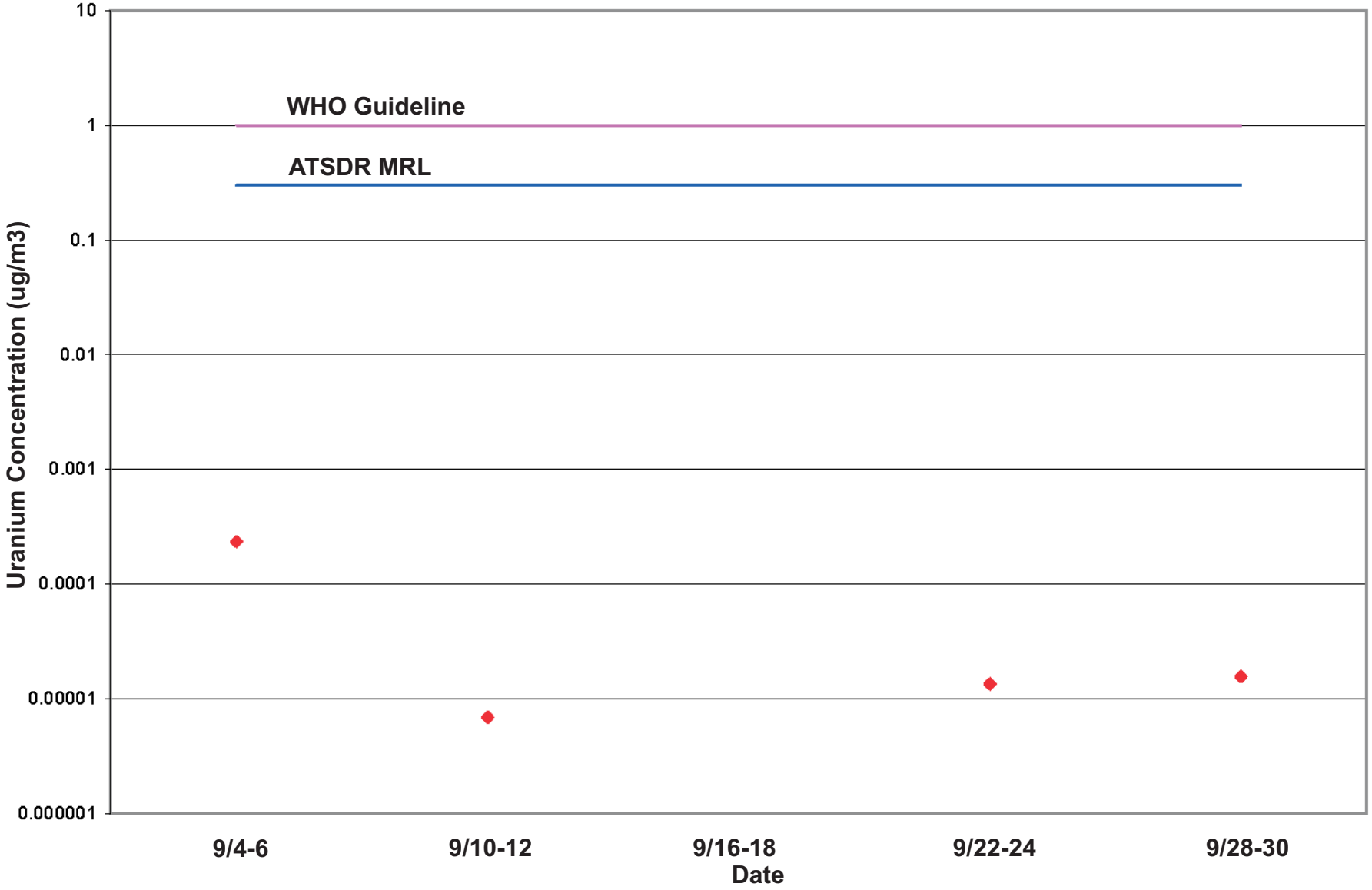


FIGURE 3

AIRBORNE URANIUM CONCENTRATIONS
STATION 4

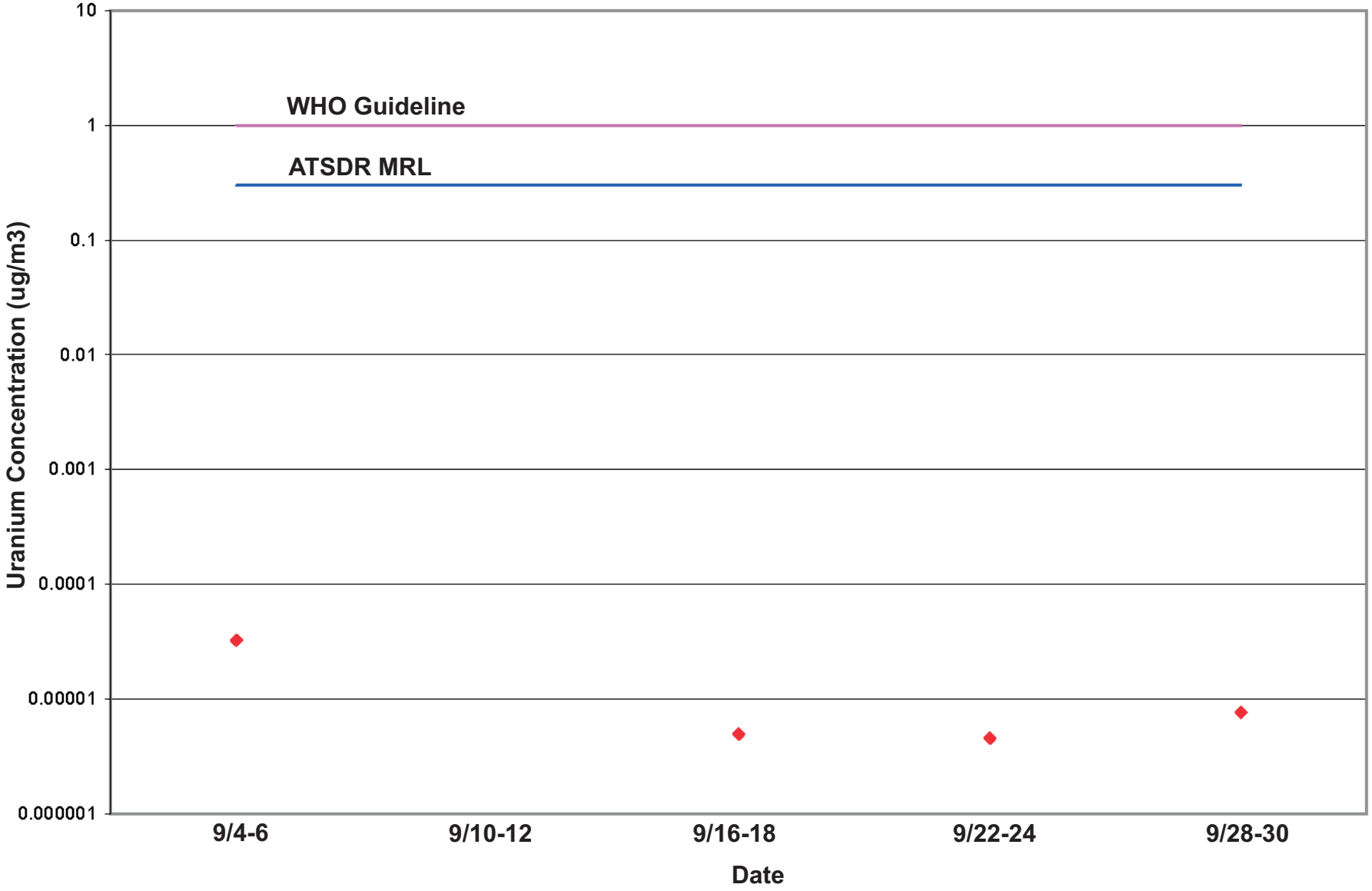


FIGURE 4

AIRBORNE URANIUM CONCENTRATIONS
STATION 14