

Preparation and Analysis Phase: Anti-cross Contamination Quality Control and Assurance Report

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6/29/05

I. Shipboard Anti-Cross Contamination Results

Ambient radiation screening of the interior of the hull and laboratory area onboard the Ocean Explorer was performed on June 13, 2004. Instrument readings indicated no pre-existing sources of radiation on any surface. In fact, in-hull radiation activity was appreciably below outdoor and indoor background monitored in Pittsburgh, Pennsylvania and on Adak Island (see Leg1GammaRadiationActivityLog11-08-04-VOLZ for raw data, on file with V. Vyas). This is because of the shielding effects of both the ocean water and plate steel hull and decking, stopping terrestrial, cosmic and cosmogenic radiation from entering the ships interior. All laboratory preparation surfaces, including HDMW and stainless steel surfaces, scanned previous to sample introduction, were free of activity over baseline. Wipe samples taken before sample preparations were below the detection limit of the Ludlum 44-9 Detector. Scanning of all biological, water and sediment samples brought on board the Ocean Explorer were below the detection limits of the Ludlum Model 44-9 Alpha, Beta and Gamma Detector. Non-detect (ND) were entered on all Chain of Custody forms for whole, dissected individual, composited, replicate and archival samples.

All tabletop scanning performed before and after sample preparation at HDMW, stainless steel and plastic covered workstations as well as wipe samples taken over the course of the expedition were below the detection limit of the Ludlum 44-9 Detector. The table Master_Expedition_AntiCon_Log_Volz11-14-04 contains the sampling data and on shipboard results of all anti-cross contamination wipe samples, this document is on file with V. Vyas.

A total of 63 end or beginning of day wipe samples were taken on board the Ocean Explorer at Tables 1, 2, 3, 4 and 5. All samples were below the calculated MDA of the meter for Cesium 137, gamma of 237 cpm. Additional confirmatory results of analysis of wipe samples by LSA at Vanderbilt, received January, 4, 2005, indicated that no sample in channels A or B of the counter showed results above blanks. Channel A was set to study tritium and the blank mean and standard deviation were 2.75 and 0.965 cpm respectively. Channel B was set-up to study all other energies and had a blank mean of 8.50 cpm and a standard deviation of 0.80 cpm.

II. Laboratory Anti-Cross Contamination Results

Ambient radiation monitoring results in the Burger laboratory were indistinguishable from ambient levels within hallways of the building, in other buildings on campus and outdoors. Screening of all working surfaces prior to sample homogenization and sonication revealed no pre-existing radiation source or activity levels above background. All wipe samples (CC81 to CC262) taken (to 4/25/05) of laboratory working surfaces and tools after surface and tool cleaning at “end of day” and immediately read were below the MDA for Cesium 137 on detector 1 and were below the detection limit for detector 2. Both data readings were entered in the COC log presented as Figure 1. Confirmatory analyses of laboratory wipe samples by LSA to sample CC 262 were indistinguishable from blanks for both tritium and all other energies. The blank mean and standard deviation for each batch and associated sample numbers are presented in Table 1, Blank Means and Standard Deviations by Batch and Sample Number presented below;

Table 1, Blank Means and Standard Deviations by Batch and Sample Number

Batch Number	Sample Numbers	Channel A-Tritium Counts per Minute		Channel B-All Other Energies Counts per Minute	
		Mean	SD	Mean	SD
2	81-121	2.75	0.0965	8.50	0.80
3	122-162	2.60	0.55	9.20	0.84
4	163-196	2.67	0.58	8.67	0.58
5	197-262	3.14	0.90	8.71	0.49

III. Cross Contamination Conclusions

All evidence indicates that the continuous anti-cross contamination protocols established in the Biological Implementation Plan and followed throughout the expedition and laboratory portions of the project (including washing instruments, changing gloves and cleaning tabletops between preparations of individual and/or composite specimens) were successful in preventing cross contamination of samples. Ambient and surface screening radiation levels taken before sample preparation both on the Ocean Explorer and in the laboratory showed no radiation activity over background. Screenings of all samples taken aboard the Ocean Explorer were below the detection limits of the probe. Wipe samples taken at end or beginning of day sample preparation on shipboard and read immediately were below the detection limit of detector 2 and below the MDA for Cesium 137 on detector 1. More in-depth, LSA of these samples indicated that they were indistinguishable from blanks for both tritium and all other energies.

Screening of the Burger laboratory and comparison to ambient levels within the building, in other buildings on campus and outdoors revealed no pre-existing source or activity levels above background. All wipe samples taken (to 4/25/05) after surface and tool cleaning at “end of day” and immediately read showed cpm below the MDA for Cesium 137 on detector 1 and were below the detection limit for detector 2. Confirmatory analyses of laboratory wipe samples by LSA to CC162 were indistinguishable from blanks for both tritium and all other energies.

The results also provide further evidence that both expedition and laboratory personnel received no exposure to ionizing radiation in excess of background levels, resulting from their work on the CRESO Amchitka Independent Science Plan.