2) VOA vials should be filled as follows:
   - Carefully remove Teflon septum cap being careful not to contact cap with potential contaminants. **Vials must not be opened prior to sampling.** The vial should be open for a minimum amount to time, no longer than 3 minutes.
   - Carefully fill vial with sample using the submerge-fill technique (immerse and fill tube to bottom of vial) until meniscus (mound of water) forms on top. Avoid agitating sample as this may cos loss of volatiles.
   - Carefully replace a septum and cap on meniscus. This will force a small amount of water off the top. Check sample for air bubbles. If bubbles are present, remove cap, top up sample and repeat step.
3) The sample bottles should be filled with minimal amount of air contact, and without allowing the sample equipment or personnel to contact the inside of the bottles.
4) Samples that are to be filtered and preserved should be placed in bottles directly from the filter with sufficient space available in the sample for the addition of required preservatives. The bottle caps should then be replaced tightly.
5) Samples that require preservation usually have preservatives in the bottles when received. These bottles should be completely filled with the sample with as little overflow as possible and bottle caps replaced tightly. If required preservatives have not been received in the bottles, the bottles should be filled so that adequate space is left in the bottles for the preservative to be added.
6) TOX, TOC and VOA vials must be filled so that they are "headspace free" (ie, no air bubbles in the sample bottle) unless the samples are to be only partially filled. These sample bottles, therefore, need to be over-filled (water tension will remain a convex water surface in the bottle). The caps for these bottles should be replaced gently, so as to eliminate any air bubbles in the sample. These must then be checked, by inverting the bottle and snapping the sharply with a finger. If any air bubbles appear, discard sample and refill vial.
7) Air space should be left in coliform bottles, as these samples must be shaken before analysis.
8) Sample bottles, caps or septums that fall on the ground before filling should be thoroughly rinsed with sample water before being used. All circumstances regarding dropped caps or bottles, and their subsequent rinsing and use, **must** be noted on the Field Parameter Form.

4.2.1.3.4 Quality Assurance/Quality Control Samples

Details of quality assurance/quality control (QA/QC) samples are provided in the General Operating Procedure tilted ***"Quality Assurance/Quality Control"*** in this manual.

However, briefly, there are four main types of QA/QC samples for groundwater investigations, these are:

- Field (equipment) and trip blanks are used as control or external QA/QC samples to detect contamination that may be introduced in the field (either atmospheric or from sampling equipment)
- Trip blanks are samples of organic free water that are prepared by the analytical lab, which is providing the bottles to be used for sampling.
- Field blanks are prepared in the field (at the sampling site) using empty bottles and the deionised water used for the cleaning of sampling equipment. A field blank is not necessary if a dedicated pump is permanently installed in the well.
- A duplicate sample is another way of checking the analytical laboratory QA/QC. Two samples are collected, one right after the other, and sent to the lab for analysis.

4.2.1.3.5 Selection of Sample Containers, Preservation, Storage and Shipment

Details of selection of selection of sample containers, preservation, storage and shipment of samples are provided in the General Operating Procedure titled ***"Selection of Sample Containers, Preservation, Storage and Shipment of Samples"*** in this manual.

However, samples should be preserved immediately after filtering or immediately after sample collection if not filtered. Pre-measured amounts of preserving reagents are placed in the sample bottles or are contained on small ampoules attached to the sample bottles. **If provided separately, the preservative should be added to the sample bottle after the bottle has been filled.** Bottles must not be overfilled, and should be inverted (once capped) to mix the preservative and sample. The bottle lids should be tightened and checked prior to shipment to prevent them from coming loose during shipment. Bottle lids must not be placed on the ground or interchanged between sample bottles.

The samples from each well should be labelled in a consistent manner to the other wells and to previous sampling events at the site.

All sample bottles, once filled and preserved as required, should be properly labelled, stored and shipped in accordance with General Operating Procedures No. 12.

4.2.1.4 Post-Sampling

After completion of the sampling event and packaging of the samples, all non-dedicated equipment should be thoroughly decontaminated as specified in this manual.

Dedicated equipment not left in the well(s) should be placed in clean plastic bags or other suitable storage device and sealed. All dedicated equipment should be kept in a clean, secure storage area to prevent use at other sites and contamination from other sources.

SKM

Environmental Investigations
Work Instruction No. 11

Decontamination

This General Operating Procedure was developed to provide guidance for the decontamination of sampling equipment.

The main objective of environmental sampling is to collect samples (normally soil and/or groundwater) for chemical analysis, to provide data on the chemical contamination in the sample. ***Obviously it is undesirable for the chemical composition of the collected sample to be unrepresentative of the actual sub-surface conditions.*** Therefore, a prime consideration of any sampling program is to take all appropriate and practical steps to ensure the chemical integrity of the sample is maintained and that "foreign" chemicals are not added or chemicals present in the sample lost.

One potential source for the addition of foreign chemicals to a sample is by the use of sampling equipment that contains or includes chemical residues from an earlier sample event or from simple atmospheric exposure to contaminants. Therefore, to ensure the integrity of the sample being collected all traces of foreign chemical residues ***have to be removed*** from the sampling equipment.

Thus, decontamination of sampling equipment is undertaken to ***minimise the potential for introduction of foreign contamination to a sample*** during the collection of that sample.

Therefore, all sampling equipment must be decontaminated between sampling events, or in the case of some pieces of equipment (eg, drill rods, etc.), between investigation locations and before commencing investigations. This includes all new and old equipment, as it is often not possible to know what contaminant equipment (out of the samplers' control) may have been exposed to.

Further, ***all sampling equipment should be thoroughly decontaminated before leaving a site.*** This should be undertaken for health and safety reasons (so as not to transfer contaminants from the site to a vehicle used to get to and from the site or to the office), and so that the equipment will be free of contaminants for the next project. Nevertheless, it is recommended that all sampling equipment be decontaminated before commencing sampling each day. To reduce the potential for contamination of sampling equipment from atmospheric fall out, sampling equipment can be sealed inside plastic bags. If for some reason it is not possible to decontaminate a piece of sampling equipment on site, the equipment should be sealed in a plastic bag that is clearly marked to identify to other personnel that it has not been decontaminated. Arrangements should be made as soon as possible to get the equipment decontaminated or the equipment should be discarded.

Equipment that will typically require decontamination includes: Hand augers; Composite trays; Push and drive samples, eg SPT split spoon sampler; Trowels; Bailers; Drill rods; PVC casing etc. Equipment decontaminated by others (eg drillers) should be checked to see that it has been carried out to an acceptable standard before use of the equipment.

Decontamination is commonly undertaken by:

- High pressure steam cleaner
- Detergent washes and water rinse

High-pressure steam cleaning is the preferred decontamination method, particularly for large bulky items such as drill rods, PVC, push and drive samplers, etc. The high-pressure steam cleaner, which requires water and a power source to function, can remove most residues.

However, it is not always possible to have a steam cleaner on site when undertaking environmental investigations. On these occasions, the decontamination should be undertaken using the detergent wash and tap water rinse.

The following equipment will be needed for the detergent washes and water rinse decontamination process.

- Laboratory (phosphate-free) detergent or Decon 90
- Tap water and deionised water
- Buckets or tubs (sufficient for size of equipment to be cleaned)
- Stiff brushes for cleaning

All sampling equipment will be decontaminated before use, between each sample, and at the completion of the sampling program. The following procedures shall be followed for decontamination of sampling equipment, by detergent and water rinse methods.

1) Buckets or tubs for decontamination shall be cleaned with tap water and detergent and rinsed with tap water before sampling commences.
2) Fill first bucket or tub with tap water, and phosphate free detergent.
3) Fill second bucket or tub with tap water.
4) Clean equipment thoroughly in detergent water, using brushes.
5) Rinse equipment in tap water.
6) Dry equipment with disposable towels.
7) Rinse equipment by thoroughly spraying with tap water and/or distilled water (as appropriate).
8) Allow equipment to thoroughly air dry.
9) Change water and detergent solution after each sampling site.

In some cases, it may be necessary to rinse with a 10% nitric acid/distilled water solution after step 7. Where this is undertaken, the equipment should then be rinsed thoroughly with distilled water followed by methanol.

Equipment that cannot be thoroughly decontaminated using the detergent wash and water rinse should be steam cleaned or if a steam cleaner is not available, do not use for further sampling marking clearly "not decontaminated" or discard. Equipment decontaminated using the high-pressure steam cleaner will be treated until all signs of contamination have been removed.

Any equipment that cannot be decontaminated to the satisfaction of the sampling team shall be discarded and replaced.

If a pump is used to develop, purge or sample a well, it should be cleaned in the following manner:

1) Clean the buckets with tap water and detergent, rinse with tap water, and finally, rinse with distilled water before cleaning equipment.
2) Fill first bucket with detergent and tap water.
3) Fill second bucket with tap water
4) Submerse the pump intake device into the detergent water and operate for 5 minutes.
5) Submerse the pump intake device into the tap water and operate for 5 minutes.

6) Tubing will be dedicated to each well.

Decontamination/Cleaning of sample Containers

Details of the decontamination/cleaning procedures for sample containers are given in the General Operating Procedure titled ***"Selection of Sample Containers, Sample Preservation, Handling and Documentation"*** in this manual.

Appendix D Chain of Custody Documentation

Project: EN01669
Quote: SY/252/041A

DATE DUE:
REPORT TO: Simon Opper/ Louise MacDonald
REQUIRED REPORT FORMAT:email
HARD / E-MAIL / FAX

CHAIN OF CUSTODY

FROM: SINCLAIR KNIGHT MERZ
100 Christie Street,
ST. LEONARD NSW 1590

TEL: (02) 9928 2237
FAX: (02) 9928 2272

Australian Laboratory Services Pty. Ltd.
277 Woodlark Road,
SMITHFIELD NSW 2164
TELL: (02) 8784 8555
FAX: (02) 8784 8500

SAMPLE INFORMATION					LABORATORY PARAMETERS												
SAMPLE ID	MATRIX	NUMBER	TIME	DATE	Heavy Metals	TPH	SVOC	VOC	Hardness	BOD	COD	TOC	Total N, Ammonia	Speciated Phenols	PAH	BTEX	COMMENTS (Container Type)#
1 MW06S	WATER	7		1/3/05	✓	✓	✓	✓	✓	✓	✓	✓	✓				Bottle
2 MW06D	"	7		"	✓	✓	✓	✓	✓	✓	✓	✓	✓				"
3 MW20S	"	7		"	✓	✓	✓	✓	✓	✓	✓	✓	✓				"
4 MW07D	"	7		"	✓	✓	✓	✓	✓	✓	✓	✓	✓				"
5 MW18D	"	7		"	✓	✓	✓	✓	✓	✓	✓	✓	✓				"
6 MW13D	"	7		"	✓	✓	✓	✓	✓	✓	✓	✓	✓				"
7 MW17D	"	7		2/3/05	✓	✓	✓	✓	✓	✓	✓	✓	✓				"

ALS Environmental
Sydney
Work Order
ES0501569
Report Version: WOLabel 1.00
Telephone : 61-2-87848555

Notes: **Metals include = As, Cd, Cr (vi), Cu, Ni, Pb, Zn, Hg** 2 x esks

RELINQUISHED BY (SIGN / PRINT): Simon Opper DATE: 2/3/05 TIME: 9am
OF: Sinclair Knight Merz

RECEIVED BY (SIGN / PRINT): Margaret
OF: ALS
(ARRIVAL TEMP: deg. C) DATE: 2/3/05 TIME: 1.00pm

S = (Yellow)Solvent Washed Acid Rinsed Glass Amber Bottle, P = (Green) Plastic Natural Bottle, N = (Red) Plastic Nitric Acid Preserved Bottle, J = (Orange) Glass Solvent Washed Acid Rinsed Jar, VS = (Maroon) Sulphuric Acid Preserved Vial, O = Other.

PLEASE SIGN AND FAX TO SKM UPON RECIEPT

Project: EN01669
Quote: SY/252/041A

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SAMPLE INFORMATION					LABORATORY PARAMETERS												
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2 MW06D	"	7		"	/	/	/	/	/	/	/	/	/				"
3 MW20S	"	7		"	/	/	/	/	/	/	/	/	/				"
4 MW07D	"	7		"	/	/	/	/	/	/	/	/	/				"
5 MW18D	"	7		"	/	/	/	/	/	/	/	/	/				"
6 MW13D	"	7		"	/	/	/	/	/	/	/	/	/				"
7 MW17D	"	7		2/3/05	/	/	/	/	/	/	/	/	/				"

ALS Environmental
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Work Order
ES0501569
Report Version: WOLabel 1.00
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S = (Yellow)Solvent Washed Acid Rinsed Glass Amber Bottle, P = (Green) Plastic Natural Bottle, N = (Red) Plastic Nitric Acid Preserved Bottle, J = (Orange) Glass Solvent Washed Acid Rinsed Jar, VS = (Maroon) Sulphuric Acid Preserved Vial, O = Other.

PLEASE SIGN AND FAX TO SKM UPON RECIEPT