Table 12-1: SUMMARY OF REMEDIAL ALTERNATIVES ANALYSIS
Aiea Laundry RI/FS

	FS EVALUATION CRITERIA						
REMEDIAL ALTERNATIVE	OVERALL PROTECTION OF HUMAN HEALTH & ENVIRONMENT	COMPLIANCE WITH ARARs	LONG-TERM EFFECTIVENESS AND PERMANENCE	REDUCTION IN TOXICITY, MOBILITY & VOLUME	SHORT-TERM EFFECTIVENESS	IMPLEMENTABILITY	COST
	Prevents domestic use of caprock ground water in wells upland of the State aquifer boundary having CVOCs in excess of MCLs	*Meets MCLs*	*Magnitude of residual risk*	*Results in destruction of all CVOCs*	*The time required to achieve the remedial objectives, protection of workers and the community during construction, and potential disruptions to residential neighborhoods*	*Overall implementability and ability to monitor remedial effectiveness*	*Total Estimated Costs (Present Value)*
RA-1: No Further Action	YES - Institutional controls restrict ground water use for domestic purposes. Natural attenuation processes will reduce CVOC concentrations below MCLs.	YES - CVOC concentrations will be below MCLs when RA-1 is complete	MINIMAL: Institutional controls reduce residual risk by restricting ground water use. Natural attenuation processes permanently remove CVOCs from dissolved phase and potentially from adsorbed phase too.	*Toxicity:* YES - There may be a temporary increase in concentration of more toxic intermediate breakdown products, but these will also eventually degrade. *Mobility:* NO - RA-1 will not affect CVOC mobility. *Volume:* YES - RA-1 will result in eventual degradation and permanent removal of all CVOCs.	*Time to reach RAOs* : 8 years, +/- 5 years in other areas upland of the State aquifer boundary. *Worker/Community Protection* : None required. *Neighborhood Disruption* : None.	EASY: RA-1 is easily implemented CANNOT monitor remedial effectiveness	$0
RA-1A: Monitored Natural Attenuation	YES - Institutional controls restrict ground water use for domestic purposes. Natural attenuation processes will reduce CVOC concentrations below MCLs.	YES - CVOC concentrations will be below MCLs when RA-1A is complete	MINIMAL: Institutional controls reduce residual risk by restricting ground water use. Natural attenuation processes permanently remove CVOCs from dissolved phase and potentially from adsorbed phase too.	*Toxicity:* YES - There may be a temporary increase in concentration of more toxic intermediate breakdown products, but these will also eventually degrade. *Mobility:* NO - RA-1A will not affect CVOC mobility. *Volume:* YES - RA-1A will result in eventual degradation and permanent removal of all CVOCs.	*Time to reach RAOs* : 8 years, +/- 5 years in areas upland of the State aquifer boundary. *Worker/Community Protection* : Minimal required. *Neighborhood Disruption* : None.	EASY: RA-1A is easily implemented CAN monitor remedial effectiveness	$525,000
RA-2: In-situ Passively Enhanced Bioremediation with HRCs	YES - Institutional controls restrict ground water use for domestic purposes. Natural attenuation processes will reduce CVOC concentrations below MCLs.	YES - CVOC concentrations will be below MCLs when RA-2 is complete	MINIMAL: Institutional controls reduce residual risk by restricting ground water use. Natural attenuation processes permanently remove CVOCs from dissolved phase and potentially from adsorbed phase too.	*Toxicity:* YES - There may be a temporary increase in concentration of more toxic intermediate breakdown products, but these will also eventually degrade. *Mobility:* NO - RA-2 will not affect CVOC mobility. *Volume:* YES - RA-2 will result in eventual degradation and permanent removal of all CVOCs.	*Time to reach RAOs* : 2 years near MW18, 8 years, +/- 5 years in other areas upland of the State aquifer boundary. *Worker/Community Protection* : Minimal required. *Neighborhood Disruption* : Some due to new well construction.	SOMEWHAT DIFFICULT: New wells are required. CAN monitor remedial effectiveness	$555,000
RA-3: Ground water Extraction	YES - Institutional controls restrict ground water use for domestic purposes. Ground water extraction will remove CVOCs, reducing CVOC concentrations below MCLs.	YES - CVOC concentrations will be below MCLs when RA-3 is complete	UNCERTAIN: Institutional controls reduce residual risk by restricting ground water use. Some uncertainty in evaluating long-term effectiveness because slow desorption of CVOCs from aquifer soil may maintain low-level dissolved phase concentrations in ground water	*Toxicity:* NO - RA-3 will not affect CVOC toxicity. *Mobility:* YES - RA-3 will decrease CVOC mobility due to local ground-water flow variations induced by extraction wells. *Volume:* YES - RA-3 will result in a decrease in CVOC mass (volume).	*Time to reach RAOs* : 5 to 10 years in areas upland of the State aquifer boundary. *Worker/Community Protection* : Minimal required. *Neighborhood Disruption* : Some, due to new well construction and noise from extraction system.	DIFFICULT: Construction components must be sited in relatively inaccessible areas. CAN monitor remedial effectiveness	$1,225,000
RA-4: 2-PHASE Extraction (TPE)	YES - Institutional controls restrict ground water use for domestic purposes. Ground water and soil vapor extraction will remove CVOCs, reducing CVOC concentrations below MCLs.	YES - CVOC concentrations will be below MCLs when RA-4 is complete	MINIMAL: Institutional controls reduce residual risk by restricting ground water use. TPE removes CVOCs permanently from ground water, and from soil via vapor extraction.	*Toxicity:* NO - RA-4 will not affect CVOC toxicity. *Mobility:* YES - RA-4 will decrease CVOC mobility due to local ground-water flow variations induced by extraction wells. *Volume:* YES - RA-4 will result in a decrease in CVOC mass (volume).	*Time to reach RAOs* : 2 years. *Worker/Community Protection* : Minimal required. *Neighborhood Disruption* : Some, due to new well construction and noise from extraction system.	VERY DIFFICULT: Construction components must be sited in relatively inaccessible areas. Extracted soil vapors must be piped over highway. CAN monitor remedial effectiveness	$1,409,000