8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

Each alternative for the NMCB Building Expanded Area was evaluated using the five criteria established by the Alaska DEC in *Guidance on Decision Documentation Under the Site Cleanup Rules* (Alaska DEC 1999b): protectiveness; practicability; short- and long-term effectiveness; regulations; and public input. These criteria are summarized in Table 8-1. Public input was not evaluated in the FFS (URS 2005a), because comments had not yet been solicited from the public. Therefore, public input was evaluated after public comments on the proposed plan were received, and the evaluation is included in this document. Each remedial alternative was assessed and assigned a rating of poor, fair, good, excellent, or superior for each evaluation criteria as presented in Figure 8-1 Based on the evaluation of the individual criteria, each alternative was also given an overall rating (poor, fair, good, excellent, or superior).

Alternative 2 was given an overall rating of good, because it provides superior implementability, excellent short-term effectiveness, and good protectiveness and long-term effectiveness at a relatively low cost. Because residual risks remain at the site after active cleanup (free-product recovery), this alternative only obtained a rating of good for long-term effectiveness. However, this alternative minimizes short-term risks and therefore obtained an excellent rating for short-term effectiveness. Although it was rated fair for time to achieve cleanup goals and for regulations because it would take a long time to achieve cleanup goals, Alternative 2 is protective of human health during the period of time required to achieve the cleanup goals (given the implementation of institutional controls and groundwater monitoring). However, it may not be fully protective of the environment during this period of time.

Alternative 3 was given an overall rating of good, because it provides superior long-term effectiveness and protectiveness, good time to achieve cleanup goals, excellent compliance with regulations, and fair implementability and cost effectiveness. This alternative is capable of achieving the cleanup goals significantly quicker than Alternative 2, and is protective of both human and ecological receptors once soil excavation is complete. However, there are additional short-term risks and costs associated with this alternative when compared to Alternative 2.

Alternative 4 was given an overall rating of fair. This alternative was rated lower than Alternatives 2 and 3 because of the difficulty of implementing this complex alternative, the high cost, and the additional short-term risks associated with this alternative. This alternative received superior ratings for long-term effectiveness and regulations, an excellent rating for protectiveness, and a good rating for time to achieve cleanup goals. Although this alternative provides superior long-term effectiveness, the effectiveness is achieved through additional remedial actions, which have additional short-term risks and costs.

Alternative 1 was given a rating of poor. This alternative received poor ratings for time to achieve cleanup goals, regulations, protectiveness and long-term effectiveness. Although this alternative would be easy to implement and would cost nothing, the alternative would not be protective of human health and the environment.

Alternatives 2 and 3 both received the highest overall rating. Therefore, only these two alternatives were considered for selection at the NMCB Building Expanded Area. A summary of the issues at the NMCB Building Expanded Area and how Alternatives 2 and 3 address these issues is provided in Table 8-2. A summary of the advantages and disadvantages of these two alternatives is provided in Table 8-3.

Based on these comparisons, Alternative 2, Institutional Controls, Free-Product Recovery, and MNA, was selected as the remedial alternative for the NMCB Building Expanded Area. This alternative will provide an appropriate, cost-effective remedy that protects human health and the environment and that can be implemented at the earliest possible time, as discussed in more detail below. In addition, the state concurs with the selection of this alternative and it is acceptable to the public.

Alternative 2 is proposed for NMCB Building Expanded Area because the additional costs associated with Alternative 3 are not warranted given that Alternative 2 is protective of human health and the environment. Although risks to ecological receptors may not be effectively controlled in the short-term with Alternative 2 if ecological receptors were exposed to soils at the site, unacceptable risks are present at only two locations within paved areas in an industrial area, and the unacceptable risks are present in soil at depths of 5.5 to 6.5 feet, which is at the lower limits of the biologically active zone. Therefore, ecological risks are most likely below target health goals because of a lack of an exposure pathway. In addition, potential risks will be reduced with time through passive free-product recovery and natural attenuation.

Although TAH and TAqH concentrations were above water quality criteria in 1998, concentrations of petroleum compounds in surface water do not pose an unacceptable risk according to the site-specific ecological risk assessment. In addition, TAH and TAqH concentrations in surface water are likely declining as a result of declining BTEX concentrations in groundwater, and free-product recovery activities that have been implemented at the site since the surface water samples were collected in 1998. If concentrations of TAH and TAqH are not currently below water quality criteria, these concentrations should decline below water quality criteria with the free-product recovery efforts and MNA included as part of Alternative 2. In addition, no sheen has been observed on Sweeper Cove. Finally, Alternative 2 would be much easier to implement than Alternative 3. Alternative 2 would not require water treatment and does not include the complicated thermal desorption system.

Alaska DEC Criteria	Rating of Alternatives for NMCB Building			
	Alternative 1 No Action	**Alternative 2** Institutional Controls, Free-Product Recovery, and MNA	**Alternative 3** Hot Spot Soil Excavation and MNA	**Alternative 4** Hot Spot Soil Excavation In-Situ Soil Treatment and MNA
Protectiveness	○	◒	●	◔
Practicable - Implementability	◔	●	◔	○
Practicable - Cost Effectiveness	●	◔	◔	○
Short- and Long-term Effectiveness Short-term Effectiveness	●	◔	◔	○
Short- and Long-term Effectiveness Time to Achieve Cleanup Goals	○	◔	◒	◒
Short- and Long-term Effectiveness Long-term Effectiveness	○	◒	●	●
Regulations	○	◔	◔	●
Public Input	○	◒	◒	◒
Overall	○	◒	◒	◔

Notes:
MNA - monitored natural attenuation

○ Poor ◔ Fair ◒ Good ◔ Excellent ● Superior

U.S.NAVY	**Figure 8-1** **Evaluation of Remedial Alternatives** **NMCB Building Expanded Area**	Adak Island, AK DECISION DOCUMENT

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Table 8-1
Alaska DEC Criteria for Evaluating Remedial Alternatives

Criteria	Description
Protectiveness	Whether the remedial alternatives protect human health and the environment both during and after the cleanup actions by eliminating, reducing, or controlling exposures to hazardous substances or contaminants and by protecting human health from physical and other hazards directly associated with the cleanup action
Practicable	Whether the remedial alternatives can be designed, constructed, and implemented in a reliable and cost-effective manner. For ease of evaluation, this criterion is subdivided into two separate criteria; implementability and cost.
Short- and Long-term Effectiveness	Ability of the alternatives to protect human health and the environment during the construction/implementation phase (short-term) and after completion of the cleanup (long-term). The speed with which the alternatives achieve the cleanup goals is also evaluated. For ease of evaluation, this criterion is subdivided into three separate criteria; short-term effectiveness, time to achieve cleanup goals, and long-term effectiveness.
Regulations	Ability of alternatives to attain federal and state applicable or relevant and appropriate requirements or to provide justification for invoking a waiver.
Public input	Whether the public agrees with, opposes, or has no comment on the preferred alternative. Public input will be evaluated after receipt of the public comments on this proposed plan.

Note:
DEC - Department of Environmental Conservation

Table 8-2
What are the Key Issues at NMCB Building Expanded Area and How Do the Alternatives Address These Issues?

Issue	How is the Issue Addressed?	
	Alternative 2	**Alternative 3**
Free product[1]	Institutional controls (excavation notification) and passive free-product recovery	Institutional controls (excavation notification) and soil excavation
Unacceptable risks to construction workers	Institutional controls (excavation notification) and natural attenuation	Institutional controls (excavation notification), soil excavation, and natural attenuation
Groundwater concentrations exceed groundwater cleanup levels (10 times Table C values)	Institutional controls (downtown groundwater use prohibition), passive free-product recovery, and MNA	Institutional controls (downtown groundwater use prohibition), soil excavation, and MNA
Unacceptable ecological risks in soil	Passive free-product recovery and natural attenuation	Soil excavation and natural attenuation
Historical marine surface water concentrations exceeded TAH and TAqH water quality standards	Passive free-product recovery and MNA	Soil excavation and MNA

[1]Measurable thicknesses of free product have only been observed on groundwater. Measurable thicknesses of free product and sheen have not been observed on surface water.

Notes:
TAH - total aromatic hydrocarbons
TAqH - total aqueous hydrocarbons

Table 8-3
Summary of Advantages and Disadvantages of Alternatives 2 and 3, NMCB Building Expanded Area

Advantages and Disadvantages	Alternative 2 – Institutional Controls, Free-Product Recovery, and MNA	Alternative 3—Hot Spot Soil Excavation and MNA
Advantages	• Future construction worker exposure to contaminated soil and free product unlikely because building foundations not constructed at or below the water table where most of the contamination is located • If construction does occur below water table, effectively controls future construction worker risk through institutional controls • Effectively controls exposure to groundwater through institutional controls • Reduces volume of free product in subsurface through passive free-product recovery • Reduces soil and groundwater concentrations through passive free-product recovery and natural attenuation • Relatively inexpensive • Easy to implement	• Effectively controls remediation construction worker risk through institutional controls • Effectively controls future construction worker risk through institutional controls and soil excavation • Effectively controls exposure to groundwater through institutional controls • Effectively controls risks to ecological receptors through soil excavation • Reduces volume of free product in subsurface through soil excavation • Reduces soil and groundwater concentrations through soil excavation and natural attenuation • TAH and TAqH concentrations in marine surface water reduced through soil excavation and natural attenuation
Disadvantages	• Institutional controls not effective for ecological receptors; therefore risks to ecological receptors may not be effectively controlled in the short-term. However, unacceptable risks ▪ Present at only two locations at depths of 5.5 to 6.5 feet, which is at the lower limits of the biologically active zone ▪ Present only within paved areas in an industrial area with little habitat • Passive free-product recovery and natural attenuation may require time to reduce TAH and TAqH concentrations in surface water to below water quality criteria. However, ▪ No unacceptable ecological risk in marine surface water according to the site-specific risk assessment	• Relatively expensive • Relatively difficult to implement for the following reasons: ▪ Soil excavation next to site buildings would require shoring ▪ Soil excavation below the groundwater table complicated by dewatering and shoring requirements ▪ Soil excavation on Adak complicated by the high rainfall ▪ Treatment of water from excavation dewatering (approximately 6,000 gpd) complicated because of

Table 8-3 (Continued)
Summary of Advantages and Disadvantages of Alternatives 2 and 3, NMCB Building Expanded Area

Advantages and Disadvantages	Alternative 2 – Institutional Controls, Free-Product Recovery, and MNA	Alternative 3—Hot Spot Soil Excavation and MNA
	▪ No exceedances of Alaska Water Quality Standards or the EPA National Recommended Water Quality Criteria for 2002 for individual chemicals ▪ Surface water samples collected and analyzed for TAH and TAqH in 1998 before most of the free-product recovery activities occurred at the site ▪ Since 1998, BTEX concentrations in groundwater have decreased to between 3% and 57% of the 1998 values indicating surface water concentrations of TAH most likely declining as well, potentially below surface water quality criteria	the extensive treatment required to meet marine surface water quality criteria ▪ Thermal desorption equipment complicated to operate and requires experienced operators ▪ Thermal desorption also complicated to implement because of the remoteness of Adak Island

Notes:

BTEX - benzene, toluene, ethylbenzene, and total xylenes
EPA - Environmental Protection Agency
gpd - gallons per day
MNA - monitored natural attenuation
TAH - total aromatic hydrocarbons
TAqH - total aqueous hydrocarbons

9.0 DESCRIPTION OF SELECTED CLEANUP ACTION

Alternative 2 – Institutional Controls, Free-Product Recovery, and MNA – is selected as the remedial alternative for the NMCB Building Expanded Area. This cleanup alternative was selected for the NMCB Building Expanded Areas based on its ability to meet the four RAOs:

1. Prevent human and ecological exposure to petroleum hydrocarbons in soil that would result in adverse health effects

2. Reduce petroleum hydrocarbons in groundwater to concentrations less than or equal to the Alaska DEC groundwater cleanup levels established for groundwater not currently used for, or not reasonably expected to be used for, drinking water

3. Prevent potential future migration of contaminants to surface water at concentrations that could result in adverse ecological effects

4. Minimize exposure to free-phase petroleum product.

The selected cleanup alternative is shown on Figure 9-1 and described below. (Note that the approximate extent of riprap on this figure and all subsequent figures in this document were updated from the FFS figures based on field measurements obtained during a site visit in early September 2005.)

The selected cleanup alternative, Alternative 2, consists of institutional controls for soil and groundwater, free-phase product recovery, and MNA for groundwater. Free-phase product will be removed using passive skimmers, petroleum concentrations in groundwater will be reduced through MNA, and institutional controls will be used to protect human health and the environment as long as groundwater concentrations are greater than the groundwater cleanup levels. The MNA timeframe for the site cannot be accurately predicted at this time. However, the timeframe needed to achieve the Alaska DEC groundwater cleanup levels will be estimated after 5 years of monitoring has been completed. It is anticipated that free-product recovery will be completed within 2 years of the start of recovery operations in the three new wells. Short-term risks associated with MNA and product recovery will be minimal and will be controlled through the use of personal protective equipment. Once groundwater concentrations have been reduced to levels less than the Alaska DEC groundwater cleanup levels established for groundwater not currently used for, or not reasonably expected to be used for, drinking water, and free product has been removed to the extent practicable in accordance with the OU A ROD (the technically practical endpoint for free-product recovery is defined in Section 4), residual risks at the site are expected to be acceptable. Note that pockets of free product may remain at the site, even if none is detected in on-site wells. Therefore, some residual risk may remain at a

site once cleanup actions have been completed. However, if groundwater concentrations are below cleanup levels throughout the site, the extent of free product is expected to be very limited.

The institutional controls implemented at this site consist of equitable servitude restrictions including restrictions on land development (i.e., residential land development would be prohibited), downtown groundwater use prohibition, and soil excavation notification requirements. These institutional controls have already been implemented on Adak Island. The Navy has an established institutional controls program that was developed to ensure that institutional controls, including the equitable servitude restrictions selected in the OU A ROD, remain effective and reliable. The Navy has prepared an ICMP (U.S. Navy 2004) documenting the approach the Navy will use to ensure that the equitable servitude restrictions remain protective. The ICMP provides details of the institutional controls management program, and therefore, a detailed description of the equitable servitude restrictions is not included here. Institutional controls are expected to remain on the site indefinitely in order to ensure appropriate land uses are maintained at the site (i.e., no residential use). This is necessary because the risk assessment assumed the site would not be used for residential purposes, and cleanup levels were developed based on these land use assumptions. Site inspections will be used to evaluate compliance with equitable servitude restrictions. Monitoring of groundwater will be used to evaluate the protection of human health and the environment until groundwater cleanup goals are achieved.

Monitoring of natural attenuation will consist of periodic groundwater sampling at the site for a period of time sufficient to assess the progress of the natural degradation of petroleum hydrocarbons in groundwater. Details of the monitoring program will be incorporated into subsequent versions of the comprehensive monitoring plan for the Former Adak Naval Complex (CMP) (URS 2004). The CMP describes the existing monitoring program for groundwater as prescribed in the OU A ROD. Groundwater monitoring will be conducted at a frequency to be established by the Navy and Alaska DEC to evaluate whether petroleum-related chemicals in the groundwater are attenuating to concentrations below applicable Alaska DEC groundwater cleanup levels at locations to be specified in the CMP. Concentrations of petroleum-related chemicals currently exceeding these Alaska DEC cleanup levels will be monitored, as well as natural attenuation indicator parameters. Groundwater sampling will be conducted following procedures specified in the appropriate Navy Standard Operating Procedures (SOPs) as specified in future versions of the CMP. Groundwater samples will only be collected for chemical analyses from individual wells if the measured product thickness in the well is less than 0.02 foot. The Navy proposes to initiate remedy-based MNA at this site in conjunction with annual monitoring activities planned for 2006 as specified in the CMP. All groundwater monitoring activities at NMCB Building Expanded Area will be coordinated with the ongoing annual monitoring activities described in the CMP.

All available site-specific data will be evaluated after each year of monitoring is completed. These data evaluations will be performed to assess whether specified institutional controls are being successfully implemented at the sites, concentrations of petroleum-related chemicals in groundwater are decreasing, and/or free product is being recovered to the extent practicable. These analyses will incorporate historical, site-specific data where appropriate. Once the annual data evaluation is completed, the Navy will make recommendations for modifications to the monitoring program or for discontinuing the monitoring program, as appropriate. MNA and free-product monitoring will be discontinued once the Alaska DEC groundwater cleanup levels for groundwater, which is not reasonably expected to be used for drinking water are achieved during three consecutive annual monitoring events in all site wells selected for monitoring in the CMP.

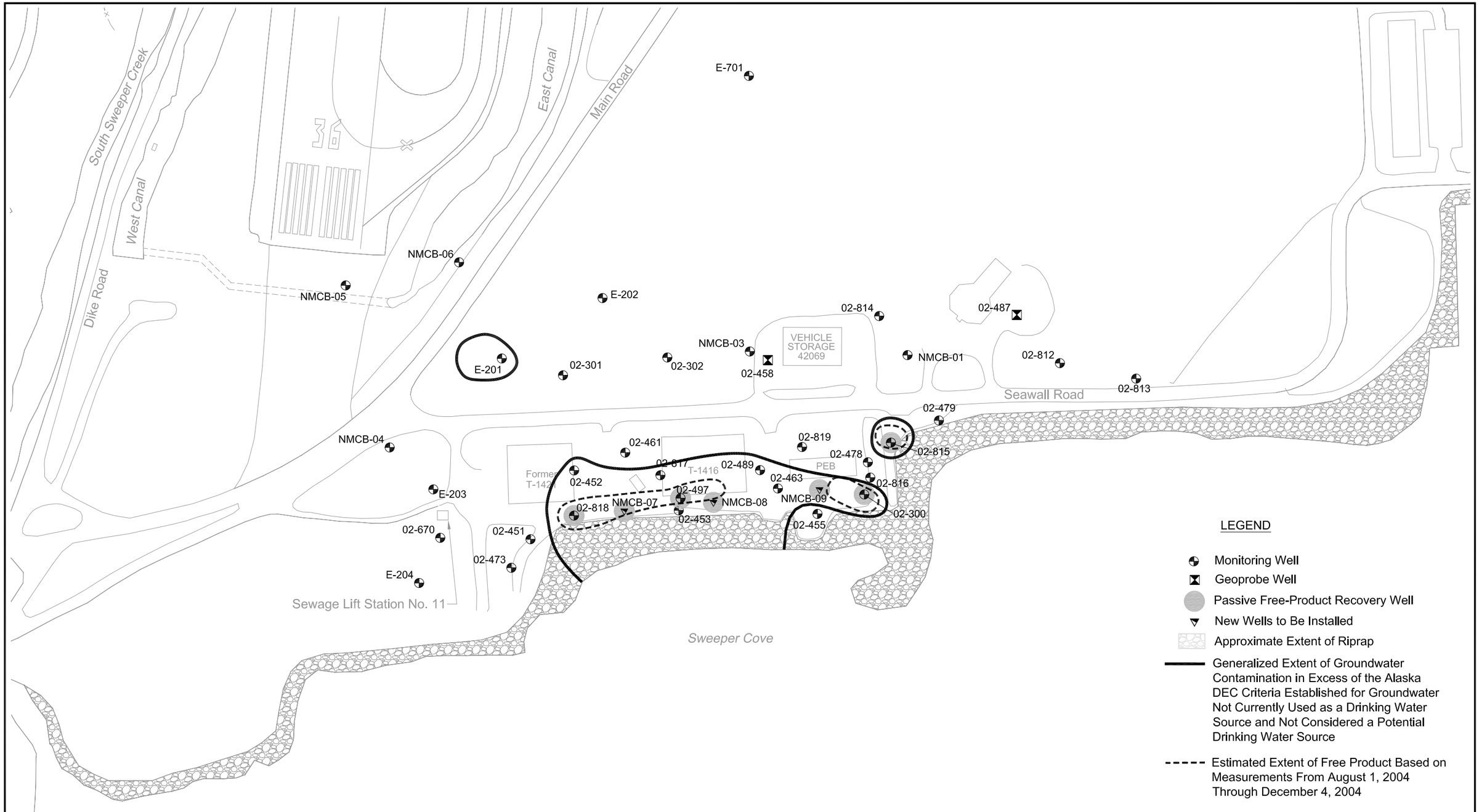
As part of the 5-year reviews required by Amendment Number 3 to the Adak FFA (U.S. Navy, USEPA, and ADEC 2002) and Amendment Number 0001 to the SAERA between the Navy and ADEC (U.S. Navy and ADEC 2002), the results of monitoring will be prepared by the Navy and submitted for review by the Alaska DEC. The 5-year reviews will evaluate the effectiveness of the selected remedy at the NMCB Building Expanded Area. Based on these reviews, the Navy and the Alaska DEC will decide whether continued monitoring, or additional actions, are necessary at the site. If the groundwater contaminant plume is shown to be stable or shrinking during three consecutive annual monitoring events, then the Navy will petition Alaska DEC for less frequent monitoring.

Recoverable product will be removed using passive skimmers. Three new wells, NMCB-07, NMCB-08 and NMCB-09 (Figure 9-1), will be installed in areas known historically to contain product or in areas between two wells containing product, for the purpose of product recovery and groundwater monitoring. The goal of installing new wells is to increase the effective area of recovery and decrease the recovery duration. If free product is detected in these new wells, passive skimmers will be installed. In addition, passive skimmers will be installed in existing wells 02-300, 02-497, 02-815, and 02-818, where measurable quantities of free product were found during the 2004 free-product recovery activities at the NMCB Building Expanded Area. Product recovery will occur on a schedule commensurate with skimmer capacity.

The product recovery schedule may be modified to optimize the recovery rate. Free product occurrence will be measured in additional wells to determine if free product is migrating and if additional wells should be added to the recovery system. The installation of additional product recovery or monitoring wells, if needed, is considered a contingent component of the selected remedy. Any future decision by the Navy and ADEC to install and operate additional product recovery or monitoring wells will not be considered a basis for amending or reopening this DD. Removal of free-phase product will continue until the technically practicable endpoint for free-phase product recovery, as defined in the OU A ROD (U.S. Navy et al. 2000), is achieved.

The costs for this alternative are presented in Table 9-1. Costs to implement MNA are estimated to be $80,000 per year. The costs associated with MNA are the incremental costs associated with the NMCB Building Expanded Area, which are above the base program costs associated with monitoring activities currently specified in the CMP. The MNA estimate includes the costs associated with sample collection at the NMCB Building Expanded Area, sample analysis, and the incremental reporting and mobilization costs. Capital costs for installation of three new wells and seven passive skimmers are $210,000. Annual O&M costs to run the free-phase product recovery system are $180,000. The present worth cost for this alternative assuming a 5 percent discount rate, a 40-year natural attenuation monitoring period and 2 years of active free-phase recovery is $1.9 million. Total capital and O&M costs (no present worth) for this alternative are estimated to be $3.8 million, not accounting for inflationary costs.

Although there are costs associated with the implementation of institutional controls at this site, they were not estimated because island-wide institutional controls will cover site-specific restrictions. The duration and frequency of monitoring and product recovery may vary from the estimated values.



Note:
Extent of riprap in the vicinity of NMCB based on field measurements collected in September 2005.

U.S. NAVY	Adak Island, AK DECISION DOCUMENT	N 0 50 100 200 SCALE IN FEET	**Figure 9-1** **Selected Cleanup Alternative** **NMCB Building Expanded Area**

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Table 9-1
NMCB Building Expanded Area
Cost Estimate For Alternative 2:
Institutional Controls, Free-Phase Product Recovery, and MNA

Item	Unit Cost	Units	Quantity	Cost
CAPITAL DIRECT COSTS (INSTALLED)				
Well Installation Costs				
Mobilize/Demobilize crew/equipment	$10,000	LS	1	$10,000
Shipping	$1.60	LB	1,000	$1,600
Per Diem	$4,700	Week	1	$4,700
Equipment Rental	$2,200	Week	1	$2,200
Well Construction (Labor)	$15,000	Week	1	$15,000
Well Construction (Materials)	$1,000	Well	3	$3,000
Automated Passiver Skimmer Installation				
Shipping	$1.60	LB	7,000	$11,200
Equipment purchase	$2,500	Well	7	$17,500
Equipment Install	$8,000	Week	1	$8,000
Subtotal Capital Costs				$73,200
Contingency Allowances		%	25	$18,300
TOTAL CAPITAL DIRECT COSTS (DC)				$90,000
CAPITAL INDIRECT COSTS				
Preliminary Design	DC	%	25	$22,500
Engineering Design	DC	%	20	$18,000
Regulatory Compliance	DC	%	15	$13,500
Construction QA and Management	DC	%	20	$18,000
System Startup	DC	%	20	$18,000
Closure Documentation	DC	%	15	$13,500
TOTAL CAPITAL INDIRECT COSTS				$100,000
Total Direct and Indirect Capital Costs				$190,000
Site Inspection and Overhead Costs	Total Costs	%	8	$15,200
TOTAL CAPITAL COSTS				**$210,000**

Table 9-1 (Continued)
NMCB Expanded Area
Cost Estimate For Alternative 2:
Institutional Controls, Free-Phase Product Recovery, and MNA

Item	Unit Cost	Units	Quantity	Cost
ANNUAL O&M COSTS				
Annual MNA Costs				
Mobilization				
Mobilize/Demobilize	$2,000	LS	1	$2,000
Shipping	$1.60	LB	2,000	$3,200
Monitoring				
Project Management/Coordination	$120	Well	32	$3,840
Field Labor	$480	Well	32	$15,360
Hydrogeologist	$100	Well	32	$3,200
Equipment Rental	$1,620	Week	2	$3,240
Sampling Supplies	$45	Well	32	$1,440
Analytical (DRO, GRO, BTEX, S/VOCs)	$850	Well	32	$27,200
SUBTOTAL MNA COSTS				$59,480
Contingency Allowances		%	25	$14,870
Site Inspection and Overhead Costs		%	8	$5,948
TOTAL ANNUAL MNA COST				**$80,000**
Cost Projection for 40 years				**$3,200,000**
40-Yr Present Worth MNA*				**$1,400,000**
Annual Free-Phase Product Recovery Costs				
Mobilization				
Mobilize/Demobilize	$2,000	LS	12	$24,000
Shipping	$1.60	LB	800	$1,280
Monitoring				
Project Management/Coordination	$1,440	Well	7	$10,080
Field Labor	$5,760	Well	7	$40,320
Supplies	$3,000	Well	7	$21,000
Hazardous Waste Disposal	$10,000	YR	1	$10,000
Battery/remote system repair/replacement	$25,000	YR	1	$25,000
SUBTOTAL RECOVERY COSTS				$131,680
Contingency Allowances		%	25	$32,920
Site Inspection and Overhead Costs		%	8	$13,168
TOTAL ANNUAL RECOVERY COST				**$178,000**
Cost Projection for 2 years				**$360,000**
2-Yr Present Worth Recovery*				**$330,000**

Table 9-1 (Continued)
NMCB Expanded Area
Cost Estimate For Alternative 2:
Institutional Controls, Free-Phase Product Recovery, and MNA

Item	Unit Cost	Units	Quantity	Cost
TOTAL CAPITAL COSTS				**$210,000**
TOTAL O&M COSTS (40 YEARS)				**$3,560,000**
TOTAL CAPITAL AND O&M COSTS				**$3,800,000**
PRESENT WORTH O&M COSTS*				**$1,700,000**
TOTAL PROJECT PRESENT WORTH*				**$1,900,000**

* Present worth costs calculated using a 5% discount rate.

Notes:

BTEX = benzene, toluene, ethylbenzene, and total xylenes
DRO = diesel-range organics
EA = Each
GRO = gasoline-range organics
LB = Pound
LS = Lump Sum
MNA = monitored natural attenuation
O&M = operation and maintenance
QA = quality assurance
S/VOCs = semivolatile/volatile organic compounds
YR = Year

10.0 ADDITIONAL ACTIVITIES

The Navy will perform additional site activities as part of the selection of the preferred remedial alternative to confirm that the selected remedy is protective. These activities include installation of new wells for soil and groundwater sampling and annual inspections of the Sweeper Cove shoreline for seeps and sheens. The Navy will install the new wells and collect additional soil and groundwater samples to ensure that the contaminant plume is stable or shrinking and surface water is protected. The annual shoreline inspections will be performed to confirm that free product is not migrating to Sweeper Cove. These additional activities are discussed in more detail below.

Five new wells (NMCB-07, NMCB-08, NMCB-10, NMCB-11, NMCB-12) will be installed along the shoreline adjacent to the riprap, as shown on Figure 10-1. These five wells will be used for surface water protection, as well as MNA. Soil samples will be collected during the drilling of these five new wells, and groundwater samples will be collected after installation of the wells as part of the annual surface water protection monitoring and MNA. Two of the wells, NMCB-07 and NMCB-08 will also be used for free-product recovery as discussed in Section 9. NMCB-09, which will be installed as part of the selected remedy will not be used for surface water protection. As discussed in Section 9, this well will be used for free-product recovery and MNA. Soil samples will not be collected from this well during drilling.

As required in 18 AAC 75.345(f), groundwater that is closely connected hydrologically to nearby surface water may not cause a violation of the water quality standards in 18 AAC 70 for surface water or sediment. Comparison of concentrations of petroleum-related chemicals reported in surface water samples from Sweeper Cove in the vicinity of the NMCB Building Expanded Area site identified maximum concentrations of TAH and TAqH at, or just above, water quality standards. All other COCs were detected at concentrations less than the water quality standards.

Surface water protection monitoring will be conducted at locations where concentrations of COCs in groundwater exceed groundwater quality criteria and could discharge to Sweeper Cove. The purpose is to verify that potential contaminants are not migrating into surface water bodies as required by 18 AAC 75.345(f). The planned surface water protection monitoring uses groundwater samples and free-product thickness measurements collected from wells located adjacent to and or upgradient from surface water (i.e., surface water protection wells). If either of the following two conditions are met, then additional actions will be initiated:

1) Condition 1 - analytical results for petroleum compounds exceed the groundwater criteria and an increasing trend in concentrations is found over three consecutive measurements in the surface water protection wells

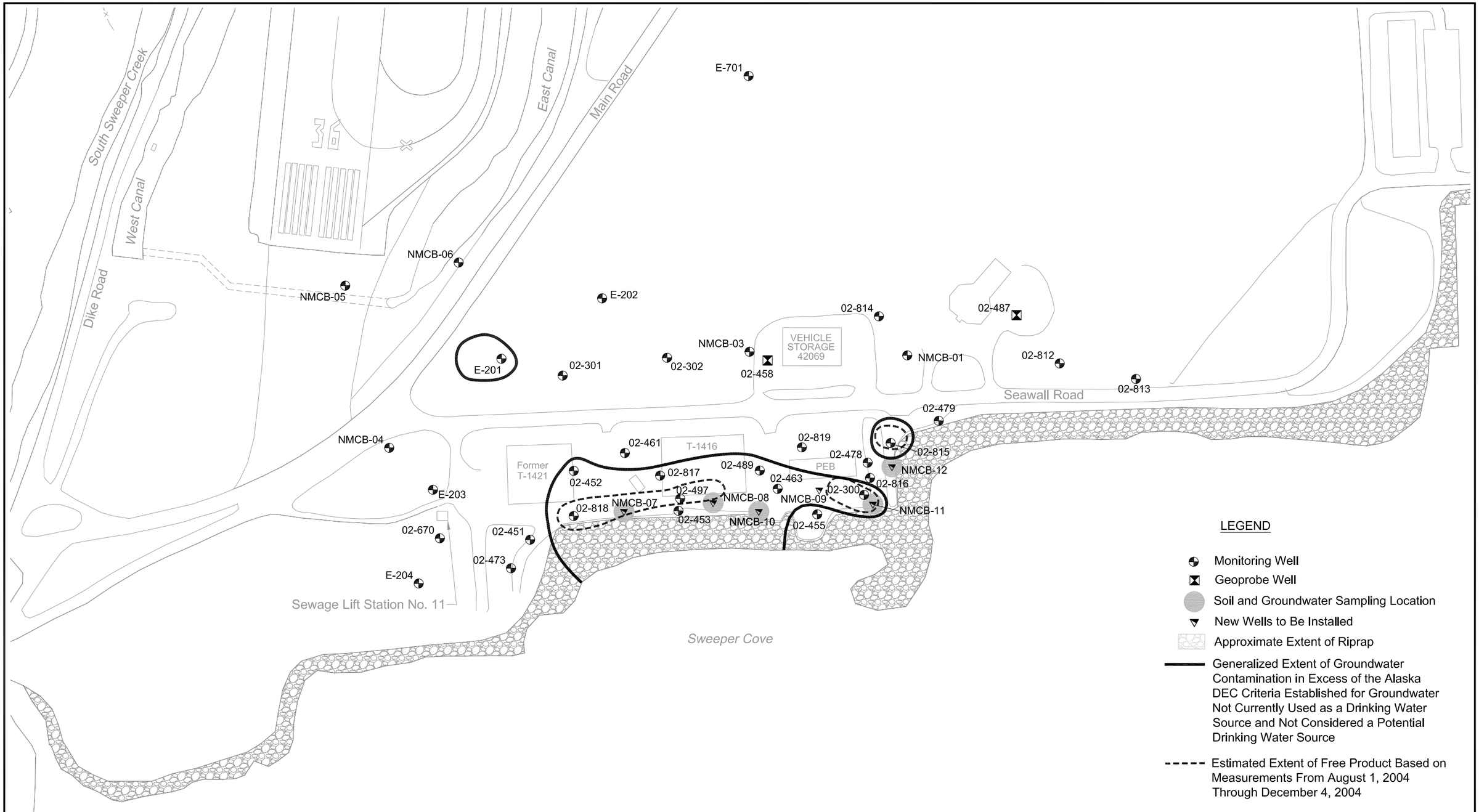
2) Condition 2 - An increasing trend in free-product thickness measurements is found over three consecutive measurements in the surface water protection wells

The following additional actions will be initiated if one or both of the above conditions is met:

- Evaluate the chemicals and their concentrations identified in surface water protection wells relative to the potential for a reasonable threat to downgradient aquatic receptors
- Evaluate the need to conduct surface water sampling
- Review final remedy selected for the site and the remedy performance relative to surface water protection

The endpoint for surface water protection monitoring is directly dependent upon the associated upgradient site achieving the remedial endpoint criteria. The remedial endpoint criteria for the site is a demonstration that the Alaska DEC groundwater cleanup levels for groundwater not reasonably expected to be used for drinking water are achieved during three consecutive annual monitoring events. Once the upgradient site has achieved the remedial endpoint and it can be demonstrated that there is no reasonable threat to the down-gradient receptor, groundwater monitoring for surface water protection at the associated location will be terminated. If the groundwater contaminant plume is shown to be stable or shrinking during three consecutive annual monitoring events, then the Navy will petition Alaska DEC for less frequent monitoring.

Petroleum seeps and or sheens on the shoreline or adjacent surface water of Sweeper Cove have not been reported. However, the shoreline along Sweeper Cove will be inspected during each annual monitoring event. The purpose of the inspection is to identify the presence or absence of petroleum seeps or sheens along the shoreline. If seeps or sheens are observed, the location(s) will be documented on a map and photographs of the seeps or sheens will be taken to document the degree to which petroleum hydrocarbons are entering the surface water environment. In the event that petroleum seeps and or sheens are identified, the Navy will consider alternative monitoring or other actions to address these conditions.



Note:
Extent of riprap in the vicinity of NMCB based on field measurements collected in September 2005.

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U.S. NAVY	Adak Island, AK DECISION DOCUMENT	N 0 50 100 200 SCALE IN FEET	**Figure 10-1** **Additional Sampling Activities** **NMCB Building Expanded Area**

11.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Applicable or relevant and appropriate requirements (ARARs) are promulgated federal and state laws and regulations that are either applicable to the conditions at a cleanup site or are relevant and appropriate. Relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the site. Three kinds of ARARs exist for cleanup of petroleum release sites on Adak Island: chemical-specific, location-specific, and action-specific.

11.1 CHEMICAL-SPECIFIC ARARs

Chemical-specific ARARs are generally risk-based concentration limits or discharge limits for specific chemicals. When a specific chemical is subject to more than one discharge or exposure limit, the more stringent requirement is used. Chemical-specific ARARs for the NMCB Building Expanded Area include Alaska DEC regulations 18 AAC 75 and 18 AAC 70 and the Clean Water Act.

As discussed in Section 6, Alaska DEC regulation 18 AAC 75 specifies soil and groundwater cleanup criteria established for petroleum-release sites located within the State of Alaska. Cleanup levels specified for soil at free-product recovery petroleum sites on the Former Adak Naval Complex are based on Alaska DEC Method Four criteria [18 AAC 75.340(a)(4)]. Cleanup levels specified for groundwater at the NMCB Building Expanded Area are based on 10 times the tabulated groundwater cleanup levels [18 AAC 75.345(b)(1), Table C] because groundwater is not reasonably expected to be a potential future source of drinking water [18 AAC 75.345(b)(2)]. Alaska regulations [18 AAC 75.345(f)] specify that groundwater hydrologically connected to nearby surface water may not cause a violation of the water quality standards in 18 AAC 70 for surface water. In addition, ambient water quality criteria (33 United States Code 1314, Clean Water Act) are relevant and appropriate for surface water that could be impacted by plume migration.

11.2 LOCATION-SPECIFIC ARARs

Location-specific ARARs are those requirements that relate to the geographic position or physical condition of the site. These requirements may limit the type of remedial activities that can be implemented or may impose additional constraints. There are no potential location-specific ARARs for NMCB Building Expanded Area because remedial actions are not proposed in sensitive environments and because ecological hazards from exposure to sediment and surface water in Sweeper Cove were found to be below target goals (i.e., a HQ less than 1).

11.3 ACTION-SPECIFIC ARARs

Action-specific ARARs generally set performance, design, or other similar action-specific controls or restrictions on particular kinds of activities. Potentially applicable action-specific ARARs for the selected cleanup alternative include the following:

- Resource Conservation and Recovery Act (RCRA) regulations (40 Code of Federal Regulations [CFR] Parts 261, 262, 268)
- Alaska Hazardous Waste Disposal Regulation (18 AAC 62)
- Alaska Oil and Hazardous Substances Pollution Control (18 AAC 75.325 through 375)
- Alaska Water Quality Standards (18 AAC 70.20)
- Federal Clean Water Act – National Pollution Discharge Elimination System (NPDES) Program (40 CFR Part 131)
- Federal Clean Water Act – Pretreatment (40 CFR Part 403)

12.0 PUBLIC INVOLVEMENT

12.1 PUBLIC INVOLVEMENT ACTIVITIES

The Navy established a community involvement program in 1994 to provide interested Alaska citizens and Adak residents with timely and updated information on the environmental cleanup and the transfer and reuse of Navy land and facilities. The community involvement program also provides a mechanism for public input on environmental cleanup decisions. Information is conveyed to the public via fact sheets and newsletters, Restoration Advisory Board (RAB) meetings and other formal public meetings, web site announcements (www.adakupdate.com), information repositories on Adak Island (Bob Reeve High School building, second floor) and in Anchorage (University of Alaska library, reserve room), and the administrative record file located at Naval Facilities Engineering Command Northwest, Poulsbo, Washington. In addition, a mailing list is maintained and updated to inform concerned citizens of upcoming meetings and significant activities, such as public comment periods. Public input is obtained through RAB meetings and other formal public meetings, community interviews, requests for public comments, and a telephone hotline.

The proposed plan (U.S. Navy and Alaska DEC 2005a) was provided to the public for review during the 30-day public comment period beginning on August 16, 2005. In addition, TAC (the current landowner) was provided a copy of the FFS report (URS 2005a) and the proposed plan (U.S. Navy and Alaska DEC 2005a) and was invited to comment on these documents. No comments were received.

12.2 FUTURE CONTACTS

Adak community members are encouraged to contact Navy and Alaska DEC site managers with questions or comments. The Navy and Alaska DEC site managers are:

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13.0 RESPONSIVENESS SUMMARY

No comments were received during the public comment period.

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