Association of State and Territorial Solid Waste Management Officials
State Federal Coordination Focus Group and Removal Action Focus Group

FINAL
Removal Actions at Federal Facilities

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June 30, 2007

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REMOVAL ACTIONS AT FEDERAL FACILITIES

INTRODUCTION

Removal actions are legitimate mechanisms for addressing the actual or threatened releases of hazardous substances into the environment or the actual or threatened release of a pollutant or contaminant that may present an imminent and substantial danger to public health or welfare. Removal actions should shorten response times and still be consistent with long-term remedial decisions.

The Department of Defense (DOD) and Civilian Federal Agencies (CFAs) have been granted broad removal authority by Executive Order 12580, which delegates much of the President's authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Title 42 *United States Code* [USC] Section 9604, Title 10 USC Section 2705. Some of the removal actions conducted by these federal agencies have raised concerns among States regarding the execution of these actions and the level of coordination and consultation with States during the conduct of the removal action.

Although the remedial process is typically considered the first option for addressing contaminated sites, a well-planned removal action can be an appropriate response at a site during planning and even the investigation phase. Adequate evaluation of site characteristics and contamination, however, is necessary to determine whether a removal action is appropriate.

Removal actions are intended for higher risk sites that meet the conditions spelled out in the National Contingency Plan but are not intended to circumvent the remedial response actions. However, since the early 1990's, there has been an increasing emphasis on removals to speed site cleanup, save money, and support the reuse of closed military facilities. These potential benefits of using a removal action have encouraged their use at sites that may not exhibit the high-risk situations as defined in CERCLA Section 104. Removal actions tend to minimize community involvement requirements and reduce the State regulatory oversight in identifying Applicable Relevant and Appropriate Requirements (ARARs) and concurrence with cleanup decisions. States are concerned that the reduced role of States and more limited community involvement activities have become further incentive for federal agencies to pursue removal actions in lieu of remedial responses.

This paper developed by the State Federal Coordination Focus Group with assistance by the Removal Action Focus Group, will explore how federal-lead agencies use their removal authority, the challenges that States deal with during federal removal activities, and provide conclusions and recommendations for the improving the States' role in the removal action process. The removal notification process and coordination issues are discussed in the first section. The second section evaluates how information is used to

make removal action decisions and explores the State's roles in the decision making process. Issues surrounding Time Critical Removal Actions (TCRAs), including when a TCRA is appropriate and if TCRAs are being misused, are discussed in the third section. Section four assesses the post-removal process (ICs) requirement and challenges. Issues surrounding community involvement and removal actions are discussed in the fifth section. Section six includes the conclusions and recommendations of the removal action analysis. Case studies are presented in the appendices.

CATEGORIES OF REMOVAL ACTIONS

The three categories of removal actions based on the urgency of the situation are Emergency Removal Actions, Time Critical Removal Actions (TCRA), and non-Time Critical Removal Actions. In all cases the lead agency is required to make a determination that a removal action is appropriate. Emergency removals are those where the release or threat of release requires that response activities begin within hours of the determination that a removal action is appropriate. Time-critical removal actions (TCRA) are those removal actions where, based on a site evaluation, on-site activities must be initiated within six months of the determination. Non-time-critical removal actions (NTCRA) are those removal actions where, based on a site evaluation, there is a planning period of more than six months before on-site activities must begin.

Emergency removals can be used at any time when emergency type response is needed to contain or react to releases or threatened releases of hazardous substances. However, this paper is primarily focused on TCRA and NTCRA prior to conducting any type of removal action a removal site evaluation (RSE) must be performed to evaluate a release or threatened release. The results of the RSE are used to determine if a removal action is appropriate, and which type of removal action best addresses the conditions at the site.

Use of a TCRA is appropriate when the actual or potential threat to public health or welfare or the environment is sufficiently serious that the removal action is appropriate and must be initiated within six months. A well-planned and executed TCRA will also include opportunity for meaningful coordination and consultation with the State and opportunity for community involvement. It would not be appropriate to use a TCRA just for the sake of expediency or to avoid complying with the additional planning and community involvement requirements of a NTCRA. The NTCRA requires that an Engineering Evaluation and Cost Assessment (EE/CA) be developed and that the lead agency conduct community involvement activities. The EE/CA is similar to the Feasibility Study in that alternatives are evaluated and a preferred alternative selected. Emergency removals, TCRAs, and Non-TCRAs serve important functions in providing rapid response to hazardous substance releases or threatened releases. The NCP requires an evaluation of three criteria: effectiveness, implementability and cost for each removal alternative. There are nine criteria used during a Feasibility Study's remedy evaluation.

I. REMOVAL ACTIONS

The lead federal agency needs to involve the State environmental agency for any removal action in their State. CFR 300.400(c)(2) provides for State participation for fund-financed actions. Although this CFR relates to CERCLA and Superfund monies for CERCLA participation, most States would like the same relationship with all federal-lead agencies.

Time Critical Removal Actions (TCRA) v. Non-TCRAs

Section 104 of CERCLA authorizes a removal action whenever there is a release or threatened release of a hazardous substance into the environment or a release or threatened risk of a pollutant or contaminant that may present an imminent and substantial danger to public health or welfare or a threat to the environment based on a SRE. A removal action is defined as the cleanup or removal of hazardous substances including: 1) actions taken in the event of a release or threatened release of hazardous substances into the environment, 2) actions taken to monitor, assess, and evaluate the release or threatened release of hazardous substances, 3) disposal of removed material or 4) other actions taken to prevent, minimize, or mitigate damage to the public health or welfare or to the environment.

The major difference between a TCRA and a NTCRA is time required for planning before on-site activities must begin and the documentation and procedural requirements. For a TRCA on-site activities must begin within six months once a removal action is determined to be appropriate (signing of action memo). The TCRA has no requirements for a formal written document delineating the extent and evaluating remedial alternatives other than the action memo. Generally speaking, for TCRA projects the extent of contamination eligible for a removal action and the alternatives to address the actual or threatened release of a hazardous substance or impacts to public health or welfare or the environment is relatively straightforward. Despite a sense of greater urgency for these removal actions, successful TCRA projects have performed that nonetheless allow for substantive coordination with the State involvement and opportunity for community involvement.

In contrast, NTCRA projects are sites, meeting the removal criteria, where the planning prior to on-site activities will take longer than six months. The decision documents are more prescriptive. An engineering evaluation/cost analysis (EE/CA) is required that includes site characteristics, identification of removal objectives, and identification and analysis of removal action alternatives. The EE/CA must be placed in the administrative record. In addition, a notice of the EE/CA availability must be published in a local newspaper and there must be an announcement of a public comment period of at least 30 days. Upon the conclusion of the public comment period, a written response to significant comments must be prepared and placed in the administrative record.

Time Critical Removal Actions & Non- Time Critical Removal Actions

When the urgency of a response action allows for a period of planning of six months or more, a non-TCRA can be planned to further characterize the threats posed by a release using an EE/CA. A major component of the EE/CA is a characterization of the site. The EE/CA summarizes available data from a wide variety of sources on the physical, demographic, and other characteristics of the site and its surroundings. Site characterization data gathered during the RSE in support of the EE/CA can be found in existing reports. Information pulled from those reports may include the location of the hazardous substances or contaminants, the quantity or magnitude of the contamination, the physical and chemical attributes of the hazardous substances, and the targets potentially affected by the site. If information on the source, nature, and extent of contamination can't be readily found, site managers may survey the site using non-analytical methods including geophysical surveys to locate buried objects. Aerial photographs can be examined to locate possible disturbed areas or drainage pathways. Information can also be found from the Toxic Release Inventory or through interviews with past employees or operators.

Analytical data is presented in tabular and narrative summaries within the EE/CA. Sampling should be conducted with accepted EPA and Contract Laboratory Program protocols. Sampling should be coordinated through the integrated assessment approach of the Superfund Accelerated Cleanup Model. Appropriate data quality objectives and routine quality assurance and quality controls samples should be used for decisions in support of removal actions.

Once adequate site characterization data are collected, a site conceptual model can be prepared and a streamlined risk assessment can be performed. Streamlined risk assessments fall between the limited risk assessment for emergency removal actions, and the conventional baseline risk assessments that are normally conducted for long-term remedial actions. The streamlined risk assessment serves to help site managers decide whether to take a removal action, what exposures need to be addressed by the removal action, and may in some cases establish the appropriate cleanup levels.

When is a Time-Critical Removal Action (TCRA) Appropriate?

Per CFR 300.415(a)(1) and CFR 300.415(b)(1), a removal response (this applies to the definition of "removal action", so it actually covers all three categories of removal actions) is appropriate when the results of a RSE determines that there is a threat to public health or welfare of the United States or the environment. The lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release.

Per CFR 300.415(b)(2), the factors to be considered in determining the appropriate removal action are:

- An actual or potential exposure to nearby human populations, animals, or food chain from hazardous substances or pollutants or contaminants;
- Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release;
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;
- Threat of fire or explosion;
- The availability of other appropriate federal or State response mechanisms to respond to the release, and;
- Other situations or factors that may pose threats to public health or welfare of the United States or the environment.

Applicable or Relevant and Appropriate Requirements (ARARs)

Per CFR 300.415(j), for TCRA the lead federal agency must request ARARs from the State prior to the removal action. The US EPA has produced a guidance document "Superfund Removal Procedure, Guidance on the Consideration of ARARs During Removal actions", (EPA/540/P-91/011, September 1991). The guidance document provides the lead federal agency information on when and how to request the ARARs from the State and how the ARAR's need to be incorporated in the removal action. The State environmental agency is an appropriate agency to contact for the ARARs. Once the federal agency provides information on the site and requests the State to identify ARARs, the State is required to identify ARARs in a timely manner. It is the federal agency responsibility to determine which ARARs can be practicably met but is not bound to comply with all requirements identified by the State.

As outlined in EPA's Guidance, if the State is concerned about the identification of ARARs or the decision relative to which ARARs can be practicably met, the State can pursue it and consult with the management of the federal agency. This is an area that by its very nature requires coordination between the federal agency and States and should be a collaborative process. It is also an area that can be contentious and which if unresolved does not lend itself to efficient cleanups.

States have had occasion when a lead federal agency has made a determination or interpretation of a State regulation that the State views as inaccurate. Often the misunderstanding can be cleared up by discussion with the federal agency on what the specific issues are related to the State law or statute. However, in some cases this explanation may not be adequate and States must consider what type enforcement or legal action may be appropriate. State oversight of DOD removals that are covered by the Department of Defense State Memorandum of Agreement (DSMOA) represent a special case where enforcement action must be preceded by a dispute resolution process.

For DOD sites not managed through the DSMOA, States may take immediate legal action if they believe they have a valid regulatory or statutory basis for the action.

Conclusion

TCRA should be considered by the appropriate federal agency when the threat to public health or the welfare of the environment is determined to be imminent and the situation will not allow for a six-month planning period. This decision should be made shortly after the RSE is completed. A TCRA should be conducted if the RSE identifies some new condition or threat. The removal action should follow the non-time critical process if the RSE is completed and no new information, condition, or threat is discovered, and the site is stable and a new release is not imminent. States have observed that, many times, DOD and (CFAs) will use removal actions, and TCRAs when a situation may not be imminent (e.g., contaminated sites that have been known for many years without any remediation are subject to TCRAs rather than following the RI/FS process). Several States have noted that some lead federal agencies ignore the six-month planning period that divides TCRAs and Non-TCRAs.

II. COORDINATION OF REMOVAL ACTIONS WITH STATE, EPA AND FEDERAL AGENCIES

Federal agencies use the removal process for a variety of different reasons. The NCP is clear on the conditions that should be present at a site if the removal process is to be used. In many instances there appears to be an inconsistency between the NCP criteria and the rationale federal agencies use for removals, which creates challenges between federal agencies, States and EPA. For most removal actions implemented by federal agencies, EPA is not directly involved and guidance developed by EPA's removal program does not appear to be used between the federal agency rationale for using removals and NCP criteria which creates challenges between federal agencies, EPA, and the States. This section will explore inconsistent interpretation of NCP criteria by federal agencies, the challenges to coordination between agencies during removals, and the use of removals as a funding tool.

Inconsistent Approaches Among Federal Agencies

Federal agencies are using the removal process for different reasons. The NCP is fairly explicit on the conditions that should be present at a site if the removal process is to be used. Challenges arise because the decision criteria for using a removal action is not specific and does not always discuss imminent and substantial criteria. Since most federal agencies are following CERCLA and the NCP to clean up sites for which they have jurisdiction, the reasons and conditions for using removal actions should not change significantly from one federal agency to another. However, States have noted that federal agencies are implementing removals differently between agencies and even sometimes within agencies region to region.

It is difficult for States to maintain and be consistent in their oversight activities when the federal agencies they regulate are not implementing CERCLA consistently. Some federal agencies use the removal process exclusively for all cleanup activities they perform and this is not the proper use of removal authorities. When applied consistently and for the appropriate reasons, removal actions can be an integral part of the cleanup effort.

Coordination: CFAs to EPA

The level of coordination between EPA and federal agencies may affect the level of State involvement. There are occasions when federal agencies fail to coordinate their activities with EPA and the State (typically for non-NPL sites, the CFAs do not coordinate with EPA), or because they have already coordinated with EPA, believe that coordination with the State is not necessary. This philosophy is misguided and incorrect. States maintain regulatory authority for a variety of actions and have established statewide standards that may be essential to the successful implementation of any investigation or cleanup effort.

Federal agencies should not rely upon EPA to assure proper coordination with the States. In order for removal actions on federal lands to be effective, there must be a commitment for thorough coordination between the parties associated with the cleanup activities. Often times, proper coordination not only involves federal to State and vice versa, but also can involve federal agencies coordinating amongst each other. The EPA's One Cleanup program is a good example of how coordination can and should be accomplished.

Federal agencies performing removals on sites under their jurisdiction have the same requirements under the NCP as EPA. Under the NCP§300.525(e), it states "EPA shall consult with a State on all Removal actions to be conducted in that State." The federal agency must also consult with the State for all removal actions they conduct within that State. Under the OSWER Directive 9360.3-07, EPA developed a checklist to assist the OSCs ensuring appropriate State involvement in all aspects of a removal action, including closure and notification. It is uncertain if these checklists are used or if other federal agencies have anything similar to these checklists.

Coordination: CFAs to State

States coordinate with federal agencies in various ways. In some situations a State's authority is clearly based on delegated federal programs with specific State laws and regulations, which outline a detailed process based on various planned actions. Oversight generally exists through permits, enforcement orders, voluntary agreements and federal facility agreements.

State Role in DOD & CFA Removal Action Decisions

The State's involvement with a DOD or CFA removal action partially depends on how well the agency communicates with EPA and the State. It is necessary for the federal agency to understand the requirements for State participation, and the need to designate

an appropriate contact person within the agency (RPM equivalent in the agency). Frequently these contacts can be designated through membership in Regional Response Teams, agency agreements, and other coordination mechanisms.

The NCP outlines the circumstances whereby State input to the EPA is recommended or required for removal action decisions. To improve coordination and communication between States and CFA's it would be prudent to apply these at federal facility removal actions. These circumstances are:

- State consultation is *recommended* when State assurances for remedial actions (such as post-removal site controls (PRSC))are required
- State participation is *requested* for non-TCRAs over $2 million
- State consultation is *requested*, and State concerns *should* be considered for all removal actions
- State notification is *recommended* before beginning a removal action
- State notification is *recommended* when there is a threat to natural resources
- EPA is *required* to request a State identification of ARARs
- States are *required* to provide ARARs in a timely manner when requested
- Continuous involvement with the State is *recommended* to avoid problems arising when EPA isn't aware of State's concerns
- EPA *must inform* States of decisions regarding use of institutional controls (ICs) when wastes are left on site (but not necessarily consult on the appropriateness of their use)
- Although CERCLA doesn't require compliance with ARARs, EPA *should* attain ARARs to the extent practicable considering the situation
- EPA *requests* that the other government entity provide PRSC

For the removal process, the only points where EPA is required to have State involvement is in the request for ARARs, the State's response with ARARs, and the notification of the use of ICs for waste containment. It should be remembered that the NCP presents these removal action requirements in the context of a NPL site where there will be final remedial actions more explicitly investigated and defined with State input through the RI/FS and ROD process.

All other items are only recommendations. EPA is not required to have State involvement in the selection of remedy or any other removal action decisions. The level at which different regions and on-scene coordinators (OSCs) work with State agencies also varies because of the relaxed, informal nature of requirements. This can lead to disputes between States and federal agencies as to the nature of the removal action, the level of compliance with ARARs, and the responsibilities for PRSC. Courses of action are limited for States involved in disputes over these types of issues.

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Munition-Removals Coordination

Coordination on removals at sites in DOD's military munitions response program (MMRP) is based on the "collaborative decision process" as defined by the DOD-EPA-States Munitions Response Committee Charter dated December 20, 2001 and in the 2004 Attachment B (See Appendix C). The Munitions Response Committee (MRC) was established to assist States, EPA, and DOD to work on investigation and cleanup issues at DOD munitions sites. A primary goal of the MRC was to develop a Collaborative Decision Making process or a mutual agreement process. The MRC collaborative decision process states that mutual agreement at critical decision points throughout the munitions response process is essential. Attachment B identifies both the Removal/Remedial Action determination and Removal/Remediation Investigation work plan as critical decision points requiring mutual agreement between States and DOD and other federal agencies (EPA, and other federal land managers as applicable). If a State disagrees to the proposed removal action, they may invoke dispute resolution to resolve the issue. If dispute resolution fails to resolve the issue, States may take action based on their respective legal authorities.

Funding Challenges

Federal agencies often utilize the removal process as a means to expedite the expenditure of dollars within a given fiscal year so that the money is not lost upon year-end. The removal process as outlined in the NCP can be much quicker to initiate and implement because there are fewer requirements than those under the remedial process. However, the removal process was designed, first and foremost, to mitigate unacceptable risks in a timely manner. Adequate evaluation of site characteristics and contamination, however, is necessary to determine whether a removal action is appropriate. In no instance should a TCRA be used unless there is a risk that needs to be mitigated quickly. Federal agencies usually have a multi-year planning and funding process, so it is unusual that projects would have a planning period of less than six months.

Rather than use the removal process as a means to avoid funding losses, which often seems to be the case, federal agencies should be more diligent during the planning process such that remedial activities are initiated and completed on time and within schedule. Proper planning can insure a cost effective, complete and protective cleanup of contaminated federal lands.

One other factor that has encouraged the recent use of removal actions at federal facilities is performance-based contracting, where contractors are paid when they achieve site closeout (all remedial actions in place or completed). Since these contracts may use incentives to reward contractors for exceeding schedules, contractors are recommending

removal actions as a way to quickly achieve site closeout. All these factors combine to produce an increasing inventory of sites where removal actions have been completed, but a final remedial decision regarding the site has not been made.

State Reimbursement for Oversight

Most States and Territories have a signed Memorandum of Agreement/Cooperative Agreement with the Department of Defense, commonly know as the DSMOA in order to obtain reimbursement for State assistance at military facilities. The DSMOA covers costs for work performed including removal actions that are done with environmental restoration funds. Removal actions often are a critical component in the cleanup process at environmental restoration projects and States can obtain reimbursement for services if the facility and State plan appropriately.

In some situations, removal actions may be performed without environmental restoration funding (for example installations that perform these action with operation and maintenance funding), reimbursement for States services would not be available from the DSMOA program but reimbursement could be obtained using alternative military funding mechanism with a site specific agreement. Some States may elect to seek reimbursement for services by a State cost recovery process.

In some situations States have been successful with developing an agreement for reimbursement for regulatory involvement at Civilian Federal Agencies. Some States have been very successful in developing agreements with Civilian Federal Agencies to provide State oversight. States use their involvement in these agreements to ensure all contamination issues with this site are addressed consistently, and that the data from one investigation can be used by both parties (e.g. background information, determining who is responsible for the contamination at the site).

Conclusion

Many times federal agencies appear to be using the removal process because of a perception that State involvement and oversight is somehow diminished through that process. However, States maintain a critical oversight role during the investigation and remediation of contaminated sites located on federal lands regardless of the process being used to accomplish the cleanup. Removal actions are an important part of this process for which the States' role is not diminished. It is extremely important that federal agencies work closely with States to fully understand and plan activities associated with any action involving site cleanup. Cooperative planning and execution routinely maximizes timesaving, effort and costs, allowing for a smooth investigation and cleanup in order to facilitate property reuse.

III. REMOVAL ACTION DECISIONS

The appropriateness and extent of a removal action must be based on a sound knowledge of the contamination at the site and the threats to human health and the environment that it poses. Removal actions may be appropriate to address immediate or high priority threats or may be used to address an entire site's contamination. In either case, adequate characterization of the site is necessary for the intended purpose. Early characterization work should be used to develop a conceptual site model and strategy for response actions at the site. Each removal alternative should be evaluated using the three criteria defined in the NCP: effectiveness, implementability, and cost. For removal actions that are expected to achieve a final remedy, it may be beneficial to incorporate the nine criteria, used during a Feasibility Study into the removal evaluation, as follows:

	Remedial Action	Non-TCRA (final or only action)
1	Overall Protection of Human Health and the Environment	Component of Effectiveness
2	Compliance with ARARs	Component of Effectiveness
3	Long-Term Effectiveness and Permanence	Component of Effectiveness
4	Reduction of Toxicity, Mobility, or Volume Through Treatment	Component of Effectiveness
5	Short-Term effectiveness	Component of Effectiveness
6	Implementability	Implementability
7	Cost	Cost
8	State Acceptance	
9	Community Acceptance	

After interim removal actions are completed, the lead agency must assure that there is orderly transition from removal to remedial response actions. This should include a strategy and schedule for subsequent investigations and remedial response actions.

Removal Site Evaluation

The process for determining if a removal action is warranted starts with a removal site evaluation as outlined in Section 300.410 of the NCP. Removal site assessments consist of a removal preliminary assessment (PA), and if needed, a removal site inspection (SI). The removal PA is prepared using readily available information to determine the likely nature of the release or threatened release, to assess magnitude of threats to public health, and to assess the factors necessary to determine the need for a removal action. If additional information is needed to characterize the release, a removal SI can be completed to help determine the need for a response, and the urgency of any response action.

Risk-Based Decisions

Risk-based decisions are a critical component of the removal action. It is at this point of the removal action process that decisions are made as to which contaminants are

identified to pose a health risk and at what concentration should be left in place, such that there is no longer a threat to humans or the environment.

Establishing removal action clean-up goals usually doesn't involve the traditional risk assessment process, but rather uses a streamlined risk evaluation. This document is used to define the risk associated with a pollutant or contaminant "which may present an imminent and substantial danger to public health and welfare," and provide reasoning for the selected clean-up level. Generally, since there is a lack of site-specific information, risk-based decisions are often very conservative and may be restrictive in their use. There are times when it is appropriate to use clean-up goals that are not risk-based (i.e., MCLs, MCLGs, and other state standards).

Some of the limitations of the clean-up goals set for a removal action may include: (1) only the most hazardous chemicals have been identified as the chemicals to be dealt with, and (2) often times the clean-up goals are set for human exposure and may not be protective of other land use scenarios or be protective of ecological receptors.

After the removal actions have been completed, because of these limitations and the inherent nature of these actions (i.e., to eliminate the imminent and substantial environmental threat), environmental managers should evaluate if there are any lingering risks. This evaluation should include: (1) is there a need to clean-up other areas because of possible hazardous chemicals that were not evaluated previously, (2) are there land use issues (i.e., restricted land use vs. unrestricted land use), and (3) is there a need to be protective of other receptors (i.e., ecological receptors). Additionally, if there is a need for future clean-up actions to take place, risk-based decisions from the removal action should be consistent, transparent and supportive of future clean-up decisions.

Revisiting Removal Action Decisions in the Record of Decision (ROD)

Removal actions are frequently conducted at sites that ultimately require additional cleanup to ensure that the final remedy is thoroughly protective of human health and the environment. In many circumstances these sites are on the NPL and require completion of a Record of Decision (ROD) as part of the CERCLA process. There are a number of factors that should be considered when conducting a removal action at a site where further action will be necessary or completion of a ROD is required.

States frequently will have oversight authority after completion of the project and removal action decisions can have a dramatic effect on the role of the State after construction is complete. Involving States in the decision process will ensure that the regulatory agencies are satisfied with decisions and will minimize future conflicts.

States will sometimes have State-specific ARARs that must be considered as part of a remedial action when the ROD is prepared. Involving States in the decision process for a removal action will allow the parties to thoroughly discuss these ARARs and ensure that the proper interpretation of the requirements are applied to the removal action, thereby ensuring a smooth transition to the remedial action.

The final remedy at a NPL site must ultimately satisfy the nine evaluation criteria established by CERCLA and the NCP. Implementing removal actions in a way that considers the nine criteria as much as practicable will enhance the overall efficiency of the project. Incorporating this concept early in the decision process will also help frame the goals for the removal action and can result in significant cost savings for the overall project.

Public involvement requirements must be satisfied when the final ROD in completed. In most cases the public participation process for a removal action is significantly less rigorous than for a remedial action. Devoting additional attention to the public participation process during a removal action will make the preparation of the final ROD easier and will enhance the working relationship with the local community and the general public.

The key to a smooth transition between a removal action and remedial action is coordination between the stakeholders and defining goals early in the cleanup process. By considering the issues discussed above and thoroughly coordinating with the various stakeholders, a project can progress quickly and efficiently to completion in a manner that satisfies all of the affected parties in the most efficient and cost effective manner possible. One key issue not discussed is authority. States have little authority for removal actions (determining cleanup goals, workplans, sampling plans).

Even at DOD bases with a lot of coordination, DOD often moves forward even if consensus on action does not exist. Any disputes regarding the removal action are postponed to the appropriate primary document (RI/FS or ROD). Coordination does not mean agreement. Removal actions are not a primary document in Federal Facility Agreements (FFAs). For example, the Hunters Point, California FFA only allows dispute on whether a Removal action should be initiated. There is no dispute process if the State does not agree with cleanup goals, contaminants of concern (COC) or other issues.

Conclusion

The goals of the removal action must be clearly established early in the process. Removal actions are intended to mitigate immediate threats, while remedial actions are intended to provide permanent solutions. In some cases it may be more cost effective to perform a removal action with the intent being the final remedy, but it will require additional work that is typically beyond the scope of simply mitigating immediate threats. This may be more costly, but will also probably result in overall savings for the project. In other cases it may be appropriate to do just enough work to ensure that immediate threats are controlled and postpone decisions about the final remedy until the ROD is prepared. Ensuring that all stakeholders are engaged early in the decision process and there is consensus on the goals for the removal action will improve the efficiency and effectiveness of the overall project.

IV. POST REMOVAL PROCESS

Under the removal action program, there are several possible post-remedial scenarios. The removal action could address all the contamination at the site such that no further actions (including Post Removal Site Controls) are necessary. "Post-removal site control" (PRSC) refers to those response activities that are necessary to sustain the integrity of a Fund-financed removal action following its conclusion. The type of post removal site control depends on the type of removal action that is chosen by the On Scene Coordination (OSC) or Federal Agency counterpart. PRSC activities therefore may be as varied as the removal action taken. Some examples of PRSC activities may be direct traditional operation and maintenance type activities or may be engineering/institutional control activities. The traditional operation and maintenance activities may be relighting gas flares, replacing filters, collecting leachate, etc. Engineering Controls (EC) may be fences/warning signs or a landfill cap for consolidation of waste in place. ICs may include restrictions on groundwater use or land use.

When it comes to the post removal process where residual contamination is left in place, DOD and CFAs have different responsibilities than EPA due to the fact that DOD and CFAs not only implement the removal action but also own the property. PRSCs are intended to continue until a permanent remedy is implemented or no further site control is needed. When EPA conducts a removal action and no further federal work is contemplated by EPA (e.g., NPL remedy), EPA attempts to work with the responsible party, subsequent property owner or State or local government to assume responsibility for maintaining PRSCs. EPA relies on other parties for PRSCs because their action is time critical and there is a limitation on the duration of EPA's removal action (two years unless an extension is granted). However, when DOD and CFAs conduct the removal action they are also the property owners. Therefore, as owners, these federal agencies have the responsibility to implement and maintain PRSCs until a permanent remedy is implemented or no further site control is necessary. Institutional controls (use restrictions, environmental covenants, etc.) are typically part of the PRSCs. States have significant roles with the implementation of institutional controls, and also are involved when federal properties are redeveloped or transferred.

Documentation of a post removal action requiring no further action would include information supporting the decision that no further response actions are necessary. Another scenario can result where the removal action addresses all contamination at the site, but PRSCs are necessary for the removal action to remain protective of human health. In this case, post removal reporting would need to demonstrate that the objectives of the removal were achieved, but would also need to provide details concerning post-removal site controls. These details would vary based on the PRSC chosen for the site, but should include who is responsible for funding, maintenance, and enforcement of the PRSCs. The third scenario is when the removal action addresses only a part of the necessary response actions, and the site needs further evaluation prior to selection of a final response action. For each of these different outcomes, the process and documentation required differs.

Post Removals Coordination

During the post removal process, coordination between the State and the lead federal agency is important since much of this process is not clearly defined in the NCP. Through coordination, the State and federal agency should agree on the objectives and scope of the removal action before the removal action is initiated. This agreement would then provide clear criteria on post removal actions that the OSC could use to determine project completion, and would also allow the State and federal agency to define future actions at the site.

One of the few requirements defined in the NCP is that the OSC decides when a project is complete. Because of this, the State and federal agency should agree on the objectives and scope of the Removal action before the action is initiated. This agreement would then provide clear criteria that the OSC could use to determine project completion, and would also allow the State and federal agency to define future actions (if necessary) at the site.

Closeout documentation and reporting is not clearly defined. EPA uses several reports for documenting the removal action: the final Pollution Report (POLREP); Superfund Comprehensive Accomplishment Plan (SCAP) reporting; and, the OSC reports. The final POLREP contains the dates of completion and demobilization and documents completion of the removal. The completion date submitted to the SCAP reporting signifies that all approved response actions outlined in the Action Memorandum (AM) have been completed. The OSC report summarizes events, analyzes the effectiveness of the removal action, and discusses problems affecting the response and the OSC's recommendations for avoiding such problems in the future.

However, the DOD documents their removal actions in a Removal Action Completion Report, which has a format similar to the Remedial Action Completion Report.

PRSC at Federal Facilities

In the federal facilities universe, Institutional Controls (ICs) can be considered part of a selected remedial action when environmental contamination is left in place at levels that do not allow for unrestricted use. In order to be effective, ICs must be appropriately documented and implemented at the facility. Adequate enforcement mechanisms and authority is necessary to ensure ICs are protective of human health and the environment.

The use of ICs at federal facilities presents unique issues due to overlapping roles and responsibilities of the federal and State governments. In addition, the federal agencies have been somewhat reluctant to place enforceable ICs on property it currently owns and/or those that are about to be transferred outside of federal control. There also are issues with the federal government's ability to place ICs on leased property where it is conducting a cleanup.

At most federal facilities, the removal actions are not EPA fund-financed actions. Therefore, there is no requirement that the State agree to fund PRSC. PRSC pose a special problem for sites proposed for transfer or no longer under federal control. One such example could be a removal action consisting of fencing a former disposal area at a FUDS site. The FUDS program would consider the action complete with the installation of the fence. Because of this, they may not fund on-going inspections or maintenance of this fence and its effectiveness, as a control will be impacted.

One example is the Hunters Point Landfill in California. At this site, the Navy placed a cap on the landfill to extinguish an underground landfill fire. After the cap was installed, methane began to migrate off-site. To address the methane problem, the Navy then constructed a gas containment system and began monthly monitoring and gas extraction when necessary. Due to the need for continued monitoring and gas extraction, the Navy will not issue a Removal Action Completion Report until the final remedy is in place. If the Navy closed out the Removal action then they would not have a mechanism to fund the necessary monitoring and gas extraction at the landfill and therefore would need to find some other mechanism. The way the Navy resolved the issues of post removal action O&M was to not close out of the original removal action that took place in 2000.

Post Removal Challenges

Since there are various reasons that federal agencies use their removal action authorities for cleanup, they may not have established a process for determining how final remedial decisions at a site will be made. At some sites, the removal action is intended to be the only response action, while at other sites, the removal may leave residual contamination issues that will need to be addressed through another federal or State cleanup action or program. In both cases, these final remedial decisions may be made long after the removals have been completed, if at all. For example, at BRAC sites, removals have been used as the primary response action to address contamination so that property transfer can be expedited. At these sites, the need for property transfer drives the schedule and prioritizes the work to be completed.

If completion of the removal action allows the property transfer to occur, the need to prepare a proposed plan and ROD formalizing a final remedial decision may no longer be a priority and may never be completed. In addition, once the removal action has been performed at a site, the risk posed by the site may be lessened so that additional necessary response actions are no longer a priority for funding, so these actions are never completed. In both situations, since there is no ROD documenting the final remedial action (even if the decision is that of no further action), there is no clear guidance concerning whether reviews of the effectiveness of the remedy are required, or when these reviews should be performed.

A different issue can occur if multiple removal actions are used to address a site due to limited funding available. At these sites, if a comprehensive site strategy was not established, there may be no mechanism developed for how the various removal actions at a site will be evaluated to determine if any additional remedial action is necessary.

One example is the FUDS program, where projects are established to address contamination at properties. There may be multiple projects (tank removals, landfills, contaminated soils), each funded separately and under its own schedule. Though there is a process to document when individual projects are completed, there may not be a mechanism established to document all necessary remedial actions are completed on the entire property. In addition, if multiple removal actions occur over several years, clean up goals established for the various removal actions may be different (due to changes in planned reuse, toxicity values, regulatory changes or additional data showing the nature and extent of contamination has changed over time).

At non-NPL sites, States can request that EPA conduct an evaluation of the removal to determine if the site should have a site inspection and HRS scoring. Under the NCP §300.420(b)(5) any person may petition the lead federal agency to perform a removal preliminary assessment. This action may take months or years depending on priorities. Once the scoring is completed, if the site score is greater than 28.5, the site could be proposed for listing on the NPL. This listing would ensure that a final remedial decision documented in a ROD would be completed. Should the site not meet the 28.5 score, and the State still has concerns, then the State should explore options to utilize their State enforcement authority.

Cleanup Goals Differing between Removal and Remedial Action

Cleanup levels should be established that would satisfy the removal and remedial programs to the extent possible. Cleanup levels for removal actions are typically less stringent than cleanup levels for remedial actions. Developing cleanup levels that can satisfy both program objectives will ensure protection of human health and the environment and ultimately result in project savings.

The design and construction work must be completed in a way that facilitates completion of additional work at the site. During design and construction of a removal action there are many decisions made that can have a dramatic affect on the success of the remedial action. Anticipating possible remedial action options and conducting the removal action in a way that is compatible with the remedial action to the extent possible will also result in improved efficiency and significant savings for the overall project.

One other issue concerns whether cleanup goals established for the removal action are consistent with those established in the final ROD for the site as a whole. Since there is a preference for the removal action to be consistent with the final remedy, the cleanup goals established for the removal may be more stringent than those derived after the site characterization has been completed. At some sites, site characterization (including a baseline risk assessment) may not have been completed prior to the decision to perform the removal action. Therefore, final cleanup goals derived from a complete site characterization cannot be established. At some sites, U.S. EPA's Region 9 preliminary remediation goals were used as clean-up goals for the removal action. These goals may be more or less protective than final remedial goals established through a remedial investigation process.

Conclusion

Federal agencies have broadly used their removal authorities at both current and former federal properties. In several situations, removal actions were performed to address contamination that posed an imminent endangerment to human health or the environment. However, in many more examples, federal agencies performed removal actions to expedite the transfer of property. This philosophy was encouraged by the Fast-Track Cleanup Process that was developed jointly by DOD and EPA to expedite property transfer and economic redevelopment by local communities. In addition, federal agencies have also used this authority to address situations when adequate funding for a comprehensive remedial action was not available. For example, due to limited funding for the FUDS program, removals were used as a means to address contamination at a site, since adequate funding necessary to complete a comprehensive remedial action may not be available for several years.

V. COMMUNITY INVOLVEMENT DURING REMOVAL ACTIONS

Removal actions vary in both their scope and duration and thus present unique community involvement (CI) challenges and opportunities. Early and continued CI and outreach (including State environmental agencies), especially during TCRAs, promotes acceptance of the removal itself as well as reduces conflict with stakeholders as the removal proceeds. The NCP sets forth specific community relations requirements that are dependent on the circumstances of the removal action. Note that these are the minimum requirements that must be met, with some States having their own requirements in lieu of the federal requirements.

To obtain a measurement of the extent to which federal agencies have satisfied CI requirements, and whether those activities have been effective, a questionnaire developed by the State of Texas was distributed to State program managers. In all, sixteen States provided responses to the nine-question survey.

The following table presents a summary of the survey results:

State	Federal Agencies Conducting Removal actions	Level of Community Involvement Acceptable	CI issues identified
Alaska	DOD, Bureau of Land Management (BLM), National Park Service, Federal Aviation Administration, Forest Service, Coast Guard	Yes and No, Depends on the agency	Navy failed to public notice EE/CA. Public lack of knowledge about process has led to issues with property transfer. Many federal land managers do not establish an administrative record.
Arizona	Army, Navy, Air Force	Generally, yes	None
California	EPA, All branches of DOD	Generally, yes	Inadequate public participation at Army property transfer. Adequate public involvement at removal action stage could have avoided community concerns.
Colorado	ACOE, FUDS	Generally, yes	Inadequate public participation at Army property transfer. Adequate public involvement at removal action stage could have avoided community concerns.
Kansas	Need to follow up	Generally, yes	None identified
Maryland	Army, Air Force, Navy	Generally, yes	Community knowledge of process could be improved
Massachusetts	Need to follow up	Generally, not adequate	Site specific issues not identified

New Mexico	ACOE, FUDS	Generally, yes	None
New York	Air Force, ACOE, FUDS, DOE	Generally, yes	Public knowledge of process could be improved at some sites
Ohio	Air Force, Army, Navy, ACOE FUDS	Improvement needed	State needs to remind agencies of their responsibilities for appropriate action. Knowledge of communities about removal process could be improved
Oklahoma	Not aware/involved in federal agency removals	N/A	N/A
South Carolina	ACOE, FUDS (limited response)	Generally, yes	None identified
Tennessee	DOE	Generally, yes	None identified
Texas	ACOE, FUDS	Generally, yes	None identified
Utah	EPA, DOD, U.S. Forest Service, ACOE, FUDS, BLM	Generally, yes with public	Federal agency involvement with State has been inadequate in some cases
Virginia	ACOE, FUDS, Navy, Air Force, NASA	Generally, yes	None identified

Overall, State responses indicated the following trends/concerns:

Responses ranged from States apparently having minimum awareness of federal agency CI activities at removal actions, to States with an in-depth knowledge, and involvement, with CI activities.

As expected, States where federal agency removal actions are more frequently conducted also report having more CI issues.

Conformance with CI requirements varies among CFAs, and within branches of DOD. However, the ACOE FUDS program apparently has achieved a consistent level of conformance with CI requirements. One State reported that although the federal agency adequately involved the community, the federal agency failed to involve the State.

Most States (of those that responded) believe the federal agency conducting the removal action has fulfilled CI requirements of the NCP.

Communities and States have had objections to the use of ICs in conjunction with Removal actions. This concern has been identified at BRAC facilities where the Removal action became the final remedy. As a result, communities and States were not as involved in the implementation of ICs, as they would have in the remedial process.

California, which has its own public involvements requirement that apply for non-NPL sites, generally reported a high level of cooperation to fulfill CI requirements.

A number of States believe the community members lack adequate knowledge of the removal/remediation process. Several States have noted problems with the ACOE FUDS program, specifically gaining access to private property.

CI Recommendations

Results of the CI survey indicate that all federal agencies should strive to improve their Community Involvement activities. For removal actions that have failed to meet the CI requirements of the NCP, the responsible federal agencies should determine the cause and degree of the noncompliance and implement measures to ensure the NCP requirements are consistently met. As indicated in Section III, Removal Action Decisions, improving CI activities, will make the preparation of the final ROD or Decision Document (DD) easier, and will enhance the working relationship with the local community and general public. This could be particularly beneficial in obtaining access agreements. Below are a number of recommendations federal agencies should consider for improving their CI process:

1. The State environmental agency should be consulted on the appropriate CI activities for the proposed Removal action, and State concerns should be considered for all Removal actions. At the minimum, the CI activities must meet NCP requirements;

2. To address the lack of consistency in the implementation of CI activities, federal agencies should use the checklist developed by EPA under OSWER Directive 9360.3-07. Federal agencies should also consider the development of specific agency CI guidance, similar to the CI requirements included in the ACOE Engineering Regulation;

3. For DOD sites included in the Defense and State Memorandum of Agreement (DSMOA), removal actions should be identified in the Joint Execution Plan (JEP) to ensure adequate State involvement;

4. If multiple removal actions are occurring at the same facility/property, CI activities can be coordinated to avoid duplication of effort; and,

5. Removal actions that are anticipated to result in a no further action determination should incorporate CI activities that will satisfy the public participation requirements of the ROD, DD, RCRA permit, or other enforceable agreement.

VI. CONCLUSION

While researching this paper, we have found that removals, properly implemented, are a valuable part of the cleanup process. However, the research also demonstrates multiple problems that can occur at removals creating both short and long term problems reducing the effectiveness and in some cases causing additional inadvertent problems. The following are recommendations gained from the research and we believe, if followed, would substantially improve removals by federal agencies.

Overall Recommendations

Federal agencies should involve the State early in the site planning and funding process.

Federal agencies should involve the State in the prioritization process of their site universe.

Federal and State agencies should consider the entire scope of the site problems in selecting appropriate removal actions and overall strategies to address all the threats from the site.

When *federal facility removal actions* are planned to be the only response action, ARARs and public involvement should be implemented in a manner that is consistent with the NCP requirements for final remedial actions. To facilitate this it is recommended that States request that the lead agency evaluate overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness as components of effectiveness during the evaluation of removal alternatives.

Federal agencies should follow EPA CERCLA guidance and coordinate with EPA on their procedures, site activities, and the potential for NPL site listing.

Coordination

Lack of coordination is the foremost problem at most removals where difficulties or unsuccessful removals have occurred. Many times federal agencies appear to be using the removal process because of a perception that State involvement and oversight is somehow diminished through that process. However, States maintain a critical oversight role during the investigation and remediation of contaminated sites located on federal lands regardless of the process being used to accomplish, the cleanup. Removal actions are an important part of this process for which the States role is not diminished. It is extremely important that federal agencies work closely with States to fully understand and plan activities associated with any action involving site cleanup. Cooperative planning and execution routinely maximizes timesaving, effort and costs, allowing for a smooth investigation and cleanup in order to facilitate property reuse.

Coordination Recommendations

The lead agency must establish an administrative record and make it available to the public at a central location. 40 CFR 300.820.

At FUDS sites, to improve access, ACOE should review its communication process for obtaining access to private property, including wording of its access notification letters.

As per OSWER Directive 9360.2-02, federal agencies should consult with State environmental agencies, concerning implementation of ICs in conjunction with removal actions. Preferably, State approval should be sought, especially in situations of property transfer, or where the remedial action will be the final remedy.

APPENDIX A: EXISTING GUIDANCE

CERCLA and NCP Requirements for Removal Actions

The first NCP was released in 1968 in response to the 1967 sinking of the Torrey Canyon oil tanker off the coast of England. The principle focus of the first NCP was on quick response to significant spills of petroleum. Today this would equate to removal actions. Consequently, the language of the NCP provided broad authority for the federal government to respond quickly to major releases of petroleum. The plan established a system for accident reporting, spill containment, and cleanup, and established a response headquarters, a national reaction team, and regional reaction teams.

In 1973, the NCP was revised to include hazardous substance spills as a result of the 1972 passage of the Clean Water Act. In response to the identification of numerous uncontrolled 'hazardous' waste facilities during the late 1970s Congress passed the CERCLA in 1980. The initial focus of the Superfund program was to address clearly hazardous conditions that posed threats to human health and the environment. At first, many sites were addressed using removal authority. The NCP was again revised in 1982 in response to the passage of the CERCLA. Again the principle focus was on the rapid response to spills or releases of hazardous substances. The 1985 amendment more fully developed the concept of the National Priorities List or NPL, which recognized the need for more long-term response actions.

The Superfund Amendments and Reauthorization Act (SARA) (1986) amended CERCLA and addressed federally owned property through Section 120. SARA, like most federal environmental legislation, empowers the President. The President delegates his powers, by Executive Order (EO) to the various federal agencies that will execute the statute. EO 12580 (1987) was the instrument that delegated certain of the President's CERCLA authority to federal agencies other than the EPA. Both the DOD and DOE were given a significant Lead Agency role at the property under their jurisdiction, custody or control. This is true whether or not the facility has been listed on the NPL.

From the initial NCP, implementing agencies had broad authority to address major spills and releases through removal actions. Succeeding revisions of the NCP refined the implementation of Removal Actions but retained the quick response and independent actions necessary to react to situations that posed an imminent and substantial endangerment to human health or the environment. The EPA has great latitude in making the determination regarding an imminent and substantial endangerment. This same latitude may be exercised by the DOD, DOE, and to a lesser extent the CFAs.

E.O. 12580 delegates all types of removal authority, including emergency removal authority, to both DOD and DOE. Other federal agencies also have a lead agent role, but their removal authority specifically excludes emergency removals (E.O. Sec. 2, (e)(1)).

EPA's removal authority, when drawing on the "Fund" is generally limited to $2 million and 12 months for a removal action (CERCLA 104 (c) (1)). The federal agencies, which

do not draw from the "Fund," have no such dollar limit restriction. Removal actions are generally defined in the NCP at §300.415. Removals fall into the following classes:

- Emergency Removals – are immediate response actions (hours or days) to mitigate or abate a release or threat of release that poses an immanent threat to public health, welfare or the environment generally requiring less than 30 days to complete response. An Action Memorandum is required (OSWER Dir. 9360.3-01) as well as the following:
    - A spokesperson shall be designated by the Lead Agency to inform the community who "shall notify, at a minimum immediately affected citizens, state and local officials,"
    - Publish a notice of availability of the administrative record file within 60 days of the initiation of on-site removal activity and place administrative record file in a central location near the site,
    - Prepare a written response to significant public comments.

- Time Critical Removal Actions (1) - require less than six months of planning time and 120 days or less to complete the removal action. An Action Memorandum is required as well as the following:
    - A spokesperson shall be designated by the Lead Agency to inform the community who "shall notify, at a minimum immediately affected citizens, state and local officials,"
    - Publish a notice of availability of the administrative record file established pursuant to CERCLA §300.820 in a major newspaper within 60 days of the initiation of on-site removal activity,
    - Provide a public comment period of not less than 30 days from the time the administrative record is available for public inspection pursuant to § 300.82(b)(2),
    - Prepare a written response to significant public comments.

- Time Critical Removal Actions (2) - require less than six months of planning time and more than 120 days to complete the removal action. An Action Memorandum is required as well as the following:
    - A spokesperson shall be designated by the Lead Agency to inform the community who "shall notify, at a minimum immediately affected citizens, state and local officials,"
    - By the end of the 120 day period of on-site activities, conduct community interviews, and prepare a formal Community Relations Plan,
    - Publish a notice of availability of the administrative record file within 60 days of the initiation of on-site removal activity and place administrative record file in a central location near the site,
    - Provide a public comment period of not less than 30 days, as appropriate,
    - Prepare a written response to significant public comments.

- Non-Time Critical Removal Actions – require six months or more of planning prior to the commencement of the removal action. An Engineering

Evaluation/Cost Analysis (EE/CA) Approval Memorandum must be prepared and approved (OSWER Dir. 9360.0-32), the completion of the EE/CA and a minimum 30 day public comment period on the EE/CA is required as well as the following:

- A spokesperson shall be designated by the Lead Agency to inform the community who "shall notify, at a minimum immediately affected citizens, state and local officials,"
- Publish a notice of availability of the administrative record file established pursuant to CERCLA §300.820 in a major newspaper within 60 days of the initiation of on-site removal activity,
- Provide a public comment period of not less than 30 days from the time the administrative record is available for public inspection pursuant to § 300.82(b)(2),
- Prepare a written response to significant public comments,
- If a sampling and analysis plan is required to for the EE/CA or removal action EPA must review and approve these plans (§300.415(b)(4)(ii)),
- Conduct community interview,
- Prepare a formal Community Relations Plan,

In addition to community relation's activities, the NCP allows for State input through ARARs. Section 300.410(i) requires that State and other ARARs be attained and TBCs considered to the extent practicable considering the exigencies of the situation.

Since removal actions were not selected under CERCLA § 121 (c), there is no statutory requirement for five-year reviews of Removal Actions.

Section 300.410(f) requires the lead agency to ensure a smooth transition from removal to remedial response actions when the removal action will not fully address the threat posed by the release.

EPA Guidance: "Superfund Removal Procedures"

This 10-volume set replaces the Superfund Removal Procedures manual, issued in February 1988. The set of document provides guidance on statutory and regulatory requirements, procedural guidelines, agency and staff roles and responsibilities, and some technical issues regarding the removal process. It is written as guidance to EPA OSC's, but it could also be applied to other CFAs. Appendix A for each volume provides a comprehensive list of more detailed supporting guidance documents and citations of referenced statutes and regulations.

A listing and summary of these guidance documents is provided below.

1. **Removal Response Decision: Site Discovery to Response Decision**. June 1998. 36p.

   Provides general guidance for OSCs regarding whether a removal action may and should be conducted. Provides an overview of the Roles and Responsibilities of the

various federal agencies involved in the removal action process, defines the interaction with the State, and identifies the procedural requirements in the context of the NCP. Pursuant to NCP section 300.110, national planning and coordination is accomplished through the National Response Team (NRT), which includes EPA, Coast Guard, DOD and the CFAs.

The Regional Response Team (RRT) parallels the NRT, except that it includes state and local representatives. The role the RRT is to develop and coordinate region-wide emergency and planning activities before a response action is taken. The specific functions of the RRT are defined in section 300.15(j)(4) of the NCP. Each State Governor is asked to designate a single office/representative to represent the state on the RRT.

2. **Action Memorandum Guidance**. December 1990. 64p.

   The Action Memo is the primary decision document that substantiates the need and identifies the actions and rationale for the Removal Action. It also reserves funding for the removal action. The volume provides detailed guidance on the procedural requirements and components of the Action Memo. An Action Memorandum Model is provided.

3. **Response Management: Removal Action Start-up to Closeout**. September 1996. 65p.

   Provides procedures for conducting Removal Actions including regarding access agreements, worker and visitor health and safety, contractor procurement and oversight, cost management, enforcement, public participation, identification and compliance with ARARs, and reporting and record keeping.

4. **Enforcement**. April 1992. 36p.

   Provides guidance for EPA OSCs on enforcement. It is generally not relevant to CFAs.

5. **Public Participation for On-Scene Coordinators: Community Relations and the Administrative Record**. July 1992. 40p.

   Summarizes the relevant public participation guidance and statutory authorities for conducting community relations and administrative record activities. It contains a Community Relations Plan Outline.

6. **Removal Response Reporting: PolReps and OSC Reports**. June 1994 86p.

   Provides guidance on preparing initial, progress, special, and final Pollution Reports (PolReps) that document the conduct of the Removal Action. The OSC Report is a concise summary of the entire removal action and is prepared at the completion of the

removal action. Section 300.165 of the NCP requires preparation of an OSC Report within one year of completion of a fund-financed removal. The guidance includes models for all of these documents.

7. **Special Circumstances**. January 1998. 65p.

   Provides useful guidance on the activities and issues of: 1) offsite storage treatment and disposal, 2) land disposal restrictions and additional requirements for PCBs and dioxins, 3) innovative treatment technologies, 4) provision of alternate water supply, 5) use of institutional controls (includes reference to coordination with state and local), 6) removal actions in floodplains and wetlands, 7) radioactive wastes, 8) naturally occurring substances, 9) conducting temporary relocations, and 10) reporting requirements for continuing releases.

8. **Guidance on the Consideration of ARARs during Removal Actions**. August 1991 31p.

   Provides an overview of the procedures for identifying and evaluating ARARs, including state ARARs, during the removal process. Addresses the use of ARARs during emergency, time-critical, and non-time-critical removal actions.

9. **State Participation in Federal-Lead Removal Actions**. December 1996. 28p.

   Identifies possible activities and roles for the state from an EPA OSC perspective.

10. **Overview Volume**- apparently never released.

    National Oil and Hazardous Substances Pollution Contingency Plan, a.k.a. National Contingency Plan (NCP) (1968, 1973, 1985, 1990)

    Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (1980)

    Superfund Amendments and Reauthorization Act (SARA) (1986)

    Executive Order 12580 (1987 and as amended)

APPENDIX B: CASE STUDIES

Voluntary Cleanup Agreement between Department of Energy and the California Department of Toxic Substances Control for Ford City Drill Sites

After substantial negotiation, California's Department of Toxic Substances Control (DTSC) entered a Voluntary Cleanup Agreement with the Department of Energy (DOE) to address potential contamination at eight drill sites. These activities demonstrate that although federal and state laws may differ on detailed administrative procedures, agreements can be reached to allow state technical oversight of federal actions and State oversight costs can be funded as an appropriate component of the action.

The site is located in the rural residential community of Ford City, Kern County, California. DOE Naval Petroleum Reserve established drill sites in the area in 1912 and the community developed around them. Congress authorized DOE to dispose of the drill sites under the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999. DOE came to DTSC for evaluation of one of the drill sites with known lead contamination. Available information indicated that lead contamination went off property into the residential neighborhood. DOE had previously been advised by Kern County that a burn dump might exist on their property. DTSC evaluated burn ash contaminated soil within the community. Lead contamination was found on residential properties due to numerous burn dumps within the community. DTSC's and EPA's Emergency Response programs partnered to cleanup the residential soil contamination. DOE agreed to investigate the other drill sites within the community.

DTSC proposed to enter into its standard Voluntary Cleanup Agreement with DOE. A great deal of time and effort went into fine-tuning the DTSC model agreement into a draft agreement that was appropriate for an agreement with a federal agency. After several iterations to the agreement it appeared that reaching acceptable agreement language was too difficult and instead of delaying the project, DOE agreed to issue a Purchase Order to DTSC to provide for funding DTSC's oversight. The Purchase Order included the Scope of Work and Cost Estimate that had previously determined to be acceptable to the two agencies. The allowed the work to proceed. A copy of this Purchase Order is attached.

DOE continued to consider DTSC proposed language for the Voluntary Cleanup Agreement. Several months later, DOE agreed to the language of the agreement and it was signed and replaced the Purchase Order governing the relationship for the site. This agreement is attached. Some of the sections of the model that were modified for DOE are: Payment procedures, Dispute Resolution, Preservation of Documents, Reservation of Rights, and DTSC and DOE Liabilities.

Case Study

Hunters Point Shipyard – PCB Hot Spot and IR-02 Time Critical Removal Actions

February 2007

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The Navy's cleanup strategy at Hunters Point Shipyard in San Francisco often involves Time Critical Removal Actions (TCRAs). As a result, the Navy and regulatory agencies struggle with many of the national questions regarding TCRAs at Federal Facilities; questions like:

- Are TCRAs implemented when an imminent threat exists or are they used for expediency purposes?
- What is the significance of the six-month planning period requirement for TCRAs (National Contingency Plan Section 300.415(b)(4))?
- Are TCRAs appropriate for initiating major remedial activities, or would the site benefit from an Engineering Evaluation and Cost Assessment (EE/CA) or a Record of Decision (ROD)?
- How does the Department of Defense apply their removal authority when disagreements arise?
- Are communities involved appropriately?

The Navy and State and Federal agencies strive to work cooperatively at Hunters Point Shipyard as the Base Realignment and Closer (BRAC) Cleanup Team (BCT). The BCT resolved many difficult issues listed above; however, still disagreements occur. This case study examines two TCRAs at Hunters Point Shipyard: the PCB Hot Spot and the Installation Restoration (IR) – 02 Northwest Radiological Disposal Area (IR-02). The case study highlights challenges and strengths of the process at Hunters Point Shipyard and provides recommendations for improvement.

Hunters Point Shipyard: History

Hunters Point Shipyard lies at the southeast corner of San Francisco and consists of 420 acres of land and 443 acres within the San Francisco Bay. The Navy divided the shipyard into seven parcels (i.e. operable units). Terrestrial parcels include A, B, C, D, E and E2, while parcel F encompasses the Navy's submerged property. The Navy transferred Parcel A to the City and County of San Francisco in January 2005 and is now being redeveloped.

Hunters Point industrial activity spans nearly one hundred and forty years. San

Franciscans built the first dry dock on the west coast there in 1867. In 1939 the Navy took possession of the shipyard and constructed a major ship repair facility for the Second World War. After the war, Hunters Point acted as a decontamination facility for ships returning from "Operation Crossroads": the 1946 Bikini Atoll nuclear bomb test. The naval shipyard closed in 1974; however, lessees continued ship maintenance and other industrial activities. The Environmental Protection Agency added Hunters Point Shipyard to the National Priority List in 1989 and in order to receive the benefits of the Base Realignment and Closure (BRAC) process the federal government included Hunters Point in BRAC law of 1991.

Polychlorinated Biphenyl (PCB) Hot Spot

The PCB Hot Spot lies in Parcel E-2 near the shoreline and industrial landfill and in an area planned for open space. The PCB Hot Spot is a suspected source for adjacent PCB contaminated San Francisco Bay sediment. Other contaminants include radiological material, petroleum, metals, and volatile and semi-volatile organic compounds (VOCs and SVOCs). However, cleanup goals exist only for PCBs, petroleum, and radionuclides. The cleanup goal is 1 milligram per kilogram (mg/kg) for PCBs in the upper 3 feet of soil and or 100 mg/kg below three feet, and 3,500 mg/kg for total petroleum hydrocarbon (TPH). Radiological remediation goals are 1 pico curies per gram (pCi/gm) over background for Radium -226 and 42.3 pC/gm for Strontium-90.

The Navy completed the PCB Hot Spot removal action in October 2006 after transporting 46,464 cubic yards (cy) of soil and 1,178 cy of large debris off-site for disposal. This included forty 15-yard bins of radioactive contaminated material. During the action, the Navy uncovered 110 drums and 537 miscellaneous waste containers. The Navy budgeted $ cost exceeded $9 million dollars.

Overview photo IR-02 (foreground) and adjacent PCB Hot Spot. Photo shows excavations, radiological screening conveyor systems and stockpiles. The Hunters Point 'landfill' is in the upper right corner and the San Francisco Bay is to the left.

IR-02 Northwest – Radiological Disposal Area

Located in Parcel E and adjacent to the PCB Hot Spot is IR-02 Northwest. This site served as a Navy disposal area for radiological devices, such as radium markers, as well as other debris like metal, wood, PCBs and asbestos. The Navy excavated 49,526 cubic yards of soil and disposed of nearly 10,000 cy of radiological soil from the 4-acre site. Contractors identified and disposed over 2,300 radiological items and 1,813 cy of general debris. The Navy stockpiled all non-radiological soil on-site for future use as backfill for the excavation. Although other contaminants of concern occur at IR-02 (metals, PCBs, asbestos), cleanup goals only address radioactive contaminants. Radiological remediation goals are similar to the ones established for the PCB Hot Spot. Confirmation

sampling included all contaminants of concern. Again the $15 million final price tag far exceeded the initial estimate of $5 million.

Case Study Analysis

Engineering Evaluation and Cost Analysis, Six-Month Planning Period and Justification

By implementing TCRAs, the Navy responds more quickly to removal action needs and avoid completing an Engineering Evaluation and Cost Analysis (EE/CA). The National Contingency Plan (NCP), Section 300.415(4) requires that the lead agency conduct an EE/CA whenever a planning period of at least six months exists before initiating on-site activities. But when does the planning period begin?

The Navy required budgeting and contracting steps necessitates a long planning period for removal actions. After an internal planning and budgeting period the Navy's formally presented the PCB Hot Spot TCRA to the agencies at a meeting in July 2004. The Navy issued a draft Action Memorandum on January 2005 and finalized the Action Memorandum May 2005. On-site activities began in June 2005. The Navy supported the IR-02 TCRA with a Radiological Action Memorandum finalized in 2000, while on-site activities began in June 2005. The 2000 Action Memorandum failed to identify the IR-02 removal, or envision large removal actions like IR-02.

Neither the NCP nor EPA guidance defines the start of the TCRA planning period. Because of Navy budgeting and contracting constraints, two or more years can elapse prior to beginning on-site TCRA activities. Thus, the Navy treats the six-month planning period as a non-binding requirement. EPA and DOD guidance can help avoid or resolve future conflicts regarding TCRA implementation.

The NCP provides general guidelines for supporting a removal action; however, the NCP does not distinguish between a time critical and non-time critical removal action, nor does the NCP define an imminent threat. The Navy cited the following conditions in support of the PCB Hot Spot TCRA:

- Actual or potential exposure of nearby populations, animals, or food chains;
- High levels of contaminants in soils largely at or near the surface that may migrate; and
- Weather conditions that may cause contaminants to migrate or be released.

These conditions exist at IR-02 as well and meet the NCP requirements for supporting a removal action. However, these sites are decades old and threats to the environment have been known for several years. While an imminent threat may not exist, the agencies and the Navy agreed on the appropriateness of the PCB Hot Spot and IR-02 removal actions.

Because the Navy implemented these removals as TCRAs, EE/CAs were not completed. However, an EE/CA would likely not alter the Navy's decision to excavate and remove contaminated soil. Radiological contamination limits the available technologies to essentially removal and disposal. However, complications (unexpected discovery of buried drums at PCB Hot Spot, greater extent of contamination and winter flooding), delays (16 months rather than 6 months), and cost overruns (nearly twice than budgeted) were not anticipated.

TCRA and the Support of the ROD

The PCB Hot Spot and IR-02 removal actions contributed significantly to the cleanup of Hunters Point Shipyard and provided valuable information on the nature and extent of contamination in the area. This information helps the Navy and agencies create a better Feasibility Study and Record of Decision (ROD). The Navy encountered PCBs exceeding cleanup goals at the bottom of the excavation and discovered that the shoreline was much more contaminated than previously thought. Further, excavating in Parcel E and E-2, the landfill area, and in areas with radiological contamination provides valuable experience that will improves costs estimates and the design of future actions.

In contrast, the Navy conducted post-ROD remedial actions excavations at Parcel B beginning in 1998. The Navy excavated over 100 sites; however, they failed to meet remediation goals. This experience led to a new site conceptual model for Parcel B, the need to re-evaluate alternatives and amend the ROD. Likewise, the PCB Hot Spot TCRA and the other Parcel E/E2 removals changed the BCT's understanding of the nature and extent of contamination at these parcels. These lessons help the BCT better prepare for the Parcel E/E2 RODs.

Navy Authority

No serious disagreements surfaced during the PCB Hot Spot TCRA and the BCT established a working relationship that fostered cooperative problem solving. While the Navy led the removal action, the Navy communicated to the BCT through weekly conference calls. During these calls the BCT identified issues and crafted solutions. Regular regulatory inspections also aided in understanding site conditions and identifying and resolving issues. These issues included: flooding and erosion control, discovery and response to buried drums, discovery and response to liquid waste, equipment malfunctions, and delays.

At IR-02, the Navy limited cleanup goals to radiological contamination although the site includes other contaminants of concern including metals and PCBs. The regulatory agencies requested that Navy dispose of all contaminated soil off-site. The BCT resolved the issue when the Navy agreed to dispose of all material not suitable for use as backfill, including: metal and other debris, asbestos, oil stained soil, and metal and PCB hot spots. Therefore, the Navy removed much of the contaminant sources and sampled all remaining soil prior to use as backfill. The Navy placed three feet of clean soil on top of this backfill.

Public Involvement

The Navy's PCB Hot Spot public involvement program included:

- public notice
- 30 day comment period,
- public repository,
- community Restoration Advisory Board (RAB) presentations, and
- a public meeting.

This program exceeds the public involvement requirements for both Time Critical and Non-Time Critical removal actions by including a public meeting and Restoration

Advisory Board participation. Although the Navy held a public meeting, the RAB involvement is most significant. Because the IR-02 TCRA was implemented under a 2000 Action Memorandum, the public involvement process was limited to RAB involvement. The Navy involved the RAB during the planning of each TCRA and provided updates as the TCRAs progressed. The RAB and Navy held a Saturday field trip to the PCB Hot Spot, IR-02, and other removal action locations.

Conclusion

The PCB Hot Spot and IR-02 TCRAs demonstrate that cooperation and communication between state, federal agencies and the Navy leads to successful removal actions. Legitimately involving state and federal agencies in removal action planning and decision-making is critical to that success. Weekly conference calls and frequent site visits helped identify and resolve issues.

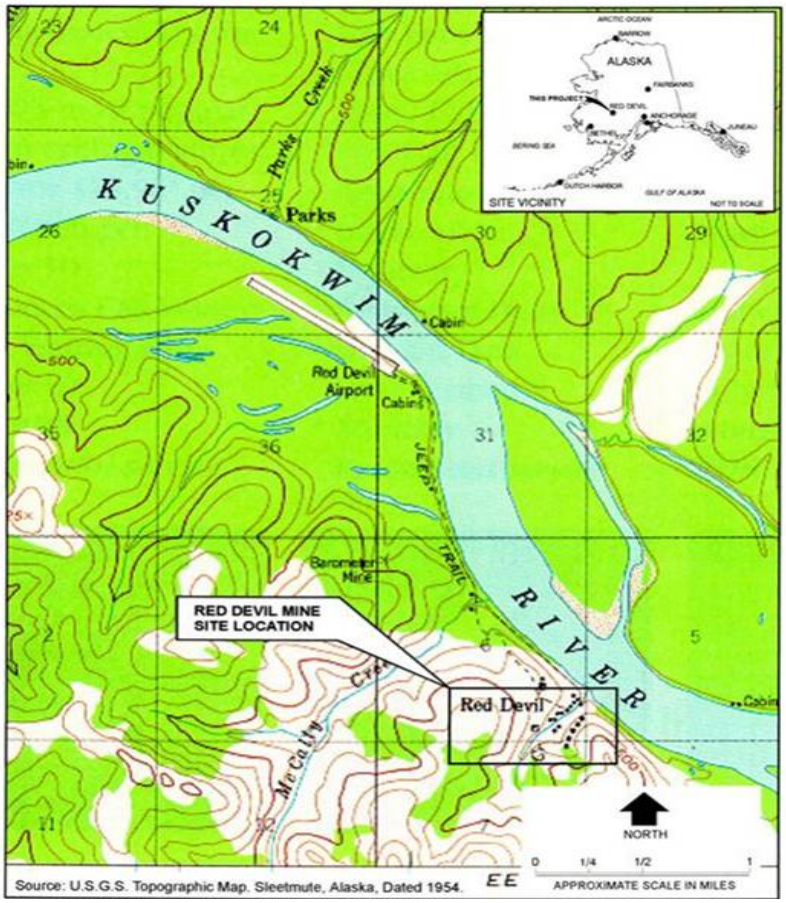
Both TCRAs were successfully implemented without the benefit of an EE/CA or ROD and provide needed environmental protection, advance cleanup and speed transfer of Hunters Point. Further, the TCRAs provide valuable information and will help the BCT produce better final remedial decisions. The Navy exceeded public involvement requirements for the PCB Hot Spot. The RAB played an important role for community involvement for each TCRA.

Less clear is whether these removal actions were truly time critical and if or how the NCP 6 month planning period requirement was met. The U.S. EPA wrote the NCP with private, EPA lead sites in mind and fails to consider the Department of Defense's conditions and processes. EPA's On-Site Coordinator role and authority supports a quick response to imminent threats, while EPA plans long-term remediation. The TCRA provides a different function at Hunters Point Shipyard. TCRAs support streamlined pre-Record of Decision cleanup actions, thus speeding cleanup and supporting reuse. More EPA and DOD guidance could clarify the appropriate use and implementation process for TCRAs.

Case Study
Red Devil Mine Red Devil, Alaska
1996-2006

History

The Red Devil Mine is a former mercury mine located on the banks of the Kuskokwim River, 250 miles west of Anchorage and 1.5 miles southeast of Red Devil (pop. 48). The mine is on 10 acres of land managed by the Bureau of Land Management (BLM) and which has been selected as a future Native patent by the Kuskokwim Native Association. Located in a small valley with fairly steeps slopes, the mine was bisected by Red Devil Creek, which flows one-half mile to the Kuskokwim River. Mine features included a housing complex, equipment and chemical storage buildings, a shop pad (laboratory), engine shop, mine portals, power plant, retort building, settling pond, and five aboveground petroleum storage tanks.



The Red Devil Mine was established in 1921 and operated continuously until 1946 when the mercury market dipped. In 1952, another mining company acquired the lease and began operating. A fire destroyed the mine and mill equipment in 1954, but it was rebuilt and operated until 1971. In 1969, open pit mining began and by 1970, the Red Devil Mine was the largest mercury producer in Alaska and one of the largest in the U.S. The mine shut down in 1971 when the mercury market dropped and has not operated since. During its lifetime, the mine produced approximately 35,000 flasks (76 lbs. per flask) of mercury.

Contamination

The U.S. Environmental Protection Agency first inspected the site in late 1971 and collected water and sediment samples. Elevated mercury concentrations of up to 9,000 micrograms per liter (ug/L) were found in the settling pond. Subsequent sampling investigations by EPA, ADEC, BLM, and the U.S. Geological Survey were conducted at the mine and surrounding areas

between 1979 and 2004. The sum of these investigations showed elevated concentrations of metals and petroleum in the soils around the retort building, as high as 73,300 mg/kg of mercury, 6100 milligrams per kilogram (mg/kg) of antimony, 7190 mg/kg of arsenic, and diesel-range organics at 13,600 mg/kg. This correlated to approximately 250 cubic yards of RCRA-regulated (arsenic or mercury) hazardous waste.

Mine tailings with elevated levels of antimony, arsenic, and mercury were used throughout the site as fill: the highest measured concentration from monitoring wells was 129 ug/L arsenic and 5.3 ug/L mercury. Sediment samples from Red Devil Creek contained the highest concentrations of antimony 6680 mg/kg, arsenic 5150 mg/kg, and mercury 250 mg/kg. Other contamination included asbestos and lead-based paint present in the housing complex buildings, elevated levels of diesel-range organics and benzene in the soils at the Fuel Storage Area, and elevated lead (13,500 mg/kg) in the soils at the Battery Storage Area.

Initial Attempts at Resolution

In 1990 EPA reviewed the site and said that it planned no further action at the site under CERCLA and turned the site over for State-lead. ADEC added the site to its list of contaminated sites and ranked it in 1995. In July 1998, BLM submitted a "Draft Limited Waste Removal Work Plan," for limited waste removal at the Red Devil Mine site. That September, ADEC requested a revised plan, asking for additional sampling and documentation. BLM conducted waste identification and removal in the summer of 1999. Approximately 100 batteries, mercury contaminated slag, mineral processing chemicals, and liquid wastes (petroleum products and solvents) were removed. Five large fuel storage tanks were found to be empty and free of sludge, with no contamination identified in adjacent soils.

2002-3 Removal Actions

Apparent pressure to clean up the land to make it available for transfer prompted BLM to take action in 2002. The agency submitted a work plan to ADEC for a "landfill." Informally, BLM representatives told ADEC's solid Waste Program that they were not required to obtain approvals from the State for the work in the draft plan and that it was merely advisory in nature. The BLM moved equipment onto the site in June 2002 without State approval.

Work that summer included building demolition, debris removal and on-site disposal of various materials. Two monofills were created without State permits and without review and approval by the State Solid Waste program:

- Monofill #1 (4400 cy) holds building debris, concrete, wood, scrap metal, crushed drums, 3 vehicles, 23 drained non-PCB transformers, and Category 1 and II asbestos-containing materials.
- Monofill #2 (930 cy) contains the retort bricks and retort slag (hazardous waste treated with arsenic and mercury encapsulant to prevent leaching); retort building debris (non-hazardous waste treated with mercury encapsulant) and untreated general building debris. A 60-mil geomembrane liner was placed on top of the retort building concrete pad and some surrounding treated soils. The retort bricks, slag, and debris were placed on top of the liner and capped with another liner. Processed tailings pile soil was treated and used as capping and void-filling material. Appropriate quality control sampling was not conducted, thus it is unknown if encapsulation was effective.
- A third monofill was created in 2003 to dispose of the aboveground tanks and ore hopper.

2005-6 Removal Actions

In 2005, BLM began removing petroleum-contaminated soil from the area of the five

aboveground storage tanks and the fueling pipeline, in accordance with an approved workplan. The workplan stated that excavation would occur in 2005 and disposal/treatment in 2006. Very little characterization work had been performed prior to the start of the removal action. Contractors discovered a larger volume of contaminated soil than anticipated, and not all of the contamination could be excavated in 2005. Additional contaminated soil was excavated in 2006 and still more contamination remains in-situ at Tank 5. Approximately 3000 cubic yards of contaminated soil has been excavated and stored in a lined and covered cell. BLM has now stated that they do not have funding to continue the removal, or dispose of or treat, the soil in 2007. As of April 2007, BLM has yet to provide a draft report to ADEC citing contracting issues. The report was due in Fall 2006.

State Concerns Not Addressed In Removal Actions

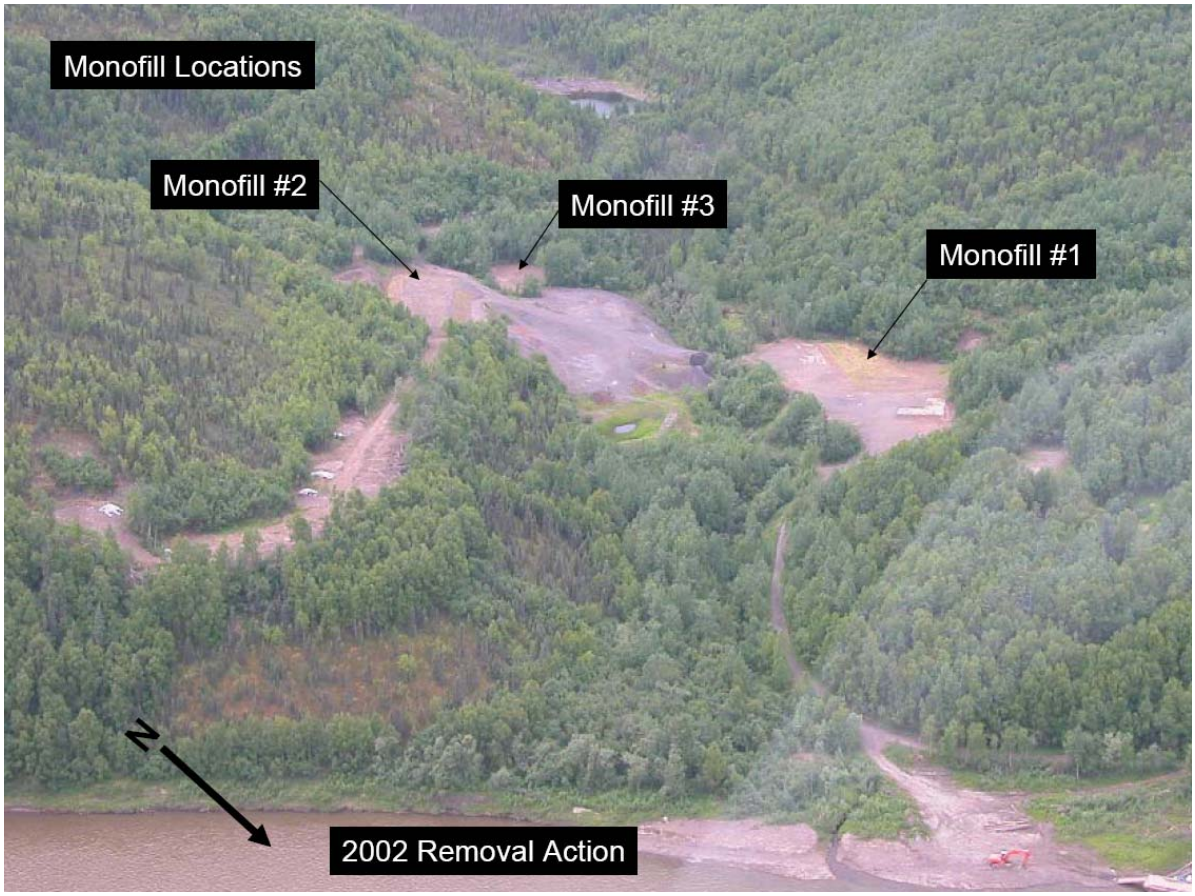
BLM has spent a considerable amount of money at the Red Devil Mine site, mostly dismantling and burying the structural hazards that remained. BLM has stated that following the petroleum cleanup, it will not need to conduct further work at the site. BLM hopes to be able to transfer this property to the Kuskokwim Native Association.

The State has several concerns, which were not addressed in the Removal Action:

Problems:

- Site investigations have indicated mercury-contaminated soil and tailings remain at the site above the ADEC cleanup level. The retort building's concrete floor slab is cracked – soil borings through the slab revealed the presence of free phase mercury not addressed in removal (the monofill was created on top of the slab). Additional borings around the edges of the pad also show free phase mercury not covered by the monofill. Potential future migration of the free mercury has not been studied, addressed or even acknowledged by BLM.
- Tailings were placed in the monofill from unidentified areas around the site without sampling the soil left in place or assessing the remaining risk posed by residual contamination. Additional tailings piles are spread throughout the site, including Red Devil Creek, but their locations have not been documented or characterized.
- Contaminated sediments in Red Devil Creek and in the former settling ponds exceed screening values and have not been addressed. Mercury levels in Red Devil Creek and the Kuskokwim River are below the Maximum Contaminant Levels for drinking water but the concentrations have not yet been evaluated under the Alaska Water Quality Standards for potential impacts to ecological receptors.
- There are potential ecological impacts from the mine that have not been evaluated.
- Long-term groundwater and surface water monitoring has not been formally established.
- A sufficient Risk Assessment has not been conducted.
- Institutional Controls sufficient to ensure the integrity of the monofills and a Five-Year Review schedule have not been agreed upon by the agencies.

For additional information regarding contamination issues at the Red Devil Mine, please contact:
Alaska Dept. of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501Phone:
(907) 269-7503


Monofill Locations
Monofill #2
Monofill #3
Monofill #1
N
2002 Removal Action

Closed Soil Stockpile at End of FY-05 Field Work.
Cell Holds About 1,400 CY Screened Soil

Case Study
Former Adak Naval Complex Rifle Grenade Range
(RG-01) 1996-2006

History

Military occupation of Adak Island began on August 30, 1942, two months after Japanese troops landed on the Aleutian Islands of Attu and Kiska. Adak was developed as a forward operating and staging base for U.S. Army Air Corps forces to dislodge the Japanese (See map).

Following World War II, the U.S. Air Force (succeeding the Air Corps) used Adak, and turned the island's facilities over to the Navy in 1950. The Adak Naval Complex served as the base of operations for the North Pacific submarine monitoring network and other purposes through the Cold War.

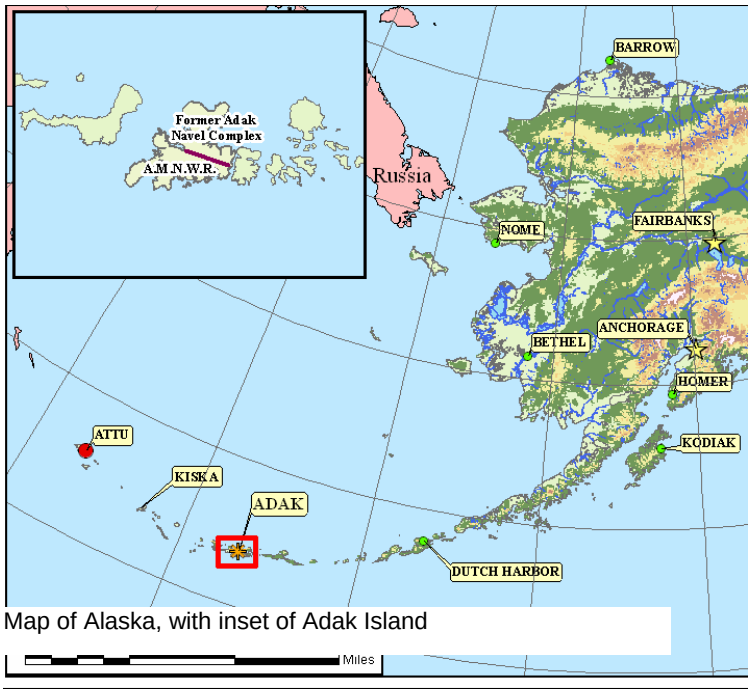


Figure 1: Map of Alaska, with inset of Adak Island

Contamination

In 1986, the Navy first investigated contamination and other environmental issues at the base. The Navy, the Environmental Protection Agency (EPA) and the Alaska Department of Environmental Conservation (ADEC) signed a Federal Facilities Agreement (FFA) for the Adak Naval Complex in November 1993. Adak was put on the National Priority List in May 1994.

Contaminated sites on the island were divided into two management areas. Operable Unit A includes petroleum sites and hazardous substance release sites under CERCLA. Operable Unit (OU) B includes sites with munitions contamination. OUB was further divided in two to facilitate relinquishment of lands to US Department of the Interior (DOI) and subsequent transfer to the US Fish and Wildlife Service, The Aleut Corporation, the City of Adak and the State of Alaska Department of Transportation. OUB-1 contains the majority of the WWII munitions sites located across the base. A Record of Decision (ROD) was executed for OUB-1 in 2001. Many sites from this OU have been designated no further action (NOFA); four sites require additional action. OUB-2 includes the areas used more recently for small arms and other munitions training by the Navy and WWII impacts.

On March 31, 1997, active Navy management of the island ceased. The facilities were transferred to the new property owners in 2004. The Navy has spent over $300 Million cleaning up CERCLA, petroleum, and munitions contamination remaining from military activities on Adak, and this work continues

today. This cleanup has included over $50 Million associated with successful munitions site investigations and cleanup. The Navy retains about 5,400 acres of the former base encompassing both OU B-1 and OU B-2 sites, where all of the munitions sites requiring further action are located.

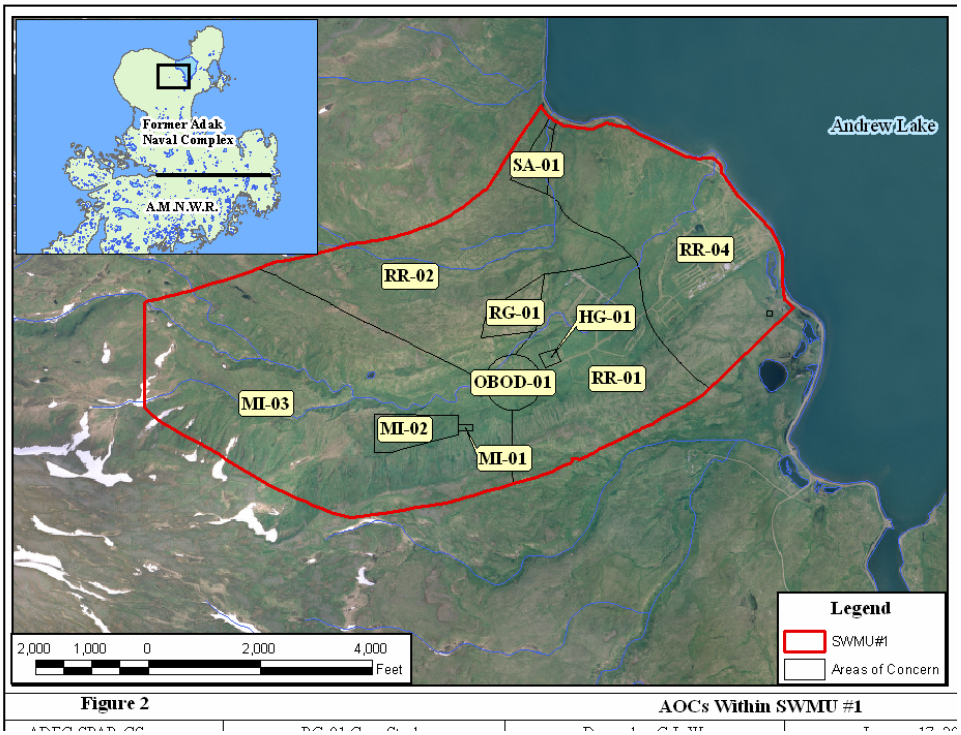


Figure 2 AOC's Within SWMU #1

Adak Today

About 140 people reside on the island year-round, with increasing numbers of summer visitors. People visit the island for hunting, fishing, hiking, bird watching, and historical interest. Adak serves as a major fuel supply center and seafood transfer point for fishing boats along the Aleutian chain. Adak will soon be the staging and docking site for missile defense floating radar platform (X-band radar).

Figure 2: Areas of concern within Solid waste Management Unit #1, Including RG-01

Operable Unit B-2, SWMU #1

One of the areas most heavily contaminated with munitions and related debris on Adak lies within OUB-2 and west of Lake Andrew. Identified as Solid Waste Management Unit (SWMU) #1 (see Figure 2 at right), it includes small arms and machine gun ranges, a hand grenade range, mortar impact area, an open burning and open detonation area, and this paper's feature, a 40mm (millimeter) projected grenade range (RG-01).

The first site investigation of munitions contamination at SWMU #1 occurred in 1996. An Explosives Ordnance Disposal (EOD) unit surveyed the boundaries of the ranges within SWMU#1 but did not conduct intrusive investigations of RG-01 due to the sensitive nature of the 40mm projected grenade. Normal EOD policy at the time was to burn off vegetation and blow the 40mm in place. The island's thick tundra mat and high precipitation made this impractical. The sensitive nature of the 40mm munition prevented additional site

investigation in RG-01. This site was evaluated in the Preliminary Assessment/Site Investigation (PA/SI) phase of the investigation and forwarded on to the

A 40mm projectile grenade, next to a pocket knife found in SWMU #1.During 1999 Site investigations.

Feasibility Study (FS).

Primary Munitions and Explosives of Concern (MEC)

The Primary MEC at this site is the 40mm projected grenade. It incorporates an extremely sensitive fuse, designed to detonate the round regardless of how it lands. This makes it one of the most hazardous unexploded ordnance (UXO) known. The soft, cushiony tundra of Adak left many rounds unexploded.

ESHA Methodology

The Navy, EPA and ADEC developed a methodology to assess risk or hazard at the former Adak Naval Complex's munitions sites that is consistent with CERCLA principles and acceptable to Adak stakeholders. The Explosive Safety Hazard Assessment (ESHA) methodology ranks relative hazard at sites on a scale of "A" to "E," the lowest to the greatest. Sites ranked "A" or "B" were designated "No Further Action" and are subject to baseline Institutional Controls, which include UXO/Ordnance Awareness training.

Initial Attempts at Resolution

The Navy submitted three drafts of a Remedial Investigation/Feasibility Study (RI/FS) report for OUB-2 to EPA and ADEC for review between 2002 and 2004. Due to the complex nature of the sites, and disagreements between Adak stakeholders, these documents were not finalized. Here is a summary of the recommendations for RG-01:

2002 Draft RI/FS

- ESHA score of D (site requires further evaluation in the FS)
- Preferred alternative: clearance to 4 feet below ground surface [bgs].
- Estimated $5.5 million to implement.
- Navy policy has been not to remediate OUB-2 sites unless it was technically practical to render all of Parcel 4 relinquishable to Department of Interior.

2003 Draft Final RI/FS

- ESHA score remained D.
- No preferred alternative.
- No cost estimate.
- No remedy selected due to technical impracticality of clearance to 4 ft. bgs and an unacceptable risk to site workers.

2004 Draft Final RI/FS

- New alternative: Herbicide application to kill the vegetation, prescribed vegetation burn by helio-torch, UXO survey, and clearance of ordnance and explosives to 4 feet bgs.
- Estimated $5 million to implement.

Non-Time Critical Removal Action in 2006

Even though OU B-2, RG-01, did not have a signed Record of Decision (ROD), the Navy decided to implement a Non-Time Critical Removal Action (NTCRA) for RG-01 because of the high hazard at the site.

The Navy intended to execute the fieldwork for the NTCRA in the 2006 field season. Prior to executing this action the Navy needed to complete a CERLCA Engineering Evaluation/Cost Analysis and an Action Memorandum. In addition, given the Navy's desire that this removal action be the final action for this site, the Navy needed to coordinate the technical components of the work with ADEC and EPA.

Conducting these actions within a short period of time requires significant interagency coordination, clearly defined schedules, and clear agreement on the removal action technical approach. The planning process for the NTCRA at RG-01 did not run smoothly. This section identifies several issues encountered during the execution of the work.

The Navy admitted to the State of Alaska, the EPA and the Adak Restoration Advisory Board that mistakes were made during project planning. The Navy noted the NTCRA planning was completed by a junior Navy remedial project manager and a contractor new to Adak. These two factors contributed significantly to the issues identified herein. The Navy identified in writing how they planned to address the identified issues and has made strides towards meeting this plan.

The purpose of the following discussion is to stress the importance of resourcing munitions projects with experienced DOD and contractor staff. This increases the likelihood of success, and minimizes project team review and oversight efforts.

Issue 1:

Planning document was developed without input from the project team.

In January 2006, the Navy submitted a Conceptual Plan for conducting the NTCRA at RG-01. Neither EPA nor ADEC were consulted prior to submission of this plan. Both responded to the plan in February 2006. The EPA sent a follow-up letter requesting a schedule for the NTCRA deliverables on March 15, 2006.

The Navy did not provide a schedule. Since the Navy intended to conduct this work during the 2006 field season, a schedule for the sequential submittals required under CERCLA was critical for effective project management and stakeholder consensus building.

Issue 2

The Navy's proposal for the NTCRA involved methodology, which would not detect deeper ordnance items.

The plan was to conduct a magnetometer-assisted surface and sub-surface clearance of munitions from the site. Vegetation would be cleared using gas-powered weed eaters where necessary. Munitions would be surveyed and cleared to the depth of detection, but not to exceed the depth of bedrock or two feet below ground surface.

"Ground surface" on Adak, means the top of the mineral soil. In many cases on Adak the tundra mat can be as much as 2-3 feet thick**.** The actual depth of detection for the instrumentation specified by the Navy would likely be 17 inches or less. In many areas on Adak this depth of detection would not reach the bottom of the tundra layer.

Issue 3

The timing of document submission, agency review, and public comment was not conducive for gaining regulatory and stakeholder buy-in. Note the timeline during 2006:

On April 14, the Navy gave the agencies draft versions of four documents:

- Engineering Evaluation/Cost Analysis,
- Action Memorandum,
- Munitions and Explosives of Concern Work Plan, and
- Quality Control Plan.

Typically, these documents are released sequentially, giving the agencies and the public opportunity to be involved and ensure consensus between the involved parties. Given the poor quality of the deliverables, a significant change in the proposed removal action, and the concurrent submittal of sequential deliverables, the documents required significant revisions.

ADEC submitted important comments on the April draft and a June draft final of the

Engineering Evaluation/Cost Analysis (EE/CA). The EE/CA is intended to present the remediation options for the sites, including analysis of the nine National Contingency Plan criteria.

July 24: The Navy offered the Final EE/CA.
July 19: EPA issued approval for all of the documents.
July 28: DEC issued approval.

The affected public was not notified until the State objected.

June 17: (a Saturday) the Navy published a notice in the Anchorage Daily News of proposed plan for the RG-01, starting the public comment period. Eight days later, the Navy notified the Department of the public notice and a correction being published, changing the document from a Proposed Plan to an EE/CA. Both notices stated that the Department supported this work, when in fact; DEC approval was not given for another month.

The public notices were not provided to the Restoration Advisory Board or residents of Adak. Only the Sunday and Thursday Papers are delivered to Adak. The affected public had no way of knowing that the document was available for review and comment. The Department objected and the Navy published a correction in the paper, posted the revised and approved EE/CA on the Adak Update website, and extended the public comment period.

ADEC submitted comments on April and July drafts of the Action Memorandum. This document presents the selected remedy and the justification for this decision. The Navy resolved these comments and issued the final on September 8, as fieldwork began.

ADEC submitted significant comments on the draft (April) and two draft final (July and August) versions of the Munitions and Explosives of Concern Work Plan and Quality Control Plan. ADEC provided verbal concurrence for the Navy to begin work at RG-01 on September 6. The Navy issued the Final version of the work plan on September 7. The Navy agreed to conduct follow-up Digital Geophysical Mapping (DGM) at RG-01 to confirm the adequacy of the removal action. While follow-up DGM is not typically required for standard "Mag and Dig" clearance projects, the Navy agreed to conduct the DGM survey to alleviate ADEC's concerns over the adequacy of the work plan.

The Navy's contractor began mobilizing to Adak in late August. By August 27, 2006, the contractor was on site awaiting approval to begin work.

Issue 4

The site description presented in the work plan did not match actual site conditions.

When the Navy's remediation contractor for RG-01 initially mobilized to Adak the Navy Technical Representative identified an area to the west of RG-01 as RG-01. This area matched the site description in the work plan. The work plan describes the eastern portion of the site as *"relatively flat and marshy with areas of standing water throughout..."*

When the contractor surveyed in the actual location of RG-01, they found that the entire site is located on a steep hillside, with slopes ranging from 10 to 15 degrees across the eastern portion and greater than 20 degrees on the western portion. A significant part of the western section exceeds 30 degrees (see Figure 3).

Based on this inaccurate site description, ADEC, EPA, the Navy, and its contractor realized that follow-up DGM would not be feasible across the entire site to confirm the adequacy of the removal action. The Project team agreed to conduct DGM over the eastern half of RG-01 (where slopes are less than 30 degrees). The slope in this area is amenable to DGM and the majority of the Munitions and Explosives of Concern (MEC) items were removed from the eastern half of the site (Figure 4).

RG-01 NTCRA Results

The Navy's contractor conducted the survey and removal of ordnance at RG-01 between September 7 and October 4 in 2006. The after action report indicates that 145 MEC items were located and removed from the site, 138 of which were 40mm grenades. Figure 4 shows the location of MEC items removed from RG-01. The work was completed without injury.

According to the Navy the 2006 RG-01 field activities were completed for approximately $1 Million. In the RI/FS reports, the estimated costs to complete remediation at RG-01 ranged from $5 to $5.5 million. However, work at RG-01 is not complete and additional costs are anticipated.

The Digital Geophysical Mapping will be conducted on the eastern portion of the site. The Navy also determined, based on the QC parameters presented in the work plan, that additional work needed to be performed beyond the site boundaries, to the east. There was not enough time in the 2006 field season to complete the work. This work is planned for the 2008 field season.

Lessons Learned

The following is a brief summary of the important "Lessons Learned" through the implementation of the NTCRA at RG-01.

- Sequential documents (EE/CA, Action Memorandum, work plan) should be developed individually to support consensus building and limit revisions to multiple documents. The project team should work through the process.
- Develop consensus with project team members prior to submitting planning documents, not through revisions.
- Better preparation by contractor. This was the first time the contractor conducted munitions work on Adak and they were not familiar with site-specific issues.
- Ensure a good understanding of actual site conditions and use current geographical mapping tools. Existing GIS data accurately portrayed the slope of RG-01.

For additional information regarding munitions issues at the Former Adak Naval Complex please contact:

Alaska Dept. of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501
Phone: (907) 269-7503

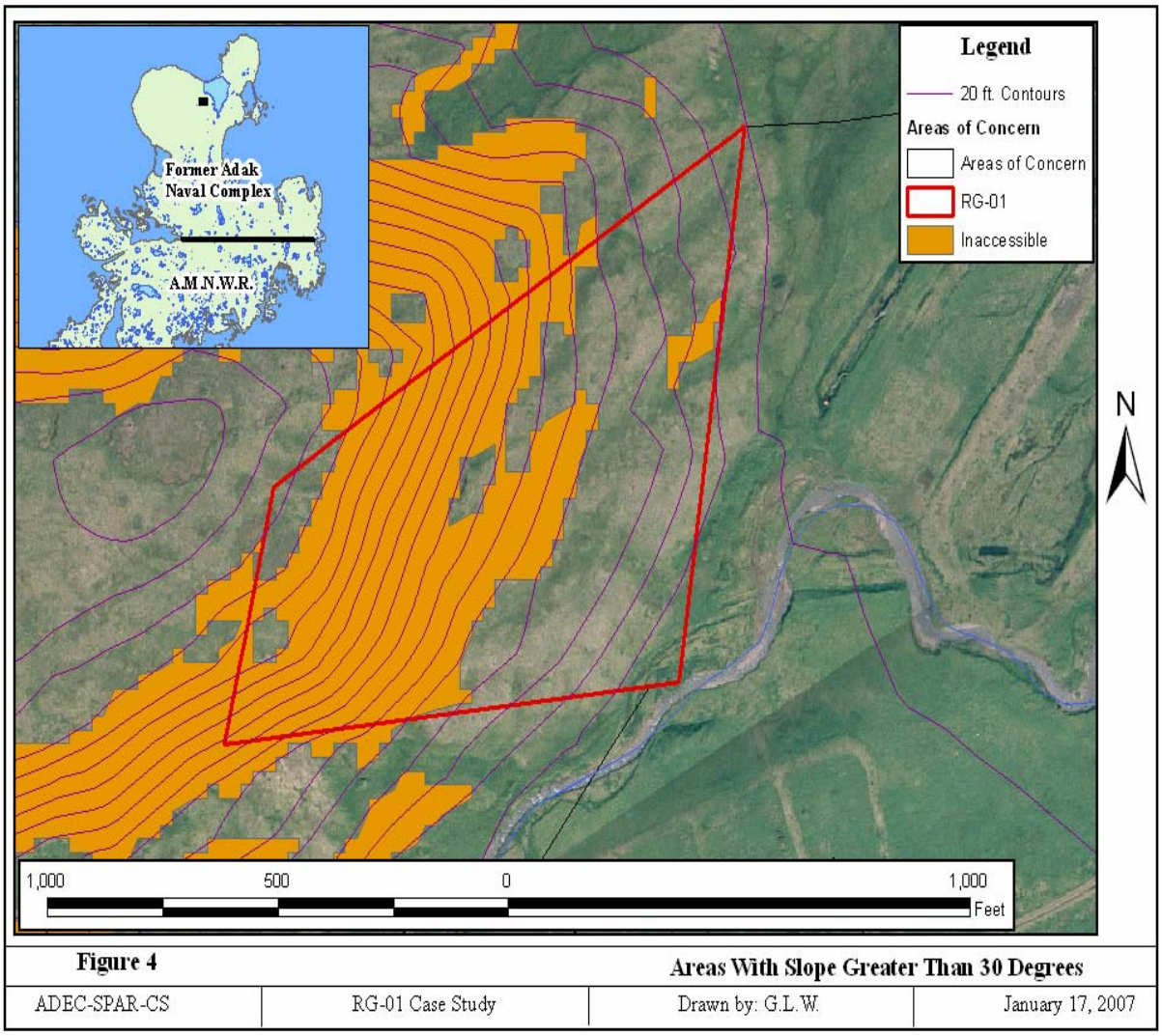


Figure 4		Areas With Slope Greater Than 30 Degrees	
ADEC-SPAR-CS	RG-01 Case Study	Drawn by: G.L.W.	January 17, 2007

Figure 3

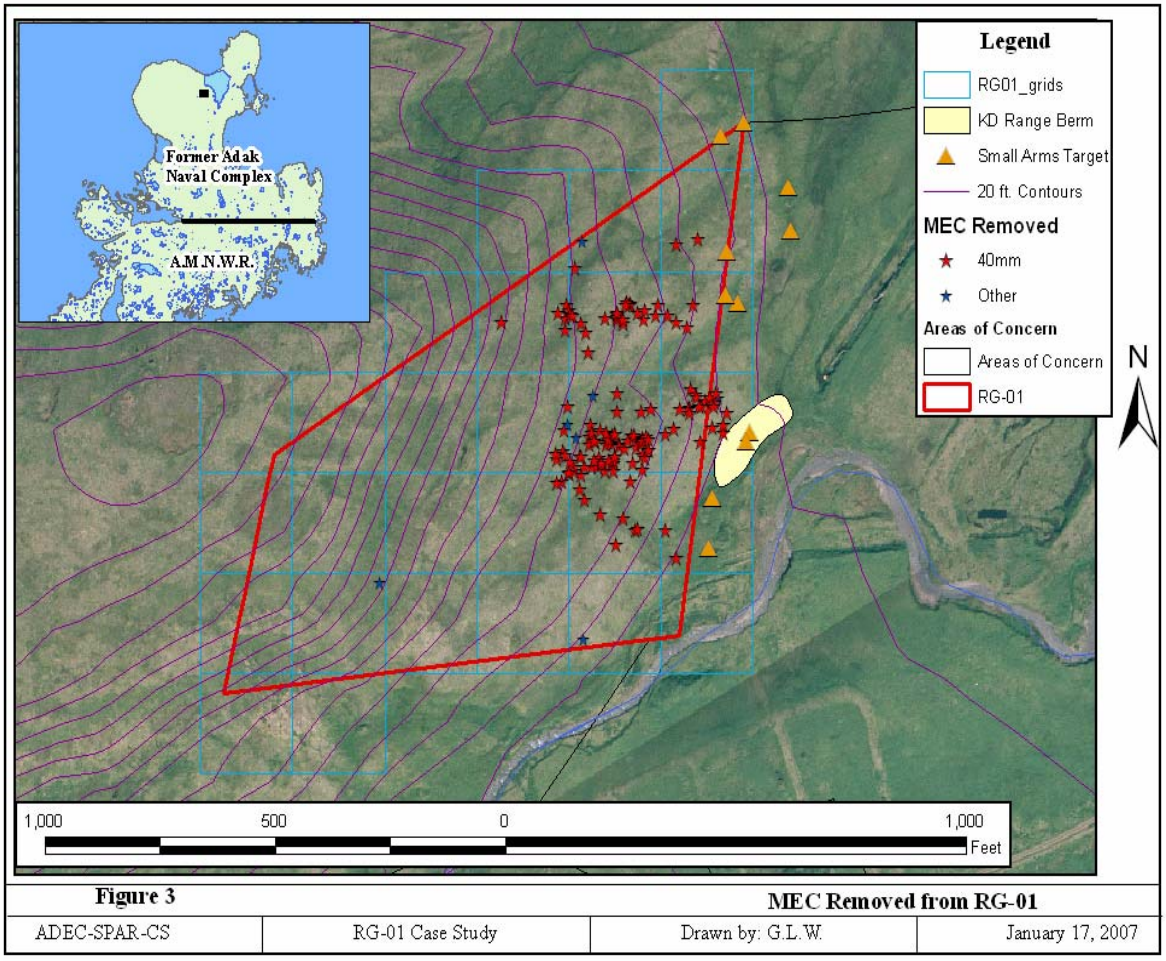

Former Adak Naval Complex
A.M.N.W.R.
Legend
RG01_grids
KD Range Berm
Small Arms Target
20 ft. Contours
MEC Removed
40mm
Other
Areas of Concern
Areas of Concern
RG-01
N
1,000
500
0
1,000
Feet
Figure 3
MEC Removed from RG-01
ADEC-SPAR-CS
RG-01 Case Study
Drawn by: G.L.W.
January 17, 2007

Figure 4

Case Study ***Community/Regulator Involvement at the Camp Swift FUDS in Texas***

In FY2000, the U.S. Army Corps of Engineers (COE) began planning its remedial investigation/feasibility study (RI/FS) (formerly known as engineering evaluation/cost analysis) for munitions and explosives of concern (MEC) at the former Camp Swift Formerly Used Defense Site (FUDS). Since that time, the COE has routinely sought involvement of the regulators and the community, while it continues its investigation and remedial activities. In 2003, community involvement was of paramount importance, as the COE initiated a time critical removal action (TCRA) for unexploded ordnance.

The COE recognized early on that community involvement was not only a priority, but also a necessity given the circumstances at former Camp Swift. Large tracts of land had been redeveloped into private residences. It was not until 2000, through notification by the COE, that private homeowners became aware of the former use of their property. As expected many homeowners were upset, however, the COE continued to keep lines of communication open with the public as they requested rights of entry. In addition to public meetings, additional community involvement tools included distribution of fliers with frequently asked questions, and a COE Camp Swift webpage for more information. During this period the COE held a Technical Project Planning (TPP) meeting involving representatives of multiple State regulatory agencies, EPA Region 6, and large landowners including the Boy Scouts of America, and the Lower Colorado River Authority. This meeting laid the groundwork for future information exchange between the stakeholders. In 2003, the COE performed a TCRA to clear ordnance on a 21-acre tract of land to be developed into a new elementary school by the Bastrop Independent School District. In addition to holding a public meeting prior to conducting the TCRA, the COE also issued a press release, and sent letters to homeowners informing them of the planned TCRA. Upon completion of the TCRA the COE informed local residents of the results of this action.

In summary, the COE used multiple lines of communication throughout the TCRA and non-TCRA removal processes to keep community members, and regulators, informed of the project status.

APPENDIX C: MUNITIONS

Association of State and Territorial
ASTSWMO
Solid Waste Management Officials

444 North Capitol Street, N.W., Suite 315
Washington, D.C. 20001
tel: (202) 624-5828 fax: (202) 624-7875
www.astswmo.org

March 26, 2002

Mr. John Paul Woodley, Jr.
Assistant Deputy Under Secretary of Defense (Environment)
Room 3E787
3400 Pentagon
Washington, DC 20301-3400

Dear Mr. Woodley:

On January 14, 2002 the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Board of Directors reviewed and endorsed the December 20, 2001 charter developed by the Munitions Response Committee (MRC) composed of State organizations (ASTSWMO, ECOS, ITRC, NAAG), EPA, and DOD.

The Board welcomed the development of a collaborative, decision-making process for munitions response actions, which acknowledges State authority. We look forward to working closely with the MRC and Col. John Selstrom in developing the process for States' review and approval of adequacy of munitions response actions, and in achieving the other outcomes outlined in the charter.

Sincerely,

Mark F. Giesfeldt
ASTSMWO President

Cc. Stan Phillippe, CA
Jennifer Roberts, AK
Howard Rhitman, CO
Clarence Smith, IL
Jim Woolford, EPA
Paul Cotter, NAAG

December 20, 2001

CHARTER
DoD-EPA-Tribal-States MUNITIONS RESPONSE COMMITTEE

Operating within the framework of existing Federal and State authorities, the Committee will coordinate, identify and synchronize efforts among the Office of the Secretary of Defense (OSD), the Military Services, the U.S. Environmental Protection Agency, Native Americans and Alaskan Natives, and the States to ensure munitions responses (for locations on other than operational ranges) are conducted in a manner that protects public health and the environment while allowing the military to fulfill its mission.

In some cases, disputes regarding the respective authorities of States, tribes DoD and EPA have hindered munitions response actions. To overcome these problems, the Committee is committed to develop collaborative decision-making processes for munitions response actions as outlined in the desired outcomes section of this charter.

The Committee will strive to achieve consensus on policy and technical recommendations for consideration by DoD, EPA, and States. The Committee recognizes the need for appropriate additional governmental and non-governmental stakeholder involvement.

PARTICIPATION

TRIBES:

- National Congress of the American Indian representatives will report actions, progress, and challenges to membership

STATES:

- Environmental Council of States (ECOS)-Commissioner level oversight, representatives will report actions, progress, and challenges back to ECOS-DoD Forum.
- Association of State and Territorial Solid Waste Management Officials (ASTSWMO)-State managers responsible for policy development and implementation. The ASTSWMO Federal Facility Research Sub-committee members and a limited number of support States will draft policy and process for review and comment of all state members.
- National Association of Attorneys General (NAAG)-responsible for legal representation and counsel to States.
- Interstate Technology and Regulatory Cooperation-provides States with a forum for development of technical guidance, training, and support.

ENVIRONMENTAL PROTECTION AGENCY

- Federal Facility Restoration and Reuse Office (FFRRO)
- Federal Facility Enforcement Office (FFEO)

DEPARTMENT OF DEFENSE

- Office of the Secretary of Defense
  - Deputy Under Secretary of Defense of Installations and Environment (I&E)
  - Department of Defense Explosives Safety Board (DDESB)
  - Operational and Environmental Executive Steering Committee for Munitions (OEESCM)
- Department of the Army
  - Deputy Assistant Secretary of the Army (Environment, Safety, & Occupational Health)
  - Army Staff
  - Army Corps of Engineers
- Department of the Navy
  - Office of the Deputy Assistant Secretary of the Navy (Installations and Environment)
  - Navy Staff
  - Marine Staff
- Department of the Air Force
  - Office of the Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health)
  - Air Staff

OTHERS: The Committee will develop procedures to include representation from other appropriate Federal Agencies and local governments

DESIRED OUTCOMES:

- Collaborative decision-making processes that are acceptable to all parties. When agreed to, these collaborative processes will:
  - Afford, subject to the processes developed for dispute resolution and reservations of rights, the States the opportunity to review and approve the adequacy of munitions response actions.
  - Be endorsed for universal adoption by the Federal agencies, tribal representatives and the state organizations represented on this committee.

- Promote consistency in approach across Tribes, States, EPA, and Military Services regarding:
  - Procedures and methods for investigation and subsequent response actions
  - Methods for prioritizing response actions
- Address complexity and scope of cleanup challenges
  - Provide for policy and technical guidance for improving munitions response actions.
  - Foster development and validation of improved technologies
  - Seek adequate funding for protective response actions
- Ensure protectiveness of response actions
  - Protect response personnel, the public, and the environment from explosives hazards and other risks during response actions
  - Ensure safe cleanup levels for public health and environment
  - Develop methods that address
    - DoD s come-back commitment
    - Institutional controls
    - Consideration of future land use
- Provide Munitions Response lessons learned to appropriate forums for consideration

Attachment B

Collaborative Decision Making
(Mutual Agreement Process)

The Federal Land Managers, and States, American Indians and Alaska Natives and various Federal agencies (including the Department of Defense (DoD), the U.S. Environmental Protection Agency (USEPA) and other Federal Land Managers) have the shared goal of reducing the risks at munitions response areas and munitions response sites. These organizations recognize that there are differing views of each organization's respective authorities regarding munitions responses. Also, they recognize that resolving these differing views through litigation is costly, time-consuming and diverts resources. The organizations agree instead to develop and use a collaborative decision-making (CDM) process for munitions responses to obtain mutual agreement at critical decision points. The CDM process will:

- Outline an integrated, coordinated approach for planning and conducting munitions response actions
- Identify key decision points in the munitions response process
- Use a process based on mutual agreement
- Describe a tiered partnering (dispute resolution) process for resolving conflicts.

Memorialization of CDM Process

After the MRC has reached agreement on the CDM process, the MRC parties will memorialize the agreement in the following manner:

- DoD will issue implementing guidance (e.g., directive, instruction, joint Service instructions) that sets forth the CDM process.
- State MRC members will seek to have their respective state organizations (i.e., ECOS, NAAG, ASTSWMO) adopt resolutions endorsing the CDM process.
- DoD may publish a Federal Register Notice that sets forth the CDM process; DoD will seek to jointly publish the CDM process with USEPA and the Federal Land Managers.
- USEPA will include the CDM Process in its guidelines concerning munitions response.

Mutual Agreement

Mutual agreement at critical decision points throughout the munitions response process is essential. Examples of critical decision points include:

- Site determination,
- Removal/Remedial Action determination,
- Removal/Remedial Investigation work plan development,
- Remedy selection, and
- Completion of response action activities.

"Mutual Agreement" is defined as "a meeting of the minds on a specific subject, and a manifestation of intent of the parties to do or refrain from doing some specific act or acts." Inherent in any mutual agreement or collaborative process are the acknowledgement of each member's role in the process and their differing views of their authorities. The mutual agreement process will provide an alternative means of resolving differences without denying the parties an opportunity to exercise their respective authorities should mutual agreement fail to be achieved.

Tiered Partnering (Dispute Resolution) and Reservation of Rights

The purpose of the tiered partnering (dispute resolution) process is to resolve disputes at the lowest possible level of authority as expeditiously as possible. In the absence of a site-specific agreement providing for dispute resolution, this is normally accomplished through an informal process.

When the on-site project managers are unable to reach agreement at a critical decision point, within 10 working days of such failure to agree, they will refer the matter in writing to the appropriate mid-level managers.

Should the appropriate mid-level managers be unable to reach agreement, within 10 working days of such failure to agree, they shall refer the matter to the appropriate Military Department Deputy Assistant Secretary and appropriate senior management (such as the state agency/department head) for resolution.

If the Military Department Deputy Assistant Secretary and the appropriate senior management (such as the state agency/department head) are unable to resolve the dispute, pursuant to the dispute resolution process, each party reserves its rights to assert any claims or defenses it may have, and to take any administrative or judicial action within its authority.

Agreements

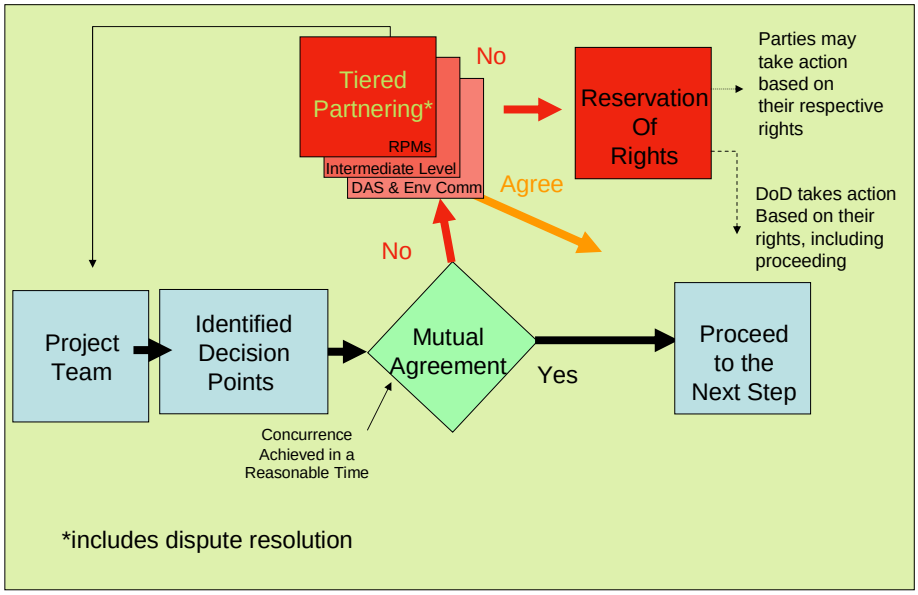
The MRC:

- Understands that DoD has a strong preference for using the CDM process as a means to mitigate the desire for state-wide or site-specific agreements. It also recognizes that some states, tribes, Federal Land Managers, and USEPA may nonetheless desire such agreements due to legal constraints or policy preferences. In such cases, the Military Departments retain the discretion to enter into such agreements whenever they deem it appropriate to do so.

- Understands that where all parties agree that a state-wide or site-specific agreement entered into under each party's respective authorities is necessary, the agreement shall include concepts similar to those described in the CDM process regarding dispute resolution and reservation of rights.

- Understands that the mutual agreement process does not supersede these agreements.

Process-Flow Diagram



APPENDIX D: LIST OF ACRONYMS

ACOE	Army Corps of Engineers
AM	Action Memorandum
ARARS	Applicable Relevant and Appropriate Requirements
BRAC	Base Realignment and Closure
BLM	Bureau of Land Management
CA	Cooperative Agreement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Civilian Federal Agencies
CFR	Code of Federal Regulations
CI	Community Involvement
COC	Contaminate of Concern
DD	Decision Document
DOD	Department of Defense
DOE	Department of Energy
DSMOA	Defense State Memorandum of Agreement
DTSC	Department of Toxic Substances Control (California)
EC	Engineering Control
EE/CA	Engineering Evaluation and Cost Assessment
EO	Executive Order
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FUDS	Formerly Used Defense Site
HRS	Hazard Ranking System
IC	Institutional Control
JEP	Joint Execution Plan
MCL	Maximum Contaminate Level
MCLG	Maximum Contaminate Level Goal
NASA	National Aeronautics and Space Administration
NCP	National Contingency Plan
NPL	National Priority List
NRT	National Response Team
NTCRA	Non-Time-Critical Removal Action

O & M	Operation and Maintenance
OSC	On-Scene Coordinator
OSWER	Office of Solid Waste Emergency Response
PA	Preliminary Assessment
POLREP	Pollution Report
PRSC	Post-Removal Site Controls
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RRT	Regional Response Team
RSE	Removal Site Evaluation
SARA	Superfund Amendments and Reauthorization Act
SCAP	Superfund Comprehensive Accomplishment Report
SI	Site Inspection
TBC	To Be Considered
TCRA	Time Critical Removal Action
US	United States
USC	United States Code