Marine Corps Air Station El Toro
Installation Restoration Program

Public Information Materials

8/6/97
Restoration Advisory Board Meeting
held at Irvine City Hall
Irvine, CA

Materials/Handouts Include:

- Sign-in sheets - 5/28/97 RAB meeting
- RAB meeting agenda/Public notice - 8/6/96 RAB meeting.
- RAB draft meeting minutes - 5/28/97 RAB meeting.
- Public meeting overview - Proposed Plan No Further Action Sites, 7/31/97
- Where to go to get more information - MCAS El Toro information repository/points of contact list
- MCAS El Toro project mailing list coupon.
- MCAS El Toro project web site information.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- Executive Summary Draft Final Phase II Remedial Investigation/Feasibility Study Addendum, Site 25 - Major Drainages, MCAS El Toro, April 1997.
- Executive Summary Draft Final Phase II Remedial Investigation Report, OU-3A Sites, MCAS El Toro, June 1997.
- U.S. EPA, "Guide to Developing Superfund Records of Decision," May 1990.
- U.S. EPA Comfort Letter Clarifying NPL Listing, Uncontaminated Parcel Identifications, and CERCLA Liability Issues Involving Transfers of Federally Owned Property, June 5, 1997. Includes as attachment, "Revised Guidance on U.S. EPA Concurrence in the Identification of Uncontaminated Parcels Under CERCLA Section 120 (h)(4)", March 27, 1997.
- Presentation - Operable Unit 3 (OU-3), MCAS El Toro, by Bernie Lindsey, Remedial Project Manager.
- Presentation - Records of Decision, by Andy Piszkin, Remedial Project Manager.
- MCAS El Toro Schedule Update, Federal Facility Agreement - 8/6/97.

- <u>Agency Comments - U.S. Environmental Protection Agency</u>
  - U.S. EPA Technical Comments, Draft Ground Water Remediation Pilot Test Work Plan for MCAS El Toro, June 17, 1997.
  - U.S. EPA Technical Comments, Draft Ground Water Remediation Work Plan and Draft Quality Assurance Project Plan for MCAS El Toro, July 3, 1997.

- <u>Agency Comments - Cal-EPA, Department of Toxic Substances Control</u>
  - Cal EPA DTSC Technical Comments, Draft Groundwater Remediation Pilot Test Work Plan for MCAS El Toro, June 24, 1997.
  - Cal EPA DTSC Technical Comments, Draft Record of Decision (ROD) for Site 24, Operable Unit 2A - Vadose Zone, MCAS El Toro, July 23, 1997.

MCAS El Toro
Restoration Advisory Board
Meeting

6 August 1997 6:30-9:00 PM
Irvine City Hall
Conference and Training Center
One Civic Center Plaza
Irvine

AGENDA

Welcome/Introductions/Agenda Review (6:30-6:40)	Joseph Joyce Marine Corps/Navy RAB Co-chair
Old Business (6:40-6:50)	
Approval of 5/28/97 Minutes	Greg Hurley RAB Community Co-chair
New Business (6:50-8:30)	
Regulatory Agency Comment Update (6:50-7:05)	Glenn Kistner U.S. Environmental Protection Agency Tayseer Mahmoud Cal-EPA, Dept. of Toxic Substances Control
Update on Shallow Soil Sites (OU-3) (7:05-7:35) + No Further Action Proposed Plan + Potential Remedial Alternatives	Bernie Lindsey U.S. Navy/Southwest Division
Records of Decision (RODs) - MCAS El Toro (7:35-7:50) + Purpose of the Documents + Requirements and Content Included	Andy Piszkin U.S. Navy/Southwest Division
Break (7:50-7:55)	
Update on Federal Facilities Agreement Schedule (7:55-8:10) + Operable Units + Public Comment Periods	Andy Piszkin
Update on Public Participation (8:10-8:30) +RAB Member Input	Joseph Joyce Greg Hurley
Meeting Summary (8:30-8:50)	Greg Hurley
Meeting Evaluation	
Future Topics and Meetings	
Closing (8:50-9:00)	Joseph Joyce & Greg Hurley

P U B L I C N O T I C E

MARINE CORPS AIR STATION EL TORO

Restoration Advisory Board Meeting

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Participate in the environmental restoration and cleanup program underway at MCAS El Toro. Your input is welcome!

Wednesday, August 6, 1997
6:30 - 9:00 p.m.

Irvine City Hall
Conference and Training Center
One Civic Center Plaza, Irvine

This meeting will feature the following activities and presentations:

- ***Update on Operable Unit 3 Sites:***
  - ***No Further Action Proposed Plan (Eleven sites)***
  - ***Potential Remedial Alternatives (Three sites)***
- ***Records of Decision - Purpose and Requirements***
- ***Cleanup Program Schedule Update***

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For more information about this meeting and the Installation Restoration Program at MCAS El Toro, please contact:

Commanding General
AC/S, Environment (1AU)
Attn: Mr. Joseph Joyce, MCAS El Toro
P.O. Box 95001, Santa Ana, CA 92709-5001
(714) 726-3470 or 726-3386

MARINE CORPS AIR STATION EL TORO

RESTORATION ADVISORY BOARD MEETING

May 28, 1997

DRAFT MEETING MINUTES

A Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, May 28, 1997 at the Irvine City Hall. The meeting began at 6:35 p.m. These minutes summarize the discussions and presentations from the meeting.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Mr. Joseph Joyce Marine Corps/Navy RAB Co-Chair, welcomed everyone to the meeting and introduced Mr. Greg Hurley, the RAB Community Co-Chair. Mr. Hurley provided some background information on himself stating that he is an environmental lawyer with an office in Irvine and a resident of Laguna Beach. He represents Orange County and other agencies and consults on environmental issues. Self introductions were made by all in attendance. During the introductions, Tom Mathews, Orange County Environmental Management Agency, stated that his agency was recently reorganized into two departments: (1) Public Facilities and Research Department and (2) Planning and Development Services. He introduced George Witt who oversees all environmental documentation and Gary Simon who oversees El Toro reuse and planning issues. Mr. Joyce also announced that Ms. Gail Reavis is the RAB's newest member.

Mr. Joyce reminded RAB members that tonight's meeting serves as the second part of the RAB's request to experiment and have questions answered during presentations instead of waiting until presentations are completed. For this meeting, questions and answers will be dealt with as they arise during presentations. The RAB will then evaluate this format and the one used at the previous RAB meeting when questions and answers were handled following each presentation. The Co-Chairs reviewed the meeting agenda.

OLD BUSINESS

Review and Approval of March 26, 1997 Meeting Minutes

The RAB minutes were approved without amendment.

Review of Parking Lot Issues from March 26, 1997 RAB Meeting

- ***Institutional controls*** - The Department of Defense is finalizing Draft Instructions on Institutional Controls and they will be provided when available.

- ***El Toro fuel pipeline*** - For information regarding fuel supply pipelines that originate in Norwalk and run to MCAS El Toro, contact: *Joseph V. Trany, Environmental Engineer, Defense Fuel Supply Center, 3171 North Gaffey Street, San Pedro, CA 90731-1099. His phone number is (562) 335-3090.*

Summary of 4/30/97 RAB Subcommittee, Dr. Chuck Bennett, Chairperson Operable Unit 2A Subcommittee

Dr. Bennett said the subcommittee met to discuss the Proposed Plan for Soil Vapor Extraction (SVE) for cleanup of soil at Site 24, the Volatile Organic Source (VOC) Area. Eleven people attended the meeting and there was a good exchange of information and views. The meeting resulted in the development of a series of questions or points for discussion directed at the project team regarding the technical aspects of the proposed SVE system. Dr. Bennett provided an overhead with the four key questions. He stated that the subcommittee would like to have these issues addressed at tonight's meeting.

Point A: What is the basis of the cleanup targets of 27 parts per billion (ppb) of trichloroethene (TCE) and 69 ppb of perchloroethene (PCE) in the soil? What is the basis and rationale for these goals? How are these targets justified? What will happen when the SVE vacuum system is turned off? Will any "rebound" encountered mean any targets are exceeded?

Point B: The Norton Air Force Base soil remediation was similar to the plan being proposed for El Toro, what has been the degree of success at Norton? Can we learn something from the process at Norton that will make the process at El Toro more efficient or cheaper?

Enid Cohn, RAB member, mentioned that the soil at Norton is cobblier than at El Toro and it is easier for vapors to be extracted. Pat Brooks, CLEAN II project manager for the Site 24 investigation and SVE pilot tests, responded that the geologic cross-sections at Norton indicate there is a lot of fine-grained material similar to El Toro. Mr. Joyce stated that the SVE pilot tests conducted to test the appropriateness of using this technology were demonstrated to be very effective in both one-day and longer-term tests. To date, over 800 pounds of TCE has been removed from the soil during the pilot tests.

Point C: With the presentation of this Proposed Plan for Site 24, have the schedules for the other operable units and corresponding Records of Decision been altered?

Point D: Dr. Bennett reminded RAB members that the "official" comment period (April 30 - May 30, 1997) for Site 24, the VOC Source Area, is nearly over. He said that the agencies are required to provide responses to Site 24 Proposed Plan comments raised during this comment period. He stated that any comments made prior to the official comment period must be resubmitted and that all comments pertaining to the SVE proposal must submitted in writing prior to end of the comment period.

Mr. Joyce responded that individuals providing written comments will not receive a personal response. Significant comments will be addressed in the Responsiveness Summary section of the Record of Decision. Mr. Hurley said that the public comment period provides the RAB with an opportunity to be truly effective in regard to this issue. Dr. Bennett pointed out that the Proposed Plan did not include a "street" address for sending comments via overnight mail service, only a p.o. box address and fax number were included. Mr. Joyce provided the street address: *Mr. Joseph Joyce, Base Realignment and Closure (BRAC) Environmental Coordinator, AC/S Environment (1AU), MCAS El Toro, Building T-2010, Santa Ana, CA 92709-5001. The fax number is (714) 726-6586.*

The subcommittee meeting also discussed the inactivity of the OU-3 subcommittee. RAB members determined that this inactivity is partly the result of a nonparticpatory subcommittee chairperson. RAB members decided that the next subcommittee meeting should focus on OU-3 issues, most notably the Draft Remedial Investigation Report for the OU-3A sites that was mailed to all OU-3 subcommittee members. RAB members present selected a new OU-3 subcommittee chairperson, Mr. Dan Mountford, after it was determined that the current subcommittee chairperson, Mr. Richard Olquin, has not been fulfilling his responsibilities per the RAB's Mission Statement.

NEW BUSINESS

Mr. Joyce reminded RAB members to feel free to ask questions at any time during any of the presentations.

Update on Groundwater, Joseph Joyce, RAB Co-Chair

- **Status of Department of Navy/Orange County Water District Negotiations**

Mr. Joyce provided some background information regarding the feasibility of the Marine Corps and the Orange County Water District (OCWD) working together on a joint project to remediate contaminated groundwater. The Marine Corps is responsible for cleaning up water impacted by TCE from the Station while the OCWD would treat groundwater to remove total dissolved solids (TDS) and nitrates that are present. TDS and nitrates are not related to Marine Corps activities. Currently, negotiations are underway and the Marine Corps is awaiting a response from OCWD regarding such a joint project. Roy Herndon, OCWD representative on the RAB, stated that a response is forthcoming in the next few weeks. He also said that Irvine Ranch Water District (IRWD) staff has been involved the past couple of months discussing the project concept, liability issues, and costs with the IRWD Board. OCWD has just received these comments and those will be factored into OCWD's response to the Marine Corps.

- **Separation of Site 24 Soil and Groundwater**

The Base Realignment and Closure Team (BCT), comprised of the Marine Corps, U.S. Environmental Protection Agency (U.S. EPA), and the California Environmental Protection Agency (Cal-EPA), previously examined ways to take quicker action at Site 24 and still comply with the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) while the negotiations are proceeding. The BCT agreed to first focus on the VOC-contaminated soil at Site 24 and follow up later with actions that address VOC-contaminated groundwater. This strategy will allow for faster cleanup of the soil and for the overall VOC Source Area.

The proposed SVE system will be designed to prevent further migration of TCE from the soil into the groundwater. As stated earlier, pilot testing has been conducted on the SVE process. Also, the Marine Corps continues to sample and test the groundwater to monitor the TCE plume.

RAB members asked if the negotiations concerning the groundwater project impact the schedule. Mr. Joyce said that the schedule has been impacted because the response from OCWD was expected in February and the response is still forthcoming. This also has put a delay on developing a Proposed Plan, holding the public comment period, and preparing the subsequent Record of Decision. Mr. Joyce said it would be premature to speculate on the response from OCWD. He said it is inappropriate to provide details on the offer during the negotiation stage. Mr. Joyce said a presentation would be made to the RAB regarding this issue at the appropriate time.

RAB members requested a rundown of the schedule for all the operable units and RODs. Mr. Joyce said he is not prepared to do that tonight but he said that there are changes to these schedules. He advised that schedule information would be best provided at a future RAB meeting.

Update on the Volatile Organic Compound Source Area (Site 24) - Bernie Lindsey, Remedial Project Manager (RPM), Southwest Division Naval Facilities Engineering Command

Mr. Joyce introduced Mr. Lindsey and reminded RAB members to ask questions at any time. To begin his presentation, Mr. Lindsey took a minute to acknowledge technical review support provided to the Marine Corps and Navy from U.S. EPA and Cal-EPA remedial project managers, and from the CLEAN II team, the Navy's contractor that develops technical reports and other documentation. Mr. Lindsey wanted to inform the RAB that an overall team effort is involved even though it may appear that the Marine Corps and Navy perform all necessary tasks.

Mr. Lindsey then displayed overheads showing aerial photos of the entire Station and Site 24, the VOC Source Area. He also showed an illustration depicting the zone of subsurface soil that is contaminated with TCE and a map that presented the plume of contaminated groundwater in the principal aquifer that emanates from the site.

- **May 15, 1997 Public Meeting - Site 24 Soil Vapor Extraction Proposed Plan**

Mr. Lindsey provided RAB members with an overview of the public meeting. He explained that various tables and accompanying information displays were set up throughout the room. They were specific to MCAS El Toro with the focus on the remedial investigation and feasibility study (RI/FS) conducted for Site 24, and U.S. EPA's presumptive remedy approach for VOC-contaminated soil. Each table was staffed appropriately with Marine Corps, Navy, Agency, and contractor personnel to answer questions, provide information, and discuss issues. Key reports and documents were available for review and numerous handouts specific to the RI/FS and SVE process were available. A court reporter was present for individuals to provide comments on the SVE Proposed Plan. When people entered the meeting, they were greeted individually and given a brief rundown of the meeting format. They were encouraged to provide any comments they had on the Proposed Plan to the court reporter or to use the comment form and meeting evaluation form provided by the greeters upon entering the room. Mr. Lindsey said that the feedback and responses on the meeting evaluation forms from those that attended the meeting were quite positive.

Mr. Lindsey's synopsis of the public meeting sparked a lively discussion on public meeting formats that dominated the remainder of the RAB meeting. Below are some of the points made during this dialog.

Don Zweifel, RAB member, said that the public meeting was an exhibition and not a meeting. He said a meeting involves a presentation with questions and answers. Mr. Lindsey responded that the requirements of CERCLA, the federal law that guides the public participation process for the Department of Defense's Installation Restoration Program, were followed in conducting the meeting. Mr. Joyce said that a presentation using the storyboard approach was provided at each display table and members of the community could ask questions at each information display table. Additionally, Mr. Joyce emphasized that those in attendance provided positive feedback on how the meeting was conducted. Mr. Glenn Kistner, U.S. EPA Remedial Project Manager, participated at the meeting along with Mr. Andy Bain, U.S. EPA Community Involvement Coordinator. Mr. Kistner said that Mr. Bain acknowledged to him that the format for the public meeting met the CERCLA requirements and that this approach breaks new ground when compared to traditional meeting formats. Also, Mr. Kistner said that the meeting was a very efficient way for educating interested individuals and that questions can be answered personally. Mr. Lindsey reiterated that people could come in on their own time and have a dialog with experts on hand and get their questions answered. Dr. Bennett said that he disagrees with the meeting format used and that this

was not a public meeting and not an effective way for sharing information. Mr. Joyce encouraged members of the RAB to attend the next public meeting to get the information firsthand and evaluate the meeting to see if the information they need is provided. Gail Reavis, RAB member, who attended the public meeting, said that announcements in the media and to the community were insufficient for publicizing the meeting. She said she personally contacted the newspapers and informed them about the meeting. Ms. Cohn said that as a forum for public comment the meeting format was lacking and that people do not understand that they should direct questions and comments to the court reporter. She suggested that people need to be informed that the court reporter is there so they can communicate their comments or questions for inclusion in the public record. She added that it may be advisable to have a court reporter at each of the information tables or signage to direct people to the court reporter. Mr. Joyce thanked Ms. Cohn for offering the suggestions and informed those in attendance that all staff working at the tables, as well as public participation specialists from U.S. EPA and Cal-EPA, explained to individuals the importance of providing questions and comments to the court reporter so they could be incorporated into the public record. He said that at the next public meeting individual signs would be used at each table to direct individuals to the court reporter so any comments people have will be included in the public record. He also stated that the focus of those working at each of the tables was to provide information and to direct people to the court reporter to provide public comments. Marcia Randolph, RAB member, who attended the public meeting, felt that information presented pertaining to the investigation and proposed cleanup was done effectively. She felt that it was not the type of format that gave people the feeling that what they said would make a difference like at town hall meeting. She suggested a format with an open house, followed by a presentation, and a subsequent opportunity for comments and questions and answers. RAB members were interested to know if the news media was present. Mr. Joyce said that reporters from the *Orange County Register* and *Irvine World News* attended the meeting.

RAB members were informed that approximately 35 people from the public attended the meeting. Of these people, nine provided verbal comments to the court reporter, two others provided written comments, and 16 submitted meeting evaluation forms.

Mr. Hurley suggested that constructive criticism on public meeting formats should be provided to him in writing and he will forward them to Mr. Joyce. It was agreed that this topic should be an agenda item at the next RAB meeting so feedback from meeting evaluations from the May 15 meeting and the next public meeting can be considered.

- **Site 24 SVE Pilot Testing**

Mr. Lindsey explained that the purpose of the pilot tests was to determine the effectiveness of SVE specific to Site 24. The TCE-contaminated soil at Site 24 is in the subsurface soil located above the water table. Tests determined the rate of removal of TCE from the test wells. Mr. Lindsey provided the results of three longer-term pilot tests

and results are expressed as "TCE concentrations versus the time the SVE system operated".

Mr. Lindsey explained that SVE is a process that physically separates VOCs from the soil. By applying a vacuum to a SVE well, the vacuum pulls air from within the soil to the surface. VOCs, of which TCE is the primary contaminant, are present as vapor within this air. This vapor is passed through an activated carbon filter to trap VOCs, clean air is then discharged to the atmosphere. When the activated carbon filters become saturated with VOCs, the carbon is returned to the manufacturer where it is regenerated and the VOCs are destroyed.

Test No. 1 was conducted at one well for two-and-a-half weeks and 253 pounds of TCE were removed. At the beginning of the test the concentrations of TCE removed started at approximately 1300 micrograms per liter (μg/L) and dropped to 400 μg/L at the end of the test. Test No. 2 was conducted at the same well as Test No. 1 approximately six months later. During Test No. 2, the SVE system operated for ten-and-a-half weeks and 251 pounds of TCE were removed. At the beginning of the test the concentrations of TCE removed started at 700 μg/L and dropped to less than 200 μg/L at the end of the test. He explained that "rebound" occurs, thus the starting point for Test No. 2 was 300 μg/L higher than the completion of Test No. 1. Results were typical for SVE tests even though rebound occurs. The key is that the second test did not start at 1300 μg/L. Test No. 3 was conducted at a different well in another area of Site 24 for approximately four-and-half weeks and 310 pounds of TCE were removed.

In response to RAB members questions regarding rebound, Mr. Lindsey said that during pilot tests you will see a rebound when the equipment is turned off. The system is purposely turned off to monitor the rebound effect. Pilot tests are a snapshot to gauge effectiveness of the SVE process. The actual cleanup proposal calls for a 2-4 year period of operating the system. He explained that decisions on system modification and when to turn on and shut off the system are done during the design phase, after construction of the system, and during the cleanup phase to maximize efficiency of the SVE system. He added that evaluation of an operational system is ongoing process to increase efficiency and removal of VOCs.

Mr. Lindsey explained that any VOCs present in the vadose zone of soil above the groundwater table are removed by the SVE system. These compounds include TCE, PCE, and freon. Test results demonstrate that SVE is an effective method of removing VOCs from vadose zone soil at Site 24. The goal of the cleanup is to reduce VOC concentrations in the soil to prevent or minimize further impact to the shallow groundwater. The contaminated soil at Site 24 (subsurface soil located above the water table) serves as the source and starting point for groundwater contamination that is present in the regional groundwater.

To respond to Point A from Dr. Bennett's subcommittee meeting presentation, Mr. Lindsey explained that the rationale of achieving cleanup levels in the soil of 27 μg/L or less for TCE and 69 μg/L or less for PCE are: (1) the migration of these contaminants into the groundwater will be minimized, and (2) these cleanup goals for soil are established to meet the cleanup goals for groundwater at the point of compliance inside the Station boundary. At the point of compliance, TCE present in the groundwater must comply with the maximum contaminant level of 5 parts per billion (ppb) or less. These cleanup goals for soil are defined as threshold soil vapor concentrations. Concentrations above the threshold levels reflect soil conditions that have the potential to contaminate groundwater above the federal standards, which are called maximum contaminant levels or MCLs. These threshold concentrations for soil are calculated using Henry's constant (a numerical value associated with specific chemicals) and are based on site- and chemical-specific factors presented in the Draft Final Remedial Investigation/Feasibility Study Reports. The only VOCs in the soil that impact groundwater above the MCLs are TCE and PCE. Mr. Joyce reiterated that if the soil is cleaned up to 27 μg/L or less for TCE and 69 μg/L or less for PCE then the groundwater extracted at the point of compliance will comply with the federal drinking water standard and be protective of public health for VOCs. He further explained that extensive monitoring and confirmation sampling will be performed to determine when the cleanup goals are met. The system will be operated as long as necessary to achieve these goals and specific decisions will be made during cleanup operations.

The issue of deed restrictions for Site 24 was raised. Mr. Joyce explained that deed restrictions are not foreseen except to drill groundwater and/or SVE wells and for the Marine Corps to have access for monitoring and operation of the wells and for whatever is necessary for operating in-place remediation systems.

A meeting attendee raised the question of risk to human health from exposure to contaminated soil at Site 24. He expressed a concern for members of the local community from contracting cancer from contaminants at the site. It was explained that there is no "pathway" for people to be exposed to soil at Site 24 since most of the area has a concrete surface and that the surface soils do not contain high enough concentrations of VOCs to pose a risk to human health. Mr. Joyce explained that the risk assessment is site-specific and takes the most conservative approach assuming that a child would be playing in the soil and consuming soil daily. The risk assessment also assumes an adult would be living at the site over a 30-year period. Specifically, the risk assessment performed for the soil estimated that the chance of contracting cancer from exposure to these soils, if one was exposed over a 30-year period, is approximately *five chances in one billion*. This is well below the U.S. EPA range of protection of public health for VOCs. To manage carcinogenic risk and protect public health, the U.S. EPA has set a protective risk level not to exceed the range at *one person in a population of ten thousand to one person in a population of one million.*

Mr. Joyce and Mr. Hurley did a time check and asked the RAB if they would like to continue with this issue or move on to the next presentation that covers the OU-3 Sites and the No Further Action proposal for ten sites and potential remedial alternatives for three others. RAB members, by a show of hands, decided to further discuss Site 24 issues and focus on OU-3 at the next RAB subcommittee meeting. Mr. Lindsey offered to participate at the subcommittee meeting and provide necessary resources to cover OU-3 issues at that meeting.

Dr. Bennett suggested that the continuation of the Site 24 discussion focus on Points A, B, C, and D introduced during his presentation at the beginning of the meeting (see page 2). A review of the four points was done and Points A, C, and D were covered to the satisfaction of the RAB. Mr. Kistner provided additional information on Point B. He said that the SVE soil remediation at Norton AFB was very successful and over 6,000 pounds of TCE were removed from the vadose zone of soil. Rebound always occurred but with fine tuning of the system to maximize efficiency and extensive confirmation sampling to monitor system effectiveness, the cleanup at Norton has been highly successful. Also, engineers who developed and operated the system at Norton have met with the Marine Corps and Navy and provided firsthand experience and information from lessons learned that will assist in designing and developing an SVE system for Site 24.

Regulatory Agency Comment Update - Glenn Kistner, Project Manager, U.S. EPA and Tayseer Mahmoud, Project Manager, Cal-EPA DTSC

Mr. Kistner said that U.S. EPA recently approved Draft Final Phase II Feasibility Study Reports for OU-2B and OU-2C (landfill sites). He said that U.S. EPA reviewed the Groundwater Monitoring Report for November-December 1996 and provided comments suggesting further clarification on some conclusions that are not adequately substantiated. He advised that this needs to be done prior to preparation of the evaluation report. In regard to the Draft Final Remedial Investigation Report for the OU-3A Sites, March 1997, additional comments were presented that need addressing before U.S. EPA can approve the document. Most notable is the need for clarification of sampling and analyses conducted at Sites 8 and 10.

Mr. Mahoud said DTSC approved the Draft Final Remedial Investigation Report for the OU-3A Sites after minor comments were addressed. DTSC also reviewed Draft Final Phase II Remedial Investigation Report for Site 25 and were satisfied that comments previously provided were addressed. *Copies of regulatory agency comments were provided to RAB members and are also listed at the end of these minutes.*

MEETING EVALUATION AND FUTURE TOPICS

Mr. Hurley reiterated that the format for tonight's meeting was the second part of an experiment to determine if questions and answers should be attended to at the end of each presentation or spontaneously during a speaker's presentation. Tonight's meeting tested

the spontaneous format. Mr. Hurley said, in his opinion, the spontaneous approach does not work well. Mr. Joyce informed the RAB that not all the agenda items with prepared presentations were covered, including the timely and important OU-3A No Further Action Sites presentation. At the next RAB meeting, questions will be addressed at the end of each presentation.

RAB members provided the following comments and suggestions:

- Good communication but control of the meeting was lost.
- The meeting covered a lot of ground.
- Prefer having questions during presentations.
- Excellent forum for exchange of views but suggest holding questions at the end of presentations.
- Did not get through the agenda.
- Spontaneous format provides for give and take discussion.
- Discussion on public meeting format and evaluations got side-tracked and took too much time.
- Regulatory agency comment portion should be at the beginning of the agenda.

Suggestions for future presentation topics include:

- Records of Decision, information and content necessary and the requirements needed to document cleanup position.
- Unexploded ordnance in landfills.
- Radium and other radioactive sources used at the Station.
- DTSC status update on why this agency is no longer the "point" agency.
- Underground storage tank update.
- Update on the groundwater plume.
- Reuse update by someone from the LRA.
- Update on the Environmental Impact Statement and the focus of the NEPA meetings (Maj. Baynard).
- Community relations activities.
- Public comment periods and include schedules in the minutes or as handouts.

CLOSING ANNOUNCEMENTS/FUTURE MEETING DATES

NOTE: SCHEDULE CHANGE FOR NEXT RAB MEETING - ***Since the May 28 RAB meeting, the date of the next RAB meeting has been re-scheduled for Wednesday, August 6, 1997, 6:30 to 9:00 p.m., at the Irvine City Hall, Conference and Training Center, One Civic Center Plaza, Irvine. (It was originally planned for July 30, 1997 but was changed to accommodate the next MCAS El Toro public meeting now scheduled for July 31, 1997.***

The meeting was adjourned at 9:50 p.m.

Attachments:

-Sign-in sheets.

Handouts provided at the meeting and available at the Information Repository:

- RAB meeting agenda and meeting announcement/flier.
- RAB draft meeting minutes - 3/26/97 RAB meeting.
- Points Regarding the Proposed Plan for Site 24 Vadose Zone Soil Remediation (provided by Dr. Bennett, OU-2 Subcommittee Chair).
- Executive Summary Draft Final Phase II Vadose Zone Feasibility Study Report Operable Unit 2A, Site 24, MCAS El Toro, March 11, 1997.
- U.S. EPA, "A Citizen's Guide to Soil Vapor Extraction and Air Sparging".
- U.S. EPA, "User's Guide to the VOCs in Soils Presumptive Remedy".
- U.S. EPA, "Presumptive Remedies: Site Characterization and Technology Selection For CERCLA Sites With Volatile Organic Compounds In Soils".
- Results of Remedial Investigation (Site 24), 5/15/97 Public Meeting Handout.
- Table 2-4 Remediation of Deep Soil (Site 24), 5/15/97 Public Meeting Handout.
- Define Media-Specific Remedial Action Objectives (Site 24), 5/15/97 Public Meeting Handout.
- Assemble Remaining Technologies Into Remedial Action Technologies (Site 24), 5/15/97 Public Meeting Handout.
- Comment Form, Site 24 Soil Cleanup Proposed Plan.
- RAB Membership Roster, Revised 5/28/97.

- Agency Comments - U.S. Environmental Protection Agency
  - U.S. EPA Approval of Draft Final Phase II Feasibility Study Reports - Operable Unit 2B, Sites 2 & 17, MCAS El Toro, April 10, 1997.
  - U.S. EPA Comments on Groundwater Monitoring Report, November-December, 1996, Sampling Round, MCAS El Toro, March 24, 1997.
  - U.S. EPA Comments on Draft Final Phase II Remedial Investigation Report, OU-3A Sites, MCAS El Toro, April 16, 1997.
  - U.S. EPA Review of MCAS El Toro Draft Final Phase II RI/FS Addendum, Site 25- Major Drainages, and Response to Comments, April 1997.

- Agency Comments - Cal-EPA, Department of Toxic Substances Control
  - Draft Final Phase II Remedial Investigation Report Approval: Operable Unit 3A, MCAS El Toro, April 17, 1997.
  - Draft Final Phase II Remedial Investigation/Feasibility Study Report Approval: Site 25, Major Drainages, OU-2A, MCAS El Toro, May 12, 1997.

A copy of these minutes and the handouts provided at the RAB meeting are available at the MCAS El Toro Information Repository, located at the Heritage Park Regional Library in Irvine. The address is 14361 Yale Avenue, Irvine; the phone number is (714) 551-7151. Library hours are Monday through Thursday, 10 am to 9 pm; Friday and Saturday, 10 am to 5 pm; Sunday 12 pm to 5 pm.

RAB meeting minutes are also located on the Navy's Southwest Division Environmental Web Page. There are two different internet addresses, both sites are identical and either one can be used:
http://ivory.nosc.mil/~saundel/default.html
http://www.efdswest.navfac.navy.mil/DEP/ENV/default.htm

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
May 28, 1997

RAB MEMBER SIGN-IN SHEET

Name	Signature	Name	Signature
Allen, Bob	Bob	Mathews, Thomas	
Barney, Col. Joseph P. (ret)		McVicker, Robert R.	
Bennett, Dr. Charles		Meier, Fred J.	
Brady Jr., Paul		Merryman, Robert	
Britton, George		Mountford, Dan	
Cohn, Enid		Murphy, Don	
Crompton, Chris		Olquin, A. Richard	
Gallagher, George M.		Reavis, Gail	
Hayes, Finola		Ritchie, Col. E.J.	
Herndon, Roy		Rudolph, Marcia	
Hurley, Greg - Co-Chair		Shayegan, Maria	
Hersh, Peter		Sievers, Larry	
Joyce, Joseph - Co-chair		Sipp, Jr., Myron L.	
Kistner, Glenn		Vasquez, Barbara	
Koepke, Jeffrey		Vitale, Larry	
Mahmoud, Tayseer		Werner, Jerry B.	
Matheis, Mary Aileen		Woodings, Bob	
		Zweifel, Donald E.	

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
May 28, 1997

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME	AFFILIATION	MAILING ADDRESS	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
Pat Brooks	CLEAN II		619 687 8851	NO
Jerold Watson	None		714 773 0994	NO
Pat Wiegand	CLEAN II		619 687-8850	NO
JOHN SCHOLFIELD	CLEAN II		619 687-8864	NO
[illegible]	Palmira + Irvine HOA		714 461-0000	Yes
SCOTT KOHE	NAVY	ROICC MCAS EL TORO	714 726-2506	NO
GARY SIMON	ORANGE COUNTY		714 834-2509	No
Matt Wedret	Resident		(714) 551-4940	?

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
May 28, 1997

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME	AFFILIATION	MAILING ADDRESS	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
ROBERT MARTIN	ZENO	47320 VENDULO BANNING, CA 92220	909-849-4834 849-2389	
BOB HARMAN	CDE			
Larry Seadik	JHTM/JWA	3151 Airway Ave F208 Costa Mesa CA 92626	714 979-7931	
Jack Cotter	resident	30842 Driftwood So. Laguna 92677	714-499-1015	
RICHARD TAMBARA	SCAQMD		909 396-2319	
Luis Perez	NON G	LITERATURE ONLY :)	714-434-3535	
CHRIS CALIENDO	JOHN WAYNE AIRPORT	3151 AIRWAY AVE COSTA MESA CA 92626	714 252-5269	

c:/rabmisc/gensign.doc

MCAS El Toro - Public Meeting Overview
Proposed Plan - No Further Action Sites

- This public meeting has been organized to provide the community with a step-by-step approach for obtaining information, asking questions, and providing comments on the Marine Corps' Proposed Plan for No Further Action at eleven MCAS El Toro Installation Restoration Program sites.

- Community members have the opportunity to discuss the issues directly with Marine Corps representatives at various tables throughout the room. We recommend starting at Table 1 - General Background.

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Table 1 - General Background:

Provides a summary of MCAS El Toro's history and current mission.

Table 2 - General Environmental:

Presents an overview of the Installation Restoration Program and other environmental cleanup programs at the Station.

Table 3 - Remedial Investigation:

Focuses on the environmental investigation conducted to evaluate the presence, nature and extent of soil contamination at eleven Installation Restoration Program sites.

Table 4 - Risk Assessment Role in Decision-Making:

Explains the risk assessment process, a key component of the remedial investigation, and presents risk assessment results that are used to determine if cleanup is necessary. Presents a synpopsis of the Marine Corp's Proposed Plan for No Further Action at eleven Installation Restoration Program sites.

Table 5 - Formal Public Comments:

Provides community members the opportunity to formally submit written or oral comments to the Marine Corps regarding the Proposed Plan for No Further Action at eleven Installation Restoration Program sites.

Table 6 - Mailing List Sign-up

Offers community members and other interested individuals an easy way to place themselves on the MCAS El Toro Mailing List to regularly receive information on the Station's Installation Restoration Program.

Where To Get More Information:

Copies of Remedial Investigation and Feasibility Study reports, other key documents, and additional information relating to environmental cleanup activities at MCAS El Toro are available for public review at the following information repository:

Heritage Park Regional Library
14361 Yale Avenue
Irvine, CA
(714) 551-7151

Current hours:
Monday-Thursday 10am-9pm
Friday-Saturday 10am-5pm
Sunday 12pm-5pm

The Marine Corps encourages community involvement in the decision-making process of the environmental restoration program at MCAS El Toro. If you have any questions or concerns about environmental activities at the Station, please feel free to

Mr. Joseph Joyce
BRAC Environmental Coord.
Commanding General
AC/S, Environment (I AU)
MCAS El Toro
PO. Box 95001
Santa Ana, CA 92709-5001
(714) 726-3470

Mr. Andrew Bain
Community Involvement
Coordinator
Superfund Division
U.S. EPA
75 Hawthorne St. (SFD-3)
San Francisco, CA 94105
(800) 231-3075

1st Lt. Matthew Morgan
BRAC Public Affairs Officer
Marine Corps Air Bases
Western Area (I AS)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001
(714) 726-3853

Ms. Marsha Mingay
Public Participation Coordinator
Cal-EPA
Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, CA 90802-4444
(562) 590-4881

MCAS El Toro

Installation Restoration Program

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to: Commanding General, AC/S, Environment, (1AU), Attn: Mr. Joseph Joyce, IRP Department, MCAS El Toro, P.O. Box 95001, Santa Ana, CA 92709-5001.

☐ Add me to the MCAS El Toro Installation Restoration Program mailing list.

☐ Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____

Navy and Marine Corps - Internet Access Environmental Web Sites

Southwest Division Naval Facilities Engineering Command Web Site:

www.efdswest.navfac.navy.mil/DEP/ENV/default.htm

Marine Corps Air Bases Western Area Web Site:

www.miramar.USMC.mil/BRAC/main.htm

MCAS El Toro

Restoration Advisory Board

Acronyms and Glossary of Technical Terms

This handout has been prepared to provide Restoration Advisory Board (RAB) members and others with a better understanding of acronyms and technical terms used during Installation Restoration Program activities and other environmental programs underway at MCAS El Toro.

- The list of acronyms is from the *Final Field Sampling Plan, Phase II Remedial Investigation/Feasibility Study for Marine Corps Air Station El Toro, California, August 7, 1995.*

- The list of acronyms is from the *Draft Final Phase II Vadose Zone Feasibility Study - Site 24, Marine Corps Air Station El Toro, California, March 11, 1997.*

- The glossary of technical terminology is from the U.S. EPA publication, *Terms of Environment, Communications, Education, and Public Affairs (A-107), EPA 175-B-93-001, February 1993.*

ACRONYMS/ABBREVIATIONS

Air SWAT	Air Quality Solid Waste Assessment Test
ASTM	American Society for Testing and Materials
BCT	BRAC Cleanup Team
BEIDMS	Bechtel Environmental Integrated Data Management System
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	U.S. EPA Contract Laboratory Program
CNDDB	California Natural Diversity Data Base
COPC	chemical of potential concern
CPT	cone penetrometer test
CTO	Contract Task Order
DC	direct current
DCE	dichloroethene
Desalter	Irvine Desalter Project
DoD	Department of Defense
DON	Department of the Navy
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
EC	electrical conductivity
EOD	explosive ordnance disposal
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FID	flame ionization detector
FS	Feasibility Study
FSP	Field Sampling Plan
ft/day	feet per day

ACRONYMS/ABBREVIATIONS (continued)

GC	gas chromatograph
gpm	gallons per minute
GPR	ground-penetrating radar
IAFS	Interim-Action Feasibility Study
IAS	Initial Assessment Study
ID	inside diameter
IDWMP	Investigation-Derived Waste Management Plan
IRP	Installation Restoration Program
L/min	liters per minute
µmhos/cm	micromhos per centimeter
MCAS	Marine Corps Air Station
MeCl	methylene chloride
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MSL	mean sea level
NACIP	Navy Assessment and Control of Installation Pollutants
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Facilities Engineering Service Center (formerly NEESA)
NFRAP	No Further Response Action Planned
NPL	National Priorities List
NTU	nephelometric turbidity units
OCWD	Orange County Water District
OD	outside diameter
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
PRG	(U.S. EPA Region IX) Preliminary Remediation Goal
psi	per square inch
psig	per square inch gauge

ACRONYMS/ABBREVIATIONS (continued)

QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
RWQCB	(California) Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SIPOA	Site Inspection Plan of Action
SOP	Standard Operating Procedure
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU/AOC	solid waste management unit/area of concern
TCA	trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TIC	The Irvine Company
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
USCS	Unified Soils Classification System
U.S. EPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound
v/v	volume per volume
WSA	waste staging area

ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
BCT	BRAC Cleanup Team
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal-EPA	California Environmental Protection Agency
CCR	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980)
cfm	cubic feet per minute
CFR	*Code of Federal Regulations*
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm^3/g	cubic centimeters per gram
cm/s	centimeters per second
CPT	cone penetrometer test
CTO	Contract Task Order
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense nonaqueous-phase liquid
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
DWR	(California) Department of Water Resources
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft^3	cubic feet
ft/day	feet per day
ft^3/min	cubic feet per minute
GAC	granular activated carbon
gpm	gallons per minute
HQ	hazard quotient
IAFS	Interim-Action Feasibility Study
ICE	internal combustion engine
IRP	Installation Restoration Program

ACRONYMS/ABBREVIATIONS (continued)

IRWD	Irvine Ranch Water District
Irvine Subbasin	Irvine Groundwater Subbasin
JMM	James M. Montgomery Engineers, Inc.
LGAC	liquid-phase granular activated carbon
LNAPL	light nonaqueous-phase liquid
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSL	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NPW	net present worth
OCWD	Orange County Water District
OU	operable unit
PCE	tetrachloroethene
PCO	photocatalytic oxidation
POTW	publicly owned treatment works
PVC	polyvinyl chloride
RACER	Remedial Action Cost Engineering Requirements
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RWQCB	(California) Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAQMD	South Coast Air Quality Management District
SHSO	Site Health and Safety Officer
SITE	(U.S. EPA) Superfund Innovative Technologies Evaluation
STLC	soluble threshold limit concentration

ACRONYMS/ABBREVIATIONS (continued)

SVE	soil vapor extraction
SWDIV	Southwest Division Naval Facilities Engineering Command
SWRCB	(California) State Water Resources Control Board
TAL	target analyte list
TBC	to be considered
TCA	trichloroethane
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
USGS	United States Geological Survey
U.S. EPA	United States Environmental Protection Agency
UV	ultraviolet
VGAC	vapor-phase granulated activated carbon
VES	vapor extraction system
VOC	volatile organic compound
WQCP	(Comprehensive) Water Quality Control Plan (for the Santa Ana Region)

United States
Environmental Protection
Agency

Communications,
Education, And
Public Affairs (A-107)

EPA 175-B-93-001
February 1993

EPA

Terms Of Environment

Glossary, Abbreviations, And Acronyms

Printed on Recycled Paper

Introduction

Terms Of Environment defines in non-technical language the more commonly used environmental terms appearing in EPA publications, news releases, and other Agency documents available to the general public, students, the media, and Agency employees. The definitions do not constitute the Agency's official use of terms and phrases for regulatory purposes, and nothing in this document should be construed to alter or supplant any other federal document. Official terminology may be found in the laws and related regulations as published in such sources as the Congressional Record, Federal Register, and elsewhere.

The terms selected for inclusion are derived from previously published lists, internal glossaries produced by various programs and specific suggestions made by personnel in many Agency offices. The chemicals and pesticides selected for inclusion are limited to those most frequently referred to in Agency publications or that are the subject of major regulatory or program activities.

Definitions or information about substances or program activities not included herein may be found in EPA libraries or scientific/technical reference documents, or may be obtained from various program offices.

Those with suggestions for future editions should write to the Editorial Services Division, Office of Communications, Education, and Public Affairs, A-107, USEPA, Washington DC 20460.

Abbreviation and acronymn list begins on page 31

A

A—Scale Sound Level: A measurement of sound approximating the sensitivity of the human ear, used to note the intensity or annoyance level of sounds.

Abandoned Well: A well whose use has been permanently discontinued or which is in a state of such disrepair that it cannot be used for its intended purpose.

Abatement: Reducing the degree or intensity of, or eliminating, pollution.

Accident Site: The location of an unexpected occurrence, failure or loss, either at a plant or along a transportation route, resulting in a release of hazardous materials.

Acclimatization: The physiological and behavioral adjustments of an organism to changes in its environment.

Acid Deposition: A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either wet or dry form. The wet forms, popularly called "acid rain," can fall as rain, snow, or fog. The dry forms are acidic gases or particulates.

Acid Rain: (See: acid deposition)

Action Levels: 1. Regulatory levels recommended by EPA for enforcement by FDA and USDA when pesticide residues occur in food or feed commodities for reasons other than the direct application of the pesticide. As opposed to "tolerances" which are established for residues occurring as a direct result of proper usage, action levels are set for inadvertent residues resulting from previous legal use or accidental contamination. 2. In the Superfund program, the existence of a contaminant concentration in the environment high enough to warrant action or trigger a response under SARA and the National Oil and Hazardous Substances Contingency Plan. The term is also used in other regulatory programs. (See: tolerances.)

Activated Carbon: A highly adsorbent form of carbon used to remove odors and toxic substances from liquid or gaseous emissions. In waste treatment it is used to remove dissolved organic matter from waste water. It is also used in motor vehicle evaporative control systems.

Activated Sludge: Product that results when primary effluent is mixed with bacteria-laden sludge and then agitated and aerated to promote biological treatment, speeding the breakdown of organic matter in raw sewage undergoing secondary waste treatment.

Activator: A chemical added to a pesticide to increase its activity.

Active Ingredient: In any pesticide product, the component that kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of active ingredients.

Activity Plans: Written procedures in a school's asbestos- management plan that detail the steps a Local Education Agency (LEA) will follow in performing the initial and additional cleaning, operation and maintenance-program tasks; periodic surveillance; and reinspections required by the Asbestos Hazard Emergency Response Act (AHERA).

Acute Exposure: A single exposure to a toxic substance which results in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day, as compared to longer, continuing exposure over a period of time.

Acute Toxicity: The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any severe poisonous effect resulting from a single short-term exposure to a toxic substance. (See: chronic toxicity, toxicity.)

Adaptation: Changes in an organism's structure or habits that help it adjust to its surroundings.

Add-on Control Device: An air pollution control device such as carbon absorber or incinerator that reduces the pollution in an exhaust gas. The control device usually does not affect the process being controlled and thus is "add-on" technology, as opposed to a scheme to control pollution through altering the basic process itself.

Adequately Wet: Asbestos containing material that is sufficiently mixed or penetrated with liquid to prevent the release of particulates.

Administrative Order On Consent: A legal agreement signed by EPA and an individual, business, or other entity through which the violator agrees to pay for correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

Administrative Order: A legal document signed by EPA directing an individual, business, or other entity to take corrective action or refrain from an activity. It describes the violations and actions to be taken, and can be enforced in court. Such orders may be issued, for example, as a result of an administrative complaint whereby the respondent is ordered to pay a penalty for violations of a statute.

Administrative Procedures Act: A law that spells out procedures and requirements related to the promulgation of regulations.

Administrative Record: All documents which EPA considered or relied on in selecting the response action at a Superfund site, culminating in the record of decision for remedial action or, an action memorandum for removal actions.

Adsorption: An advanced method of treating waste in which activated carbon removes organic matter from wastewater

Adulterants: Chemical impurities or substances that by law do not belong in a food, or pesticide.

Adulterated: 1. Any pesticide whose strength or purity falls below the quality stated on its label. 2. A food, feed, or product that contains illegal pesticide residues.

Advanced Treatment: A level of wastewater treatment more stringent than secondary treatment; requires an 85-percent reduction in conventional pollutant concentration or a significant reduction in nonconventional pollutants.

Advanced Wastewater Treatment: Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids. (See primary, secondary treatment.)

Advisory: A non-regulatory document that communicates risk information to those who may have to make risk management decisions.

Aerated Lagoon: A holding and/or treatment pond that speeds up the natural process of biological decomposition of organic waste by stimulating the growth and activity of bacteria that degrade organic waste.

Aeration: A process which promotes biological degradation of organic matter in water. The process may be passive (as when waste is exposed to air), or active (as when a mixing or bubbling device introduces the air).

Aeration Tank: A chamber used to inject air into water.

Aerobic Treatment: Process by which microbes decompose complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. (Such processes include extended aeration, trickling filtration, and rotating biological contactors.)

Aerobic: Life or processes that require, or are not destroyed by, the presence of oxygen. (See: anaerobic.)

Aerosol: A suspension of liquid or solid particles in a gas.

Affected Public: The people who live and/or work near a hazardous waste site.

Afterburner: In incinerator technology, a burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odors. It may be attached to or be separated from the incinerator proper.

Agent Orange: A toxic herbicide and defoliant used in the Vietnam conflict, containing 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2-4 dichlorophenoxyacetic acid (2,4-D) with trace amounts of dioxin.

Agricultural Pollution: Farming wastes, including runoff and leaching of pesticides and fertilizers; erosion and dust from plowing; improper disposal of animal manure and carcasses; crop residues, and debris.

Agro-ecosystem: Land used for crops, pasture, and livestock; the adjacent uncultivated land that supports other vegetation and wildlife; and the associated atmosphere, the underlying soils, groundwater, and drainage networks.

AHERA Designated Person (ADP): A person designated by a Local Education Agency to ensure that the AHERA requirements for asbestos management and abatement are properly implemented.

Air Changes Per Hour (ACH): The movement of a volume of air in a given period of time; if a house has one air change per hour, it means that all of the air in the house will be replaced in a one-hour period.

Air Contaminant: Any particulate matter, gas, or combination thereof, other than water vapor. (See: air pollutant.)

Air Curtain: A method of containing oil spills. Air bubbling through a perforated pipe causes an upward water flow that slows the spread of oil. It can also be used to stop fish from entering polluted water.

Air Mass: A large volume of air with certain meteorological or polluted characteristics-e.g. a heat inversion or smogginess-while in one location. The characteristics can change as the air mass moves away.

Air Monitoring: (See: monitoring)

Air Plenum: Any space used to convey air in a building, furnace, or structure. The space above a suspended ceiling is often used as an air plenum.

Air Pollutant: Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into two main groups: (1) those emitted directly from identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation. Exclusive of pollen, fog, and dust, which are of natural origin, about 100 contaminants have been identified and fall into the following categories: solids, sulfur compounds, volatile organic chemicals, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compounds, and odors.

Air Pollution Episode: A period of abnormally high concentration of air pollutants, often due to low winds and temperature inversion, that can cause illness and death. (See: episode, pollution.)

Air Pollution Control Device: Mechanism or equipment that cleans emissions generated by an incinerator by removing pollutants that would otherwise be released to the atmosphere.

Air Pollution: The presence of contaminant or pollutant substances in the air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects.

Air Quality Criteria: The levels of pollution and lengths of exposure above which adverse health and welfare effects may occur.

Air Quality Control Region: An area-designated by the federal government-in which communities share a common air pollution problem, sometimes embracing several states.

Air Quality Standards: The level of pollutants prescribed by regulations that may not be exceeded during a given time in a defined area.

Air Stripping: A treatment system that removes volatile organic compounds (VOCs) from contaminated ground water or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Air Toxics: Any air pollutant for which a national ambient air quality standard (NAAQS) does not exist (i.e., excluding ozone, carbon monoxide, PM-10, sulfur dioxide, nitrogen oxide) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunctions, neurological disorders, heritable gene mutations, or other serious or irreversible chronic or acute health effects in humans.

Airborne Particulates: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Chemical composition of particulates varies widely, depending on location and time of year. Airborne particulates include: windblown dust, emissions from industrial processes, smoke from the burning of wood and coal, and motor vehicle or non-road engine exhausts. exhaust of motor vehicles.

Airborne Release: Release of any chemical into the air.

Alachlor: A herbicide, marketed under the trade name Lasso, used mainly to control weeds in corn and soybean fields.

Alar: Trade name for daminozide, a pesticide that makes apples redder, firmer, and less likely to drop off trees before growers are ready to pick them. It is also used to a lesser extent on peanuts, tart cherries, concord grapes, and other fruits.

Aldicarb: An insecticide sold under the trade name Temik. It is made from ethyl isocyanate.

Algae: Simple rootless plants that grow in sunlit waters in proportion to the amount of available nutrients. They can affect water quality adversely by lowering the dissolved oxygen in the water. They are food for fish and small aquatic animals.

Algal Blooms: Sudden spurts of algal growth, which can affect water quality adversely and indicate potentially hazardous changes in local water chemistry.

Alternate Method: Any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but that has been demonstrated in specific cases-to EPA's satisfaction-to produce results adequate for compliance monitoring.

Alternative Remedial Contract Strategy Contractors: Government contractors who provide project management and technical services to support remedial response activities at National Priorities List sites.

Ambient Air Quality Standards: (See: Criteria Pollutants and National Ambient Air Quality Standards.)

Ambient Air: Any unconfined portion of the atmosphere: open air, surrounding air.

Anaerobic: A life or process that occurs in, or is not destroyed by, the absence of oxygen.

Anaerobic Decomposition: Reduction of the net energy level and change in chemical composition of organic matter caused by microorganisms in an oxygen-free environment.

Antarctic "Ozone Hole": Refers to the seasonal depletion of ozone in a large area over Antarctica.

Anti-Degradation Clause: Part of federal air quality and water quality requirements prohibiting deterioration where pollution levels are above the legal limit.

Applicable or Appropriate Requirements (ARARs): Any state or federal statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a Superfund site.

Aquifer: An underground geological formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Area of Review: In the UIC program, the area surrounding an injection well that is reviewed during the permitting process to determine if flow between aquifers will be induced by the injection operation.

Area Source: Any small source of non-natural air pollution that is released over a relatively small area but which cannot be classified as a point source. Such sources may include vehicles and other small engines, small businesses and household activities.

Aromatics: A type of hydrocarbon, such as benzene or toluene, added to gasoline in order to increase octane. Some aromatics are toxic.

Arsenicals: Pesticides containing arsenic.

Asbestos: A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. EPA has banned or severely restricted its use in manufacturing and construction.

Asbestos Abatement: Procedures to control fiber release from asbestos-containing materials in a building or to remove them entirely, including removal, encapsulation, repair, enclosure, encasement, and operations and maintenance programs.

Asbestos-Containing Waste Materials (ACWM): Mill tailings or any waste that contains commercial asbestos and is generated by a source covered by the Clean Air Act Asbestos NESHAPS.

Asbestosis: A disease associated with inhalation of asbestos fibers. The disease makes breathing progressively more difficult and can be fatal.

Asbestos Program Manager: A building owner or designated representative who supervises all aspects of the facility asbestos management and control program.

Ash: The mineral content of a product remaining after complete combustion.

Assessment: In the asbestos-in-schools program, the evaluation of the physical condition and potential for damage of all friable asbestos containing materials and thermal insulation systems.

Assimilation: The ability of a body of water to purify itself of pollutants.

Assimilative Capacity: The capacity of a natural body of water to receive wastewaters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.

Attainment Area: An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Attenuation: The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, and/or transformation.

Attractant: A chemical or agent that lures insects or other pests by stimulating their sense of smell.

Attrition: Wearing or grinding down of a substance by friction. Dust from such processes contributes to air pollution.

Availability Session: Informal meeting at a public location where interested citizens can talk with EPA and state officials on a one-to-one basis.

B

Background Level: In air pollution control, the concentration of air pollutants in a definite area during a fixed period of time prior to the starting up or on the stoppage of a source of emission under control. In toxic substances monitoring, the average presence in the environment, originally referring to naturally occurring phenomena.

BACT-Best Available Control Technology: An emission limitation based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts) achievable through application of production processes and available methods, systems, and techniques. BACT does not permit emissions in excess of those allowed under any applicable Clean Air Act provisions. Use of the BACT concept is allowable on a case by case basis for major new or modified emissions sources in attainment areas and applies to each regulated pollutant.

Bacteria: (Singular: bacterium) Microscopic living organisms that can aid in pollution control by metabolizing organic matter in sewage, oil spills or other pollutants. However, bacteria in soil, water or air can also cause human, animal and plant health problems.

Baffle Chamber: In incinerator design, a chamber designed to promote the settling of fly ash and coarse particulate matter by changing the direction and/or reducing the velocity of the gases produced by the combustion of the refuse or sludge.

Baghouse Filter: Large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than 20 microns in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Baling: Compacting solid waste into blocks to reduce volume and simplify handling.

Ballistic Separator: A machine that sorts organic from inorganic matter for composting.

Band Application: The spreading of chemicals over, or next to, each row of plants in a field.

Banking: A system for recording qualified air emission reductions for later use in bubble, offset, or netting transactions. (See: emissions trading.)

Bar Screen: In wastewater treatment, a device used to remove large solids.

Barrier Coating(s): A layer of a material that obstructs or prevents passage of something through a surface that is to be protected, e.g. grout, caulk, or various sealing compounds; sometimes used with polyurethane membranes to prevent corrosion or oxidation of metal surfaces, chemical impacts on various materials, or, for example, to prevent radon infiltration through walls, cracks, or joints in a house.

Basal Application: In pesticides, the application of a chemical on plant stems or tree trunks just above the soil line.

Bed Load: Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

BEN: EPA's computer model for analyzing a violator's economic gain from not complying with the law.

Bench-scale Tests: Laboratory testing of potential cleanup technologies (See: treatability studies.)

Beryllium: An airborne metal hazardous to human health when inhaled. It is discharged by machine shops, ceramic and propellant plants, and foundries.

Best Available Control Measures (BACM): A term used to refer to the most effective measures (according to EPA guidance) for controlling small or dispersed particulates from sources such as roadway dust, soot and ash from woodstoves and open burning of rush, timber, grasslands, or trash.

Best Demonstrated Available Technology (BDAT): As identified by EPA, the most effective commercially available means of treating specific types of hazardous waste. The BDATs may change with advances in treatment technologies.

Best Management Practice (BMP): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources.

Bimetal: Beverage containers with steel bodies and aluminum tops; handled differently from pure aluminum in recycling.

Bioaccumulants: Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted. (See: biological magnification.)

Bioassay: Study of living organisms to measure the effect of a substance, factor, or condition by comparing before-and-after exposure or other data.

Biochemical Oxygen Demand (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. The greater the BOD, the greater the degree of pollution.

Biodegradable: Capable of decomposing rapidly under natural conditions.

Biodiversity: Refers to the variety and variability among living organisms and the ecological complexes in which they occur. Diversity can be defined as the number of different items and their relative frequencies. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystem, species, and genes.

Biological Control: In pest control, the use of animals and organisms that eat or otherwise kill or out-compete pests.

Biological Magnification: Refers to the process whereby certain substances such as pesticides or heavy metals move up the food chain, work their way into rivers or lakes, and are eaten by aquatic organisms such as fish, which in turn are eaten by large birds, animals or humans. The substances become concentrated in tissues or internal organs as they move up the chain. (See: bioaccumulative.)

Biological Oxidation: Decomposition of complex organic materials by microorganisms. Occurs in self-purification of water bodies and in activated sludge wastewater treatment.

Biological Oxygen Demand (BOD): An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste.

Biological Treatment: A treatment technology that uses bacteria to consume organic waste.

Biologicals: Vaccines, cultures and other preparations made from living organisms and their products, intended for use in diagnosing, immunizing, or treating humans or animals, or in related research.

Biomass: All of the living material in a given area; often refers to vegetation.

Biome: Entire community of living organisms in a single major ecological area. (See: biotic community.)

Biomonitoring: 1. The use of living organisms to test the suitability of effluents for discharge into receiving waters and to test the quality of such waters downstream from the discharge. 2. Analysis of blood, urine, tissues, etc., to measure chemical exposure in humans.

Bioremediation: Use of living organisms to clean up oil spills or remove other pollutants from soil, water, or wastewater; use of organisms such as non-harmful insects to remove agricultural pests or counteract diseases of trees, plants, and garden soil.

Biosphere: The portion of Earth and its atmosphere that can support life.

Biostabilizer: A machine that converts solid waste into compost by grinding and aeration.

Biota: The animal and plant life of a given region.

Biotechnology: Techniques that use living organisms or parts of organisms to produce a variety of products (from medicines to industrial enzymes) to improve plants or animals or to develop microorganisms to remove toxics from bodies of water, or act as pesticides.

Biotic Community: A naturally occurring assemblage of plants and animals that live in the same environment and are mutually sustaining and interdependent. (See: biome.)

Blackwater: Water that contains animal, human, or food waste.

Blood Products: Any product derived from human blood, including but not limited to blood plasma, platelets, red or white corpuscles, and derived licensed products such as interferon.

Bloom: A proliferation of algae and/or higher aquatic plants in a body of water; often related to pollution, especially when pollutants accelerate growth.

BOD5: The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter.

Bog: A type of wetland that accumulates appreciable peat deposits. Bogs depend primarily on precipitation for their water source, and are usually acidic and rich in plant residue with a conspicuous mat of living green moss.

Boom: 1. A floating device used to contain oil on a body of water. 2. A piece of equipment used to apply pesticides from a tractor or truck. (See: sonic boom.)

Botanical Pesticide: A pesticide whose active ingredient is a plant-produced chemical such as nicotine or strychnine. Also called a plant-derived pesticide.

Bottle Bill: Proposed or enacted legislation which requires a returnable deposit on beer or soda containers and provides for retail store or other redemption. Such legislation is designed to discourage use of throwaway containers.

Bottom Ash: The non-airborne combustion residue from burning pulverized coal in a boiler; the material which falls to the bottom of the boiler and is removed mechanically; a concentration of the non-combustible materials, which may include toxics.

Bottom Land Hardwoods: Forested freshwater wetlands adjacent to rivers in the southeastern United States, especially valuable for wildlife breeding, nesting and habitat.

Brine Mud: Waste material, often associated with well-drilling or mining, composed of mineral salts or other inorganic compounds.

Building Cooling Load: The hourly amount of heat that must be removed from a building to maintain indoor comfort (measured in British Thermal Units BTUs).

Broadcast Application: The spreading of pesticides over an entire area.

Bubble Policy: (See: emissions trading.)

Bubble: A system under which existing emissions sources can propose alternate means to comply with a set of emissions limitations; under the bubble concept, sources can control more than required at one emission point where control costs are relatively low in return for a comparable relaxation of controls at a second emission point where costs are higher.

Buffer Strips: Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

Bulk Sample: A small portion (usually thumbnail size) of a suspect asbestos-containing building material collected by an asbestos inspector for laboratory analysis to determine asbestos content.

Bulky Waste: Large items of waste materials, such as appliances, furniture, large auto parts, trees, stumps.

Burial Ground (Graveyard): A disposal site for radioactive waste materials that uses earth or water as a shield.

By-product: Material, other than the principal product, generated as a consequence of an industrial process.

C

Cadmium (Cd): A heavy metal element that accumulates in the environment.

Cancellation: Refers to Section 6 (b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) which authorizes cancellation of a pesticide registration if unreasonable adverse effects to the environment and public health develop when a product is used according to widespread and commonly recognized practice, or if its labeling or other material required to be submitted does not comply with FIFRA provisions.

Cap: A layer of clay, or other impermeable material installed over the top of a closed landfill to prevent entry of rainwater and minimize leachate.

Capacity Assurance Plan: A statewide plan which supports a state's ability to manage the hazardous waste generated within its boundaries over a twenty year period.

Capture Efficiency: The fraction of organic vapors generated by a process that are directed to an abatement or recovery device.

Carbon Absorber: An add-on control device that uses activated carbon to absorb volatile organic compounds from a gas stream. (The VOCs are later recovered from the carbon.)

Carbon Adsorption: A treatment system that removes contaminants from ground water or surface water by forcing it through tanks containing activated carbon treated to attract the contaminants. contaminants.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Carboxyhemoglobin: Hemoglobin in which the iron is bound to carbon monoxide (CO) instead of oxygen.

Carcinogen: Any substance that can cause or aggravate cancer.

Carrier: The inert liquid or solid material added to an active ingredient in a pesticide.

Carrying Capacity: 1. In recreation management, the amount of use a recreation area can sustain without loss of quality. 2. In wildlife management, the maximum number of animals an area can support during a given period.

Cask: A thick-walled container (usually lead) used to transport radioactive material. Also called a coffin.

Catalytic Converter: An air pollution abatement device that removes pollutants from motor vehicle exhaust, either by oxidizing them into carbon dioxide and water or reducing them to nitrogen and oxygen.

Catalytic Incinerator: A control device that oxidizes volatile organic compounds (VOCs) by using a catalyst to promote the combustion process. Catalytic incinerators require lower temperatures than conventional thermal incinerators, thus saving fuel and other costs.

Categorical Exclusion: A class of actions which either individually or cumulatively would not have a significant effect on the human environment and therefore would not require preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act (NEPA).

Categorical Pretreatment Standard: A technology-based effluent limitation for an industrial facility discharging into a municipal sewer system. Analogous in stringency to Best Availability Technology (BAT) for direct dischargers.

Cathodic Protection: A technique to prevent corrosion of a metal surface by making it the cathode of an electrochemical cell.

Cells: 1. In solid waste disposal, holes where waste is dumped, compacted, and covered with layers of dirt on a daily basis. 2. The smallest structural part of living matter capable of functioning as an independent unit.

Cementitious: Densely packed and nonfibrous friable materials.

Central Collection Point: Location were a generator of regulated medical waste consolidates wastes originally generated at various locations in his facility. The wastes are gathered together for treatment on-site or for transportation elsewhere for treatment and/or disposal. This term could also apply to community hazardous waste collections, industrial and other waste management systems.

Centrifugal Collector: A mechanical system using centrifugal force to remove aerosols from a gas stream or to de-water sludge.

Channelization: Straightening and deepening streams so water will move faster, a marsh-drainage tactic that can interfere with waste assimilation capacity, disturb fish and wildlife habitats, and aggravate flooding.

Characteristic: Any one of the four categories used in defining hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

Chemical Oxygen Demand (COD): A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

Chemical Treatment: Any one of a variety of technologies that use chemicals or a variety of chemical processes to treat waste.

Chemnet: Mutual aid network of chemical shippers and contractors that assigns a contracted emergency response company to provide technical support if a representative of the firm whose chemicals are involved in an incident is not readily available.

Chemosterilant: A chemical that controls pests by preventing reproduction.

Chemtrec: The industry-sponsored Chemical Transportation Emergency Center; provides information and/or emergency assistance to emergency responders.

Chilling Effect: The lowering of the Earth's temperature because of increased particles in the air blocking the sun's rays. (See: greenhouse effect.)

Chlorinated Hydrocarbons: These include a class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain. Among them are DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene. Other examples include TCE, used as an industrial solvent.

Chlorinated Solvent: An organic solvent containing chlorine atoms, e.g., methylene chloride and 1,1,1-trichloromethane, used in aerosol spray containers and in highway paint.

Chlorination: The application of chlorine to drinking water, sewage, or industrial waste to disinfect or to oxidize undesirable compounds.

Chlorinator: A device that adds chlorine, in gas or liquid form, to water or sewage to kill infectious bacteria.

Chlorine-Contact Chamber: That part of a water treatment plant where effluent is disinfected by chlorine.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquified chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere where their chlorine components destroy ozone.

Chlorosis: Discoloration of normally green plant parts caused by disease, lack of nutrients, or various air pollutants.

Cholinesterase: An enzyme found in animals that regulates nerve impulses. Cholinesterase inhibition is associated with a variety of acute symptoms such as nausea, vomiting, blurred vision, stomach cramps, and rapid heart rate.

Chromium: (See: heavy metals.)

Chronic Effect: An adverse effect on a human or animal in which symptoms recur frequently or develop slowly over a long period of time.

Chronic Toxicity: The capacity of a substance to cause long-term poisonous human health effects. (See: acute toxicity.)

Clarification: Clearing action that occurs during wastewater treatment when solids settle out. This is often aided by centrifugal action and chemically induced coagulation in wastewater.

Clarifier: A tank in which solids settle to the bottom and are subsequently removed as sludge.

Clay Soil: Soil material containing more than 40 percent clay, less than 45 percent sand, and less than 40 percent silt.

Clean Coal Technology: Any technology not in widespread use prior to the Clean Air Act amendments of 1990. This Act will achieve significant reductions in pollutants associated with the burning of coal.

Clean Fuels: Blends or substitutes for gasoline fuels, including compressed natural gas, methanol, ethanol, liquified petroleum gas, and others.

Cleanup: Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Clear Cut: Harvesting all the trees in one area at one time, a practice that can encourage fast rainfall or snowmelt runoff, erosion, sedimentation of streams and lakes, flooding, and destroys vital habitat.

Cloning: In biotechnology, obtaining a group of genetically identical cells from a single cell; making identical copies of a gene.

Closed-Loop Recycling: Reclaiming or reusing wastewater for non-potable purposes in an enclosed process.

Closure: The procedure a landfill operator must follow when a landfill reaches its legal capacity for solid waste: ceasing acceptance of solid waste and placing a cap on the landfill site.

Coagulation: Clumping of particles in wastewater to settle out impurities, often induced by chemicals such as lime, alum, and iron salts.

Coastal Zone: Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea.

Coefficient of Haze (COH): A measurement of visibility interference in the atmosphere.

Coke Oven: An industrial process which converts coal into coke, one of the basic materials used in blast furnaces for the conversion of iron ore into iron.

Cold Temperature CO: A standard for automobile carbon monoxide (CO) emissions to be met at a low temperature (i.e. 20 degrees Fahrenheit). Conventional automobile catalytic convertors are less efficient upon start-up at low temperatures.

Coliform Index: A rating of the purity of water based on a count of fecal bacteria.

Coliform Organism: Microorganisms found in the intestinal tract of humans and animals. Their presence in water indicates fecal pollution and potentially adverse contamination by pathogens.

Collector Sewers: Pipes used to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Combined Sewer Overflows: Discharge of a mixture of storm water and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

Combined Sewers: A sewer system that carries both sewage and storm-water runoff. Normally, its entire flow goes to a waste treatment plant, but during a heavy storm, the volume of water may be so great as to cause overflows of untreated mixtures of storm water and sewage into receiving waters. Storm-water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

Combustion: 1. Burning, or rapid oxidation, accompanied by release of energy in the form of heat and light. A basic cause of air pollution. 2. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable inorganics such as carbon dioxide and water.

Combustion Chamber: The actual compartment where waste is burned in an incinerator.

Combustion Product: Substance produced during the burning or oxidation of a material.

Command Post: Facility located at a safe distance upwind from an accident site, where the on-scene coordinator, responders, and technical representatives make response decisions, deploy manpower and equipment, maintain liaison with news media, and handle communications.

Comment Period: Time provided for the public to review and comment on a proposed EPA action or rulemaking after publication in the Federal Register.

Commercial Waste Management Facility: A treatment, storage, disposal, or transfer facility which accepts waste from a variety of sources, as compared to a private facility which normally manages a limited waste stream generated by its own operations.

Commercial Waste: All solid waste emanating from business establishments such as stores, markets, office buildings, restau-

Commingled Recyclables: Mixed recyclables that are collected together.

Comminuter: A machine that shreds or pulverizes solids to make waste treatment easier.

Comminution: Mechanical shredding or pulverizing of waste. Used in both solid waste management and wastewater treatment.

Community: In ecology, a group of interacting populations in time and space. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest.

Community Relations: The EPA effort to establish two-way communication with the public to create understanding of EPA programs and related actions, to assure public input into decision-making processes related to affected communities, and to make certain that the Agency is aware of and responsive to public concerns. Specific community relations activities are required in relation to Superfund remedial actions.

Community Water System: A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

Compaction: Reduction of the bulk of solid waste by rolling and tamping.

Compliance Coating: A coating whose volatile organic compound content does not exceed that allowed by regulation.

Compliance Monitoring: Collection and evaluation of data, including self-monitoring reports, and verification to show whether pollutant concentrations and loads contained in permitted discharges are in compliance with the limits and conditions specified in the permit.

Compliance Schedule: A negotiated agreement between a pollution source and a government agency that specifies dates and procedures by which a source will reduce emissions and, thereby, comply with a regulation.

Composite Sample: A series of water samples taken over a given period of time and weighted by flow rate.

Compost: The relatively stable humus material that is produced from a composting process in which bacteria in soil mixed with garbage and degradable trash break down the mixture into organic fertilizer.

Composting: The controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

Conditional Registration: Under special circumstances, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) permits registration of pesticide products that is "conditional" upon the submission of additional data. These special circumstances include a finding by the EPA Administrator that a new product or use of an existing pesticide will not significantly increase the risk of unreasonable adverse effects. A product containing a new (previously unregistered) active ingredient may be conditionally registered only if the Administrator finds that such conditional registration is in the public interest, that a reasonable time for conducting the additional studies has not elapsed, and the use of the pesticide for the period of conditional registration will not present an unreasonable risk.

Conditionally Exempt Generators (CE): Persons or enterprises which produce less than 220 pounds of hazardous waste per month. Exempt from most regulation, they are required merely to determine whether their waste is hazardous, notify appropriate state or local agencies, and ship it by permitted facility for proper disposal. (See :an authorized transporter to a small quantity generator.)

Cone of Depression: A depression in the water table that develops around a pumped well.

Confined Aquifer: An aquifer in which ground water is confined under pressure which is significantly greater than atmospheric pressure.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement reached between EPA and potentially responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with EPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. The consent decree describes the actions PRPs will take and may be subject to a public comment period.

Conservation: Preserving and renewing, when possible, human and natural resources. The use, protection, and improvement of natural resources according to principles that will assure their highest economic or social benefits.

Construction and Demolition Waste: Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.

Contact Pesticide: A chemical that kills pests when it touches them, instead of by ingestion. Also, soil that contains the minute skeletons of certain algae that scratch and dehydrate waxy-coated insects.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse affect on air, water, or soil.

Contingency Plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous waste, or radioactive materials that threaten human health or the environment. (See: National Oil and Hazardous Substances Contingency Plan.)

Continuous Discharge: A routine release to the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc.

Contour Plowing: Soil tilling method that follows the shape of the land to discourage erosion.

Contract Labs: Laboratories under contract to EPA, which analyze samples taken from waste, soil, air, and water or carry out research projects.

Control Technique Guidelines (CTG): A series of EPA documents designed to assist states in defining reasonable available control technology (RACT) for major sources of volatile organic compounds (VOC).

Controlled Reaction: A chemical reaction under temperature and pressure conditions maintained within safe limits to produce a desired product or process.

Conventional Pollutants: Statutorily listed pollutants understood well by scientists. These may be in the form of organic waste, sediment, acid, bacteria, viruses, nutrients, oil and grease, or heat.

Conventional Systems: Systems that have been traditionally used to collect municipal wastewater in gravity sewers and convey it to a central primary or secondary treatment plant prior to discharge to surface waters.

Conventional Tilling: Tillage operations considered standard for a specific location and crop and that tend to bury the crop residues; usually considered as a base for determining the cost effectiveness of control practices.

Cooling Electricity Use: Amount of electricity used to meet the building cooling load. (See: building cooling load.)

Cooling Tower: A structure that helps remove heat from water used as a coolant; e.g., in electric power generating plants.

Cooperative Agreement: An assistance agreement whereby EPA transfers money, property, services or anything of value to a state for the accomplishment of CERCLA-authorized activities or tasks.

Core: The uranium-containing heart of a nuclear reactor, where energy is released.

Core Program Cooperative Agreement: An assistance agreement whereby EPA supports states or tribal governments with funds to help defray the cost of non-item-specific administrative and training activities.

Corrosion: The dissolution and wearing away of metal caused by a chemical reaction such as between water and the pipes, chemicals touching a metal surface, or contact between two metals.

Corrosive: A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away.

Cost-Effective Alternative: An alternative control or corrective method identified after analysis as being the best available in terms of reliability, performance, and cost. Although costs are one important consideration, regulatory and compliance analysis does not require EPA to choose the least expensive alternative. For example, when selecting a method for cleaning up a site on the Superfund National Priorities List, the Agency balances costs with the long-term effectiveness of the methods proposed.

Cost Recovery: A legal process by which potentially responsible parties who contributed to contamination at a Superfund site can be required to reimburse the Trust Fund for money spent during any cleanup actions by the federal government.

Cover Material: Soil used to cover compacted solid waste in a sanitary landfill.

Cover: Vegetation or other material providing protection as ground cover.

Cradle-to-Grave or Manifest System: A procedure in which hazardous materials are identified and followed as they are produced, treated, transported, and disposed of by a series of permanent, linkable, descriptive documents (e.g., manifests). Commonly referred to as the cradle-to-grave system.

Criteria Pollutants: The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Criteria: Descriptive factors taken into account by EPA in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. When issued by EPA, the criteria provide guidance to the states on how to establish their standards.

Crop Consumptive Use: The amount of water transpired during plant growth plus what evaporated from the soil surface and foliage in the crop area.

Cubic Feet Per Minute (CFM): A measure of the volume of a substance flowing through air within a fixed period of time. With regard to indoor air, refers to the amount of air, in cubic feet, that is exchanged with indoor air in a minute's time, i.e., the air exchange rate.

Cullet: Crushed glass.

Cultural Eutrophication: Increasing rate at which water bodies "die" by pollution from human activities.

Cultures and Stocks: Infectious agents and associated biologicals including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; waste from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures. (See: regulated medical waste.)

Cumulative Working Level Months (CWLM): The sum of lifetime exposure to radon working levels expressed in total working level months.

Curbside Collection: Method of collecting recyclable materials at homes, community districts or businesses.

Cutie-Pie: An instrument used to measure radiation levels.

Cyclone Collector: A device that uses centrifugal force to pull large particles from polluted air.

D

Data Call-In: A part of the Office of Pesticide Programs (OPP) process of developing key required test data, especially on the long-term, chronic effects of existing pesticides, in advance of scheduled Registration Standard reviews. Data Call-In from manufacturers is an adjunct of the Registration Standards program intended to expedite re-registration.

DDT: The first chlorinated hydrocarbon insecticide chemical name: Dichloro-Diphenyl-Trichloroethane). It has a half-life of 15 years and can collect in fatty tissues of certain animals. EPA banned registration and interstate sale of DDT for virtually all but emergency uses in the United States in 1972 because of its persistence in the environment and accumulation in the food chain.

Decay Products: Degraded radioactive materials, often referred to as "daughters" or "progeny"; radon decay products of most concern from a public health standpoint are polonium-214 and polonium-218.

Dechlorination: Removal of chlorine from a substance by chemically replacing it with hydrogen or hydroxide ions in order to detoxify a substances.

Decomposition: The breakdown of matter by bacteria and fungi, changing the chemical makeup and physical appearance of materials.

Decontamination: Removal of harmful substances such as noxious chemicals, harmful bacteria or other organisms, or radioactive material from exposed individuals, rooms and furnishings in buildings, or the exterior environment.

Deep-Well Injection: Deposition of raw or treated, filtered hazardous waste by pumping it into deep wells, where it is contained in the pores of permeable subsurface rock.

Deflocculating Agent: A material added to a suspension to prevent settling.

Defoliant: An herbicide that removes leaves from trees and growing plants.

Delegated State: A state (or other governmental entity such as a tribal government) that has received authority to administer an environmental regulatory program in lieu of a federal counterpart. As used in connection with NPDES, UIC, and PWS programs, the term does not connote any transfer of federal authority to a state.

Delist: Use of the petition process to have a facility's toxic designation rescinded.

Demand-side Waste Management: Prices whereby consumers use purchasing decisions to communicate to product manufacturers that they prefer environmentally sound products packaged with the least amount of waste, made from recycled or recyclable materials, and containing no hazardous substances.

Denitrification: The anaerobic biological reduction of nitrate to nitrogen gas.

Depletion Curve: In hydraulics, a graphical representation of water depletion from storage-stream channels, surface soil, and groundwater. A depletion curve can be drawn for base flow, direct runoff, or total flow.

Depressurization: A condition that occurs when the air pressure inside a structure is lower that the air pressure outside. Depressurization can occur when household appliances such as fireplaces or furnaces, that consume or exhaust house air, are not supplied with enough makeup air. Radon may be drawn into a house more rapidly under depressurized conditions.

Dermal Toxicity: The ability of a pesticide or toxic chemical to poison people or animals by contact with the skin. (See: contact pesticide.)

DES: A synthetic estrogen, diethylstilbestrol is used as a growth stimulant in food animals. Residues in meat are thought to be carcinogenic.

Desalination: [Desalinization] (1) Removing salts from ocean or brackish water by using various technologies. (2) Removal of salts from soil by artificial means, usually leaching.

Desiccant: A chemical agent that absorbs moisture; some desiccants are capable of drying out plants or insects, causing death.

Design Capacity: The average daily flow that a treatment plant or other facility is designed to accommodate.

Designated Pollutant: An air pollutant which is neither a criteria nor hazardous pollutant, as described in the Clean Air Act, but for which new source performance standards exist. The Clean Air Act does require states to control these pollutants, which include acid mist, total reduced sulfur (TRS), and fluorides.

Designated Uses: Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act. Uses can include cold water fisheries, public water supply, irrigation, etc.

Designer Bugs: Popular term for microbes developed through biotechnology that can degrade specific toxic chemicals at their source in toxic waste dumps or in ground water.

Destination Facility: The facility to which regulated medical waste is shipped for treatment and destruction, incineration, and/or disposal.

Destroyed Medical Waste: Regulated medical waste that has been ruined, torn apart, or mutilated through thermal treatment, melting, shredding, grinding, tearing, or breaking, so that it is no longer generally recognized as medical waste, but has not yet been treated (excludes compacted regulated medical waste.)

Destruction and Removal Efficiency (DRE): A percentage that represents the number of molecules of a compound removed or destroyed in an incinerator relative to the number of molecules entered the system (e.g., a DRE of 99.99 percent means that 9,999 molecules are destroyed for every 10,000 that enter; 99.99 percent is known as "four nines." For some pollutants, the RCRA removal requirement may be a stringent as "six nines.")

Destruction Facility: A facility that destroys regulated medical waste by mashing or mutilating it.

Desulfurization: Removal of sulfur from fossil fuels to reduce pollution.

Detectable Leak Rate: The smallest leak (from a storage tank), expressed in terms of gallons-or liters-per-hour, that a test can reliably discern with a certain probability of detection or false alarm.

Detection Criterion: A predetermined rule to ascertain whether a tank is leaking or not. Most volumetric tests use a threshold value as the detection criterion. (See: volumetric tank tests.)

Detergent: Synthetic washing agent that helps to remove dirt and oil. Some contain compounds which kill useful bacteria and encourage algae growth when they are in wastewater that reaches receiving waters.

Development Effects: Adverse effects such as altered growth, structural abnormality, functional deficiency, or death observed in a developing organism.

Diatomaceous Earth (Diatomite): A chalk-like material (fossilized diatoms) used to filter out solid waste in wastewater treatment plants, also used as an active ingredient in some powdered pesticides.

Diazinon: An insecticide. In 1986, EPA banned its use on open areas such as sod farms and golf courses because it posed a danger to migratory birds. The ban did not apply to agricultural, home lawn or commercial establishment uses.

Dibenzofurans: A group of highly toxic organic compounds.

Dicofol: A pesticide used on citrus fruits.

Diffused Air: A type of aeration that forces oxygen into sewage by pumping air through perforated pipes inside a holding tank.

Digester: In wastewater treatment, a closed tank; in solid-waste conversion, a unit in which bacterial action is induced and accelerated in order to break down organic matter and establish the proper carbon to nitrogen ratio.

Digestion: The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants.

Dike: A low wall that can act as a barrier to prevent a spill from spreading.

Diluent: Any liquid or solid material used to dilute or carry an active ingredient.

Dilution Ratio: The relationship between the volume of water in a stream and the volume of incoming water. It affects the ability of the stream to assimilate waste.

Dinocap: A fungicide used primarily by apple growers to control summer diseases. EPA proposed restrictions on its use in 1986 when laboratory tests found it caused birth defects in rabbits.

Dinoseb: A herbicide that is also used as a fungicide and insecticide. It was banned by EPA in 1986 because it posed the risk of birth defects and sterility.

Dioxin: Any of a family of compounds known chemically as dibenzo-p-dioxins. Concern about them arises from their potential toxicity and contaminants in commercial products. Tests on laboratory animals indicate that it is one of the more toxic man-made compounds.

Direct Discharger: A municipal or industrial facility which introduces pollution through a defined conveyance or system such as outlet pipes; a point source.

Disinfectant: A chemical or physical process that kills pathogenic organisms in water. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.

Dispersant: A chemical agent used to break up concentrations of organic material such as spilled oil.

Disposables: Consumer products, other items, and packaging used once or a few times and discarded.

Disposal: Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved secure landfills, surface impoundments, land farming, deep-well injection, ocean dumping, or incineration.

Dissolved Oxygen (DO): The oxygen freely available in water, vital to fish and other aquatic life and for the prevention of odors. DO levels are considered a most important indicator of a water body's ability to support desirable aquatic life. Secondary and advanced waste treatment are generally designed to ensure adequate DO in waste-receiving waters.

Dissolved Solids: Disintegrated organic and inorganic material in water. Excessive amounts make water unfit to drink or use in industrial processes.

Distillation: The act of purifying liquids through boiling, so that the steam condenses to a pure liquid and the pollutants remain in a concentrated residue.

Diversion: A channel with a supporting ridge on the lower side constructed across a slope to divert water at a non-erosive velocity to sites where it can be used or disposed of through a stable outlet.

Diversion Rate: The percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, or re-used.

DNA Hybridization: Use of a segment of DNA, called a DNA probe, to identify its complementary DNA; used to detect specific genes.

Dose Response: How a biological organism's response to a toxic substance quantitatively shifts as its overall exposure to the substance changes (e.g., a small dose of carbon monoxide may cause drowsiness; a large dose can be fatal.)

DOT Reportable Quantity: The quantity of a substance specified in U.S. Department of Transportation regulation that triggers labelling, packaging and other requirements related to shipping such substances.

Draft Permit: A preliminary permit drafted and published by EPA; subject to public review and comment before final action on the application.

Dredging: Removal of mud from the bottom of water bodies. This can disturb the ecosystem and causes silting that kills aquatic life. Dredging of contaminated muds can expose biota to heavy metals and other toxics. Dredging activities may be subject to regulation under Section 404 of the Clean Water Act.

Drop-off: Recyclable materials collection method in which individuals bring them to a designated collection site.

Dump: A site used to dispose of solid waste without environmental controls.

Dustfall Jar: An open container used to collect large particles from the air for measurement and analysis.

Dystrophic Lakes: Acidic, shallow bodies of water that contain much humus and/or other organic matter; contain many plants but few fish.

E

Ecological Impact: The effect that a man-made or natural activity has on living organisms and their non-living (abiotic) environment.

Ecology: The relationship of living things to one another and their environment, or the study of such relationships.

Ecological Indicator: A characteristic of the environment that, when measured, quantifies magnitude of stress, habitat characteristics, degree of exposure to a stressor, or ecological response to exposure. The term is a collective term for response, exposure. The term is a collective term for response, exposure, habitat, and stressor indicators.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial hazard identification, exposure and dose-response assessments, and risk characterization.

Economic Poisons: Chemicals used to control pests and to defoliate cash crops such as cotton.

Ecosphere: The "bio-bubble" that contains life on earth, in surface waters, and in the air. (See: biosphere.)

Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

Ecosystem Structure: Attributes related to instantaneous physical state of an ecosystem; examples include species population density, species richness or evenness, and standing crop biomass.

Ecotone: A habitat created by the juxtaposition of distinctly different habitats; an edge habitat; or an ecological zone or boundary where two or more ecosystems meet.

Effluent: Wastewater-treated or untreated-that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Effluent Guidelines: Technical EPA documents which set effluent limitations for given industries and pollutants.

Effluent Limitation: Restrictions established by a State or EPA on quantities, rates, and concentrations in wastewater discharges.

Effluent Standard: (See effluent limitation.)

Electrodialysis: A process that uses electrical current applied to permeable membranes to remove minerals from water. Often used to desalinize salty or brackish water.

Electrostatic Precipitator (ESP): A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Eligible Costs: The construction costs for waste-water treatment works upon which EPA grants are based.

EMAP Data: Environmental monitoring data collected under the auspices of the Environmental Monitoring and Assessment Program. All EMAP data share the common attribute of being of known quality, having been collected in the context of explicit data quality objectives (DQOs) and a consistent quality assurance program.

Emergency (Chemical): A situation created by an accidental release or spill of hazardous chemicals that poses a threat to the safety of workers, residents, the environment, or property.

Emergency Episode: (See: air pollution episode.)

Emergency Response Values: Concentrations of chemicals, published by various groups, defining acceptable levels for short-term exposures in emergencies.

Emission: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

Emission Factor: The relationship between the amount of pollution produced and the amount of raw material processed. For example, an emission factor for a blast furnace making iron would be the number of pounds of particulates per ton of raw materials.

Emission Inventory: A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community; used to establish emission standards.

Emission Standard: The maximum amount of air polluting discharge legally allowed from a single source, mobile or stationary.

Emissions Trading: EPA policy that allows a plant complex with several facilities to decrease pollution from some facilities while increasing it from others, so long as total results are equal to or better than previous limits. Facilities where this is done are treated as if they exist in a bubble in which total emissions are averaged out. Complexes that reduce emissions substantially may "bank" their "credits" or sell them to other industries. **Encapsulation:** The treatment of asbestos-containing material with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent their release into the air.

Enclosure: Putting an airtight, impermeable, permanent barrier around asbestos-containing materials to prevent the release of asbestos fibers into the air.

Endangered Species: Animals, birds, fish, plants, or other living organisms threatened with extinction by man-made or natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Endangerment Assessment: A study to determine the nature and extent of contamination at a site on the National Priorities List and the risks posed to public health or the environment. EPA or the state conduct the study when a legal action is to be taken to direct potentially responsible parties to clean up a site or pay for it. An endangerment assessment supplements a remedial investigation.

Energy Recovery: Obtaining energy from waste through a variety of processes (e.g., combustion.)

Enforceable Requirements: Conditions or limitations in permits issued under the Clean Water Act ,Section 402 or 404 that, if violated, could result in the issuance of a compliance order or initiation of a civil or criminal action under federal or applicable state laws. If a permit has not been issued, the term includes any requirement which, in the Regional Administrator's judgement, would be included in the permit when issued. Where no permit applies, the term includes any requirement which the RA determines is necessary for the best practical waste treatment technology to meet applicable criteria.

Enforcement: EPA, state, or local legal actions to obtain compliance with environmental laws, rules, regulations, or agreements and/or obtain penalties or criminal sanctions for violations. Enforcement procedures may vary, depending on the requirements of different environmental laws and related implementing regulations. Under CERCLA, for example, EPA will seek to require potentially responsible parties to clean up a Superfund site, or pay for the cleanup, whereas under the Clean Air Act the agency may invoke sanctions against cities failing to meet ambient air quality standards that could prevent certain types of construction or federal funding. In other situations, if investigations by EPA and state agencies uncover willful violations, criminal trials and penalties are sought.

Enforcement Decision Document (EDD): A document that provides an explanation to the public of EPA's selection of the cleanup alternative at enforcement sites on the National Priorities List. Similar to a Record of Decision.

Enhanced Inspection and Maintenance (I&M): An improved automobile inspection and maintenance program—aimed at reducing automobile emissions—that contains, at a minimum, more vehicle types and model years, tighter inspection, and better management practices. It may also include annual computerized or centralized inspections, under-the-hood inspection- for signs of tampering with pollution control equipment, and increased repair waiver cost.

Enrichment: The addition of nutrients (e.g., nitrogen, phosphorus, carbon compounds) from sewage effluent or agricultural runoff to surface water, greatly increases the growth potential for algae and other aquatic plants.

Environment: The sum of all external conditions affecting the life, development and survival of an organism.

Environmental Assessment: An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An independent assessment of the current status of a party's compliance with applicable environmental requirements or of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement: A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

Environmental Indicator: A measurement, statistic or value that provides a proximate gauge or evidence of the effects of environmental management programs or of the state or condition of the environment.

Environmental Response Team: EPA experts located in Edison, N.J., and Cincinnati, OH, who can provide around-the-clock technical assistance to EPA regional offices and states during all types of hazardous waste site emergencies and spills of hazardous substances.

Epidemiology: Study of the distribution of disease, or other health-related states and events in human populations, as related to age, sex, occupation, ethnic, and economic status in order to identify and alleviate health problems and promote better health.

Epilimnion: Upper waters of a thermally stratified lake subject to wind action.

Episode (Pollution): An air pollution incident in a given area caused by a concentration of atmospheric pollutants under meteorological conditions that may result in a significant increase in illnesses or deaths. May also describe water pollution events or hazardous material spills.

Equilibrium: In relation to radiation, the state at which the radioactivity of consecutive elements within a radioactive series is neither increasing nor decreasing.

Equivalent Method: Any method of sampling and analyzing for air pollution which has been demonstrated to the EPA Administrator's satisfaction to be, under specific conditions, an acceptable alternative to normally used reference methods.

Erosion: The wearing away of land surface by wind or water, intensified by land-clearing practices related to farming, residential or industrial development, road building, or logging.

Estuary: Regions of interaction between rivers and near-shore ocean waters, where tidal action and river flow mix fresh and salt water. Such areas include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife. (See: wetlands.)

Ethylene Dibromide (EDB): A chemical used as an agricultural fumigant and in certain industrial processes. Extremely toxic and found to be a carcinogen in laboratory animals, EDB has been banned for most agricultural uses in the United States.

Eutrophic Lakes: Shallow, murky bodies of water with concentrations of plant nutrients causing excessive production of algae. (See: dystrophic lakes.)

Eutrophication: The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the water body is choked by abundant plant life due to higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

Evaporation Ponds: Areas where sewage sludge is dumped and dried.

Evapotranspiration: The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil.

Exceedance: Violation of the pollutant levels permitted by environmental protection standards.

Exclusion: In the asbestos program, one of several situations that permit a Local Education Agency (LEA) to delete one or more of the items required by the Asbestos Hazard Emergency Response Act (AHERA), e.g., records of previous asbestos sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.

Exclusionary Ordinance: Zoning that excludes classes of persons or businesses from a particular neighborhood or area.

Exempt Solvent: Specific organic compounds not subject to requirements of regulation because are deemed by EPA to be of negligible photochemical reactivity.

Exempted Aquifer: Underground bodies of water defined in the Underground Injection Control program as aquifers that are potential sources of drinking water though not being used as such, and thus exempted from regulations barring underground injection activities.

Exotic Species: A species that is not indigenous to a region.

Experimental Use Permit: Obtained by manufacturers for testing new pesticides or uses of thereof whenever they conduct experimental field studies to support registration on 10 acres or more on land or one acre or more of water.

Explosive Limits: The amounts of vapor in the air that form explosive mixtures; limits are expressed as lower and upper limits and give the range of vapor concentrations in air that will explode if an ignition source is present.

Exposure: The amount of radiation or pollutant present in a given environment that represents a potential health threat to living organisms.

Exposure Indicator: A characteristic of the environment measured to provide evidence of the occurrence or magnitude of a response indicator's exposure to a chemical or biological stress.

Extraction Procedure (E P Toxic): Determining toxicity by a procedure which simulates leaching; if a certain concentration of a toxic substance can be leached from a waste, that waste is considered hazardous, i.e., "E P Toxic."

Extremely Hazardous Substances: Any of 406 chemicals identified by EPA as toxic, and listed under SARA Title III. The list is subject to periodic revision.

F

Fabric Filter: A cloth device that catches dust particles from industrial emissions.

Facilities Plans: Plans and studies related to the construction of treatment works necessary to comply with the Clean Water Act or RCRA. A facilities plan investigates needs and provides information on the cost effectiveness of alternatives, a recommended plan, an environmental assessment of the recommendations, and descriptions of the treatment works, costs, and a completion schedule.

Facility Emergency Coordinator: Representative of a facility covered by environmental law (e.g, a chemical plant) who participates in the emergency reporting process with the Local Emergency Planning Committee (LEPC).

Feasibility Study: 1. Analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site such as one on the National Priorities List. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is underway; together, they are commonly referred to as the "RI/FS". 2. A small-scale investigation of a problem to ascertain whether a proposed research approach is likely to provide useful data.

Fecal Coliform Bacteria: Bacteria found in the intestinal tracts of mammals. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

Federal Implementation Plan: Under current law, a federally implemented plan to achieve attainment of air quality standards, used when a state is unable to develop an adequate plan.

Feedlot: A confined area for the controlled feeding of animals. Tends to concentrate large amounts of animal waste that cannot be absorbed by the soil and, hence, may be carried to nearby streams or lakes by rainfall runoff.

Fen: A type of wetland that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium. (See wetlands.)

FIFRA Pesticide Ingredient: An ingredient of a pesticide that must be registered with EPA under the Federal Insecticide, fungicide, and Rodenticide Act. Products making pesticide claims mst register under FIFRA and may be subject to labeling and use requirements.

Filling: Depositing dirt, mud or other materials into aquatic areas to create more dry land, usually for agricultural or commercial development purposes, often with ruinous ecological consequences.

Filter Strip: Strip or area of vegetation used for removing sediment, organic matter, and other pollutants from runoff and waste water.

Filtration: A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by means of porous media such as sand or a man-made filter; often used to remove particles that containing pathogens.

Financial Assurance for Closure: Documentation or proof that an owner or operator of a facility such as a landfill or other waste repository is capable of paying the projected costs of closing the facility and monitoring it afterwards as provided in RCRA regulations.

Finding of No Significant Impact: A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement. An FNSI is based on the results of an environmental assessment.

First Draw: The water that comes out when a tap is first opened, likely to have the highest level of lead contamination from plumbing materials.

Flare: A control device that burns hazardous materials to prevent their release into the environment; may operate continuously or intermittently, usually on top a stack.

Floc: A clump of solids formed in sewage by biological or chemical action.

Flocculation: Process by which clumps of solids in water or sewage aggregate through biological or chemical action so they can be separated from water or sewage.

Floor Sweep: Capture of heavier-than-air gases that collect at floor level.

Flow Rate: The rate, expressed in gallons- or liters-per-hour, at which a fluid escapes from a hole or fissure in a tank. Such measurements are also made of liquid waste, effluent, and surface water movement.

Flowmeter: A gauge indicating the velocity of wastewater moving through a treatment plant or of any liquid moving through various industrial processes.

Flue Gas Desulfurization: A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the art technology for major SO_2 emitters, like power plants.

Flue Gas: The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Fluidized Bed Incinerator: An incinerator that uses a bed of hot sand or other granular material to transfer heat directly to waste. Used mainly for destroying municipal sludge.

Flume: A natural or man-made channel that diverts water.

Fluorides: Gaseous, solid, or dissolved compounds containing fluorine that result from industrial processes. Excessive amounts in food can lead to fluorosis.

Fluorocarbons (FCs): Any of a number of organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant for domestic aerosols, they are now found mainly in coolants and some industrial processes. FCs containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be modifying the ozone layer in the stratosphere, thereby allowing more harmful solar radiation to reach the Earth's surface.

Flush: 1. To open a cold-water tap to clear out all the water which may have been sitting for a long time in the pipes. In new homes, to flush a system means to send large volumes of water gushing through the unused pipes to remove loose particles of solder and flux. 2. To force large amounts of water through liquid to clean out piping or tubing, storage or process tanks.

Fly Ash: Non-combustible residual particles expelled by flue gas.

Fogging: Applying a pesticide by rapidly heating the liquid chemical so that it forms very fine droplets that resemble smoke or fog. Used to destroy mosquitoes, black flies, and similar pests.

Food Chain: A sequence of organisms, each of which uses the next, lower member of the sequence as a food source.

Formaldehyde: A colorless, pungent, and irritating gas, CH20, used chiefly as a disinfectant and preservative and in synthesizing other compounds like resins.

Formulation: The substances comprising all active and inert ingredients in a pesticide.

Fresh Water: Water that generally contains less than 1,000 milligrams-per-liter of dissolved solids.

Friable Asbestos: Any material containing more than one percent asbestos, and that can be crumbled or reduced to powder by hand pressure. (May include previously non-friable material which becomes broken or damaged by mechanical force.)

Friable: Capable of being crumbled, pulverized, or reduced to powder by hand pressure.

Fuel Economy Standard: The Corporate Average Fuel Economy Standard (CAFE) effective in 1978. It enhanced the national fuel conservation effort imposing a miles-per-gallon floor for motor vehicles.

Fugitive Emissions: Emissions not caught by a capture system.

Fume: Tiny particles trapped in vapor in a gas stream.

Fumigant: A pesticide vaporized to kill pests. Used in buildings and greenhouses.

Functional Equivalent: Term used to describe EPA's decision-making process and its relationship to the environmental review conducted under the National Environmental Policy Act (NEPA). A review is considered functionally equivalent when it addresses the substantive components of a NEPA review.

Fungi: (Singular: Fungus) Molds, mildews, yeasts, mushrooms, and puffballs, a group organisms lacking in chlorophyll (i.e., are not photosynthetic) and which are usually non-mobile, filamentous, and multicellular. Some grow in soil, others attach themselves to decaying trees and other plants whence they obtain nutrients. Some are pathogens, others stabilize sewage and digest composted waste.

Fungicide: Pesticides which are used to control, deter, or destroy fungi.

Fungistat: A chemical that keeps fungi from growing.

Furrow Irrigation: Irrigation method in which water travels through the field by means of small channels between each row or groups of rows.

Future Liability: Refers to potentially responsible parties' obligations to pay for additional response activities beyond those specified in the Record of Decision or Consent Decree.

G

Game Fish: Species like trout, salmon, or bass, caught for sport. Many of them show more sensitivity to environmental change than "rough" fish.

Garbage: Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking, and serving of foods.

Gas Chromatograph/Mass Spectrometer: Highly sophisticated instrument that identifies the molecular composition and concentrations of various chemicals in water and soil samples.

Gasification: Conversion of solid material such as coal into a gas for use as a fuel.

Gasoline Volatility: The property of gasoline whereby it evaporates into a vapor. Gasoline vapor is a volatile organic compound.

General Permit: A permit applicable to a class or category of dischargers.

General Reporting Facility: A facility having one or more hazardous chemicals above the 10,000 pound threshold for planning quantities. Such facilities must file MSDS and emergency inventory information with the SERC and LEPC and local fire departments.

Generator: 1. A facility or mobile source that emits pollutants into the air or releases hazardous waste into water or soil. 2. Any person, by site, whose act or process produces regulated medical waste or whose act first causes such waste to become subject to regulation. In a case where more than one person (e.g., doctors with separate medical practices) is located in the same building, each business entity is a separate generator.

Genetic Engineering: A process of inserting new genetic information into existing cells in order to modify any organism for the purpose of changing one of its characteristics.

Geographic Information System (GIS): A computer system designed for storing, manipulating, analyzing, and displaying data in a geographic context.

Germicide: Any compound that kills disease-causing microorganisms.

Glovebag: A polyethylene or polyvinyl chloride bag-like enclosure affixed around an asbestos-containing source (most often thermal system insulation) permitting the material to be removed while minimizing release of airborne fibers in the surrounding atmosphere.

Grain Loading: The rate at which particles are emitted from a pollution source. Measurement is made by the number of grains per cubic foot of gas emitted.

Granular Activated Carbon Treatment: A filtering system often used in small water systems and individual homes to remove organics. GAC can be highly effective in removing elevated levels of radon from water.

Grassed Waterway: Natural or constructed watercourse or outlet that is shaped or graded and established in suitable vegetation for the disposal of runoff water without erosion.

Gray Water: Domestic wastewater composed of wash water from kitchen, bathroom, and laundry sinks, tubs, and washers.

Greenhouse Effect: The warming of the Earth's atmosphere attributed to a build-up of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while infra-red radiation makes the atmosphere opaque to a counterbalancing loss of heat.

Grinder Pump: A mechanical device that shreds solids and raises sewage to a higher elevation through pressure sewers.

Ground Cover: Plants grown to keep soil from eroding.

Ground Water: The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

Ground-Water Discharge: Ground water entering near coastal waters which has been contaminated by landfill leachate, deep well injection of hazardous wastes, septic tanks, etc.

Gully Erosion: Severe erosion in which trenches are cut to a depth greater than 30 centimeters (a foot). Generally, ditches deep enough to cross with farm equipment are considered gullies.

H

Habitat: The place where a population (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Habitat Indicator: A physical attribute of the environment measured to characterize conditions necessary to support an organism, population, or community in the absence of pollutants, e.g., salinity of estuarine waters or substrate type in streams or lakes.

Half-Life: 1. The time required for a pollutant to lose half its affect on the environment. For example, the biochemical half-life of DDT in the environment is 15 years of Radium. 1,580 years. 2. The time required for half of the atoms of a radioactive element to undergo self-transmutation or decay. 3. The time required for the elimination of one half a total dose from the body.

Halon: Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere causes depletion of ozone. Halons are used in fire-fighting.

Hammermill: A high-speed machine that uses hammers and cutters to crush, grind, chip, or shred solid waste.

Hard Water: Alkaline water containing dissolved salts that interfere with some industrial processes and prevent soap from sudsing.

Hauler: Garbage collection company that offers complete refuse removal service; many also will also collect recyclables.

Hazard Communication Standard: An OSHA regulation that requires chemical manufacturers, suppliers, and importers to assess the hazards of the chemicals that they make, supply, or import, and to inform employers, customers, and workers of these hazards through MSDS sheets.

Hazardous Air Pollutants: Air pollutants which are not covered by ambient air quality standards but which, as defined in the Clean Air Act, may reasonably be expected to cause or contribute to irreversible illness or death. Such pollutants include asbestos, beryllium, mercury, benzene, coke oven emissions, radionuclides, and vinyl chloride.

Hazardous Chemical: An EPA designation for any hazardous material requiring an MSDS under OSHA's Hazard Communication Standard. Such substances are capable of producing fires and explosions or adverse health effects like cancer and dermatitis. Hazardous chemicals are distinct from hazardous waste.(See: Hazardous Waste.)

Hazardous Ranking System: The principle screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or ground water, and on other factors such as density and proximity of human population. This score is the primary factor in deciding if the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hazardous Substance: 1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise released into the environment.

Hazardous Waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Hazardous Waste Landfill: An excavated or engineered site where hazardous waste is deposited and covered.

Hazards Analysis: Procedures used to (1) identify potential sources of release of hazardous materials from fixed facilities or transportation accidents; (2) determine the vulnerability of a geographical area to a release of hazardous materials; and (3) compare hazards to determine which present greater or lesser risks to a community.

Hazards Identification: Providing information on which facilities have extremely hazardous substances, what those chemicals are, how much there is at each facility, how the chemicals are stored, and whether they are used at high temperatures.

Health Assessment: An evaluation of available data on existing or potential risks to human health posed by a Superfund site. The Agency for Toxic Substances and Disease Registry (ATSDR) of the Department of Health and Human Services (DHHS) is required to perform such an assessment at every site on the National Priorities List.

Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

Heavy Metals: Metallic elements with high atomic weights, e.g., mercury, chromium, cadmium, arsenic, and lead; can damage living things at low concentrations and tend to accumulate in the food chain.

Heptachlor: An insecticide that was banned on some food products in 1975 and all of them 1978. It was allowed for use in seed treatment until 1983. More recently it was found in milk and other dairy products in Arkansas and Missouri where dairy cattle were illegally fed treated seed.

Herbicide: A chemical pesticide designed to control or destroy plants, weeds, or grasses.

Herbivore: An animal that feeds on plants.

Heterotrophic Organisms: Species that are dependent on organic matter for food.

High-Density Polyethylene: A material used to make plastic bottles and other products that produces toxic fumes when burned.

High-Level Radioactive Waste (HLW): Waste generated in core fuel of a nuclear reactor, found at nuclear reactors or by nuclear fuel reprocessing; is a serious threat to anyone who comes near the waste without shielding. (See: low-level radioactive waste.)

High-Level Nuclear Waste Facility: Plant designed to handle disposal of used nuclear fuel, high-level radioactive waste, and plutonium waste.

Holding Pond: A pond or reservoir, usually made of earth, built to store polluted runoff.

Homeowner Water System: Any water system which supplies piped water to a single residence.

Homogeneous Area: In accordance with Asbestos Hazard and Emergency Response Act (AHERA) definitions, an area of surfacing materials, thermal surface insulation, or miscellaneous material that is uniform in color and texture.

Hood Capture Efficiency: Ratio of the emissions captured by a hood and directed into a control or disposal device, expressed as a percent of all emissions.

Host: 1. In genetics, the organism, typically a bacterium, into which a gene from another organism is transplanted. 2. In medicine, an animal infected or parasitized by another organism.

Household Waste (Domestic Waste): Solid waste, composed of garbage and rubbish, which normally originated in a private home or apartment house. Domestic waste may contain a significant amount of toxic or hazardous waste.

Hydraulic Gradient: In general, the direction of groundwater flow due to changes in the depth of the water table.

Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.

Hydrogen Sulfide (HS): Gas emitted during organic decomposition. Also a by-product of oil refining and burning. Smells like rotten eggs and, in heavy concentration, can kill or cause illness.

Hydrogeology: The geology of ground water, with particular emphasis on the chemistry and movement of water.

Hydrology: The science dealing with the properties,distribution, and circulation of water.

Hypolimnion: Bottom waters of a thermally stratified lake. The hypolimnion of a eutrophic lake is usually low or lacking in oxygen.

I

Identification Code or EPA I.D. Number: The unique code assigned to each generator, transporter, and treatment, storage, or disposal facility by regulating agencies to facilitate identification and tracking of chemicals or hazardous waste.

Ignitable: Capable of burning or causing a fire.

Immediately Dangerous to Life and Health (IDLH): The maximum level to which a healthy individual can be exposed to a chemical for 30 minutes and escape without suffering irreversible health effects or impairing symptoms. Used as a "level of concern." (See: level of concern.)

Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

Incident Command Post: A facility located at a safe distance from an emergency site, where the incident commander, key staff, and technical representatives can make decisions and deploy emergency manpower and equipment.

Incident Command System (ICS): The organizational arrangement wherein one person, normally the Fire Chief of the impacted district, is in charge of an integrated, comprehensive emergency response organization and the emergency incident site, backed by an Emergency Operations Center staff with resources, information, and advice.

Incineration: A treatment technology involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Incineration at Sea: Disposal of waste by burning at sea on specially-designed incinerator ships.

Incinerator: A furnace for burning waste under controlled conditions.

Incompatible Waste: A waste unsuitable for mixing with another waste or material because it may react to form a hazard.

Indicator: In biology, an organism, species, or community whose characteristics show the presence of specific environmental conditions, good or bad.

Indirect Discharge: Introduction of pollutants from a non-domestic source into a publicly owned waste-treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes enter local sewers.

Indoor Air: The breathing air inside a habitable structure or conveyance.

Indoor Air Pollution: Chemical, physical, or biological contaminants in indoor air.

Indoor Climate: Temperature, humidity, lighting, and noise levels in a habitable structure or conveyance. Indoor climate can affect indoor air pollution.

Industrial Pollution Prevention: Combination of industrial source reduction and toxic chemical use substitution

Industrial Source Reduction: Practices that reduce the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment; Also reduces the threat to public health and the environment associated with such releases. Term includes equipment or technology modifications, substitution of raw materials, and improvements in housekeeping, maintenance, training or inventory control.

Industrial Waste: Unwanted materials from an industrial operation; may be liquid, sludge, solid, or hazardous waste.

Inert Ingredient: Pesticide components such as solvents, carriers, dispersants,and surfactants that are not active against target pests. Not all inert ingredients are innocuous.

Inertial Separator: A device that uses centrifugal force to separate waste particles.

Infectious Agent: Any organism, such as a virus or bacterium, that is pathogenic and capable of being communicated by invasion and multiplication in body tissues.

Infectious Waste: Hazardous waste with infectious characteristics, including: contaminated animal waste; human blood and blood products; isolation waste, pathological waste; and discarded sharps (needles, scalpels or broken medical instruments.)

Infiltration: 1. The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. 2. The technique of applying large volumes of waste water to land to penetrate the surface and percolate through the underlying soil. (See: percolation.)

Infiltration Rate: The quantity of water than can enter the soil in a specified time interval.

Inflow: Entry of extraneous rain water into a sewer system from sources other than infiltration, such as basement drains, manholes, storm drains, and street washing.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Information File: In the Superfund program, a file that contains accurate, up-to-date documents on a Superfund site. The file is usually located in a public building (school, library, or city hall) convenient for local residents.

Injection Well: A well into which fluids are injected for purposes such as waste disposal, improving the recovery of crude oil, or solution mining.

Injection Zone: A geological formation receiving fluids through a well.

Innovative Technologies: New or inventive methods to treat effectively hazardous waste and reduce risks to human health and the environment.

Inoculum: 1. Bacterium placed in compost to start biological action. 2. A medium containing organisms that is introduced into cultures or living organisms.

Inorganic Chemicals: Chemical substances of mineral origin, not of basically carbon structure.

Insecticide: A pesticide compound specifically used to kill or prevent the growth of insects.

Inspection and Maintenance (I/M): 1. Activities to assure that vehicles' emissions-controls work properly. 2. Also applies to wastewater treatment plants and other anti-pollution facilities and processes.

Instream Use: Water use taking place within a stream channel, e.g., hydro-electric power generation, navigation, water quality improvement, fish propagation, recreation.

In-Situ Stripping: Treatment system that remove or "strips" volatile organic compounds from contaminated ground or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Integrated Pest Management (IPM): A mixture of chemical and other, non-pesticide, methods to control pests.

Integrated Waste Management: Using a variety of practices to handle municipal solid waste; can include source reduction, recycling, incineration, and landfilling.

Interceptor Sewers: Large sewer lines that, in a combined system, control the flow of sewage to the treatment plant. In a storm, they allow some of the sewage to flow directly into a receiving stream, thus keeping it from overflowing onto the streets. Also used in separate systems to collect the flows from main and trunk sewers and carry them to treatment points.

Interim (Permit) Status: Period during which treatment, storage and disposal facilities coming under RCRA in 1980 are temporarily permitted to operate while awaiting a permanent permit. Permits issued under these circumstances are usually called "Part A" or "Part B" permits.

Interstate Carrier Water Supply: A source of water for drinking and sanitary use on planes, buses, trains, and ships operating in more than one state. These sources are federally regulated.

Interstate Commerce Clause: A clause of the U.S. Constitution which reserves to the federal government the right to regulate the conduct of business across state lines. Under this clause, for example, the U.S. Supreme Court has ruled that states may not inequitably restrict the disposal out-of-state wastes in their jurisdictions.

Interstate Waters: Waters that flow across or form part of state or international boundaries, e.g., the Great Lakes, the Mississippi River, or coastal waters.

Interstitial Monitoring: The continuous surveillance of the space between the walls of an underground storage tank.

Inventory (TSCA): Inventory of chemicals produced pursuant to Section 8 (b) of the Toxic Substances Control Act.

Inversion: A layer of warm air preventing the rise of cooling air and pollutants trapped beneath it. Can cause an air pollution episode.

Ion: An electrically charged atom that can be drawn from waste water during electrodialysis.

Ion Exchange Treatment: A common water-softening method often found on a large scale at water purification plants that remove some organics and radium by adding calcium oxide or calcium hydroxide to increase the ph to a level where the metals will precipitate out.

Ionization Chamber: A device that measures the intensity of ionizing radiation.

Ionizing Radiation: Radiation that can strip electrons from atoms, i.e., alpha, beta, and gamma radiation.

Irradiated Food: Food subject to brief radioactivity, usually gamma rays, to kill insects, bacteria, and mold, and to permit storage without refrigeration.

Irradiation: Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet), for medical purposes, to sterilize milk or other foodstuffs, or to induce polymerization of monomers or vulcanization of rubber.

Irrigation: Applying water or wastewater to land areas to supply the water and nutrient needs of plants.

Irrigation Efficiency: The amount of water stored in the crop root zone compared to the amount of irrigation water applied.

Irrigation Return Flow: Surface and subsurface water which leaves the field following application of irrigation water.

Irritant: A substance that can cause irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high level exposure, or chronic from repeated low-level exposures to such compounds as chlorine, nitrogen dioxide, and nitric acid.

Isotope: A variation of an element that has the same atomic number of protons but a different weight because of the number of neutrons. Various isotopes of the same element may have different radioactive behaviors, some are highly unstable.

K

Karst: A geologic formation of irregular limestone deposits with sinks, underground streams, and caverns.

Kinetic Rate Coefficient: A number that describes the rate at which a water constituent such as a biochemical oxygen demand or dissolved oxygen rises or falls.

L

Lagoon: 1. A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater; also used for storage of wastewater or spent nuclear fuel rods. 2. Shallow body of water, often separated from the sea by coral reefs or sandbars.

Land Application: Discharge of wastewater onto the ground for treatment or reuse. (See: irrigation.)

Land Ban: Phasing out of land disposal of most untreated hazardous wastes, as mandated by the 1984 RCRA amendments.

Land Farming (of waste): A disposal process in which hazardous waste deposited on or in the soil is degraded naturally by microbes.

Landfills: 1. Sanitary landfills are disposal sites for non-hazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day. 2. Secure chemical landfills are disposal sites for hazardous waste, selected and designed to minimize the chance of release of hazardous substances into the environment.

Landscape: The traits, patterns, and structure of a specific geographic area, including its biological composition, its physical environment, and its anthropogenic or social patterns. An area where interacting ecosystems are grouped and repeated in similar form.

Landscape Characterization: Documentation of the traits and patterns of the essential elements of the landscape.

Landscape Ecology: The study of the distribution patterns of communities and ecosystems, the ecological processes that affect those patterns, and changes in pattern and process over time.

Landscape Indicator: A measurement of the landscape, calculated from mapped or remotely sensed data, used to describe spatial patterns of land use and land cover across a geographic area. Landscape indicators may be useful as measures of certain kinds of environmental degradation such as forest fragmentation.

Large Quantity Generator: Person or facility generating more than 2200 pounds of hazardous waste per month. Such generators produce about 90 percent of the nation's hazardous waste, and are subject to all RCRA requirements.

Lateral Sewers: Pipes that run under city streets and receive the sewage from homes and businesses, as opposed to domestic feeders and main trunk lines.

LC50/Lethal Concentration: Median level concentration, a standard measure of toxicity. It tells how much of a substance is needed to kill half of a group of experimental organisms in a given time. (See: LD50.)

LD 50/ Lethal Dose: The dose of a toxicant that will kill 50 percent of the test organisms within a designated period. The lower the LD 50, the more toxic the compound.

Leachate: Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.

Leachate Collection System: A system that gathers leachate and pumps it to the surface for treatment.

Leaching: The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid. (See: leachate.)

Lead (Pb): A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations. (See: heavy metals.)

Level of Concern (LOC): The concentration in air of an extremely hazardous substance above which there may be serious immediate health effects to anyone exposed to it for short periods **Lift:** In a sanitary landfill, a compacted layer of solid waste and the top layer of cover material.

Lifting Station: (See: pumping station.)

Limestone Scrubbing: Use of a limestone and water solution to remove gaseous stack-pipe sulfur before it reaches the atmosphere.

Limited Degradation: An environmental policy permitting some degradation of natural systems but terminating at a level well beneath an established health standard.

Limiting Factor: A condition whose absence or excessive concentration, is incompatible with the needs or tolerance of a species or population and which may have a negative influence on their ability to thrive. survive.

Limnology: The study of the physical, chemical, hydrological, and biological

Liner: 1. A relatively impermeable barrier designed to keep leachate inside a landfill. Liner materials include plastic and dense clay. 2. An insert or sleeve for sewer pipes to prevent leakage or infiltration.

Lipid Solubility: The maximum concentration of a chemical that will dissolve in fatty substances. Lipid soluble substances are insoluble in water. They will very selectively disperse through the environment via uptake in living tissue.

Liquefaction: Changing a solid into a liquid.

Liquid Injection Incinerator: Commonly used system that relies on high pressure to prepare liquid wastes for incineration breaking them up into tiny droplets to allow easier combustion.

List: Shorthand term for EPA list of violating facilities or firms debarred from obtaining government contracts because they violated certain sections of the Clean Air or Clean Water Acts. The list is maintained by The Office of Enforcement and Compliance Monitoring.

Listed Waste: Wastes listed as hazardous under RCRA but which have not been subjected to the Toxic Characteristics Listing Process because the dangers they present are considered self-evident.

Litter: The highly visible portion of solid waste carelessly discarded outside the regular garbage and trash collection and disposal system.

Local Education Agency (LEA): In the asbestos program, an educational agency at the local level that exists primarily to operate schools or to contract for educational services, including primary and secondary public and private schools. A single, unaffiliated school can be considered an LEA for AHERA purposes.

Local Emergency Planning Committee (LEPC): A committee appointed by the state emergency response commission, as required by SARA Title III, to formulate a comprehensive emergency plan for its jurisdiction.

Low NO^x Burners: One of several combustion technologies used to reduce emissions of Nitrogen Oxides (NO^x.)

Low-Level Radioactive Waste (LLRW): Wastes less hazardous than most of those associated with nuclear reactor; generated by hospitals, research laboratories, and certain industries. The Department of Energy, Nuclear Regulatory Commission, and EPA share responsibilities for managing them. (See: high-level radioactive wastes.)

Lower Explosive Limit (LEL): The concentration of a compound in air below which the mixture will not catch on fire.

Lowest Achievable Emission Rate: Under the Clean Air Act, the rate of emissions that reflects (a) the most stringent emission limitation in the implementation plan of any state for such source unless the owner or operator demonstrates such limitations are not achievable; or (b) the most stringent emissions limitation achieved in practice, whichever is more stringent. A proposed new or modified source may not emit pollutants in excess of existing new source standards.

M

Magnetic Separation: Use of magnets to separate ferrous materials from mixed municipal waste stream.

Mandatory Recycling: Programs which by law require consumers to separate trash so that some or all recyclable materials are recovered for recycling rather than going to landfills.

Manual Separation: Hand sorting of reyclable or compostable materials in waste.

Major Modification: This term is used to define modifications of major stationary sources of emissions with respect to Prevention of Significant Deteriotation and New Source Review under the Clean Air Act.

Major Stationary Sources: Term used to determine the applicability of Prevention of Significant Deterioration and new source regulations. In a nonattainment area, any stationary pollutant source with potential to emit more than 100 tons per year is considered a major stationary source. In PSD areas the cutoff level may be either 100 or 250 tons, depending upon the source.

Majors: Larger publicly owned treatment works (POTWs) with flows equal to at least one million gallons per day (mgd) or servicing population equivalent to 10,000 persons; certain other POTWs having significant water quality impacts. (See: minors.)

Management Plan: Under the Asbestos Hazard Emergency Response Act (AHERA), a document that each Local Education Agency is required to prepare, describing all activities planned and undertaken by a school to comply with AHERA regulations, including building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure.

Manifest System: Tracking of hazardous waste from "cradle to grave" (generation through disposal) with accompanying documents known as manifests.(See: Cradle to Grave.)

Manual Separation: Hand separation of compostable or recyclable material from waste.

Manufacturers Formulation: A list of substances or component parts as described by the maker of a coating, pesticide, or other product containing chemicals or other substances.

Marine Sanitation Device: Any equipment or process installed on board a vessel to receive, retain, treat, or discharge sewage.

Marsh: A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be either fresh or saltwater, tidal or non-tidal. (See: wetlands.)

Material Category: In the asbestos program, broad classification of materials into thermal surfacing insulation, surfacing material, and miscellaneous material.

Materials Recovery Facility: A facility that processes residentially collected mixed recyclables into new products available for market.

Material Type is classification of suspect material by its specific use or application, e.g., pipe insulation, fireproofing, and floor tile.

Material Safety Data Sheet (MSDS): A compilation of information required under the OSHA Communication Standard on the identity of hazardous chemicals, health, and physical hazards, exposure limits, and precautions. Section 311 of SARA requires facilities to submit MSDSs under certain circumstances.

Materials Recovery Facility (MRF): Facility that processes residentially collected mixed recyclables into new products.

Maximum Contaminant Level: The maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards.

Maximum Contaminant Level Goal (MCLG): Under the Safe Drinking Water Act, a non-enforceable concentration of a drinking water contaminant, set at the level at which no known or anticipated adverse effects on human health occur and which allows an adequate safety margin. The MCLG is usually the starting point for determining the regulated Maximum Contaminant Level. (See; Maximum Contaminant Level.)

Mechanical Aeration: Use of mechanical energy to inject air into water to cause a waste stream to absorb oxygen.

Mechanical Separation: Using mechanical means to separate waste into various components.

Mechanical Turbulence: Random irregularities of fluid motion in air caused by buildings or other non-thermal, processes.

Media: Specific environments-air, water, soil-which are the subject of regulatory concern and activities.

Medical Surveillance: A periodic comprehensive review of a worker's health status; acceptable elements of such surveillance program are listed in the Occupational Safety and Health Administration standards for asbestos.

Medical Waste: Any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, excluding hazardous waste identified or listed under 40 CFR Part 261 or any household waste as defined in 40 CFR Sub-section 261.4 (b)(1)).

Mercury: A heavy metal that can accumulate in the environment and is highly toxic if breathed or swallowed. (See: heavy metals.)

Metabolites: Any substances produced by biological processes, such as those from pesticides.

Methane: A colorless, nonpoisonous, flammable gas created by anaerobic decomposition of organic compounds.

Method 18: An EPA test method which uses gas chromatographic techniques to measure the concentration of volatile organic compounds in a gas stream.

Method 24: An EPA reference method to determine density, water content and total volatile content (water and VOC) of coatings.

Method 25: An EPA reference method to determine the VOC concentration in a gas stream.

Microclimate: The localized climate conditions with in an urban area or neighborhood.

Microbial Pesticide: A microorganism that is used to control a pest, but of minimum toxicity to man.

Million-gallons Per Day (MGD): A measure of water flow.

Minimization: A comprehensive program to minimize or eliminate wastes, usually applied to wastes at their point of origin. (See: waste minimization.)

Minors: Publicly owned treatment works with flows less than 1 million gallons per day. (See: majors.)

Miscellaneous ACM: Interior asbestos-containing building material or structural components, members or fixtures, such as floor and ceiling tiles; does not include surfacing materials or thermal system insulation.

Miscellaneous materials: Interior building materials on structural components, such as floor or ceiling tiles.

Miscible Liquids: Two or more liquids that can be mixed and will remain mixed under normal conditions.

Missed Detection: The situation that occurs when a test indicates that a tank is "tight" when in fact it is leaking.

Mist: Liquid particles measuring 40 to 500 microns, are formed by condensation of vapor. By comparison, fog particles are smaller than 40 microns.

Mitigation: Measures taken to reduce adverse impacts on the environment.

Mixed Funding: Settlements in which potentially responsible parties and EPA share the cost of a response action.

Mixed Liquor: A mixture of activated sludge and water containing organic matter undergoing activated sludge treatment in an aeration tank.

Mobile Incinerator Systems: Hazardous waste incinerators that can be transported from one site to another.

Mobile Source: Any non-stationary source of air pollution such as cars, trucks, motorcycles, buses, airplanes, locomotives.

Model Plant: A hypothetical plant design used for developing economic, environmental, and energy impact analyses as support for regulations or regulatory guidelines; first step in exploring the economic impact of a potential NSPS.

Molten Salt Reactor: A thermal treatment unit that rapidly heats waste in a heat-conducting fluid bath of carbonate salt.

Monitoring Well: 1. A well used to obtain water quality samples or measure ground-water levels. 2. Well drilled at a hazardous waste management facility or Superfund site to collect ground-water samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the ground water beneath the site.

Monitoring: Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, plants, and animals.

Monoclonal Antibodies: (Also called MABs and MCAs) 1. Man-made clones of a molecule, produced in quantity for medical or research purposes. 2. Molecules of living organisms that selectively find and attach to other molecules to which their structure conforms exactly. This could also apply to equivalent activity by chemical molecules.

Moratorium: During the negotiation process, a period of 60 to 90 days during which EPA and potentially responsible parties may reach settlement but no site response activities can be conducted.

Morbidity: Rate of disease incidence.

Muck Soils: Earth made from decaying plant materials.

Mulch: A layer of material (wood chips, straw, leaves, etc.) placed around plants to hold moisture, prevent weed growth, and enrich or sterilize the soil.

Multiple Use: Use of land for more than one purpose; i.e., grazing of livestock, watershed and wildlife protection, recreation, and timber production. Also applies to use of bodies of water for recreational purposes, fishing, and water supply.

Multistage Remote Sensing: A strategy for landscape characterization that involves gathering and analyzing information at several geographic scales, ranging from generalized levels of detail at the national level through high levels of detail at the local scale.

Municipal Discharge: Discharge of effluent from waste water treatment plants which receive waste water from households, commercial establishments, and industries in the coastal drainage basin. Combined sewer/separate storm overflows are included in this category.

N

National Ambient Air Quality Standards (NAAQS): Standards established by EPA that apply for outside air throughout the country. (See: criteria pollutants, state implementation plans, emissions trading.)

National Emissions Standards For Hazardous Air Pollutants (NESHAPS): Emissions standards set by EPA for an air pollutant not covered by NAAQS that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. Primary standards are designed to protect human health, secondary standards to protect public welfare (e.g., building facades, visibility, crops, and domestic animals).

National Estuary Program: A program established under the Clean Water Act Amendments of 1987 to develop and implement conservation and management plans for protecting estuaries and restoring and maintaining their chemical, physical, and biological integrity, as well as controlling point and nonpoint pollution sources.

National Municipal Plan: A policy created in 1984 by EPA and the states in 1984 to bring all publicly owned treatment works (POTWs) into compliance with Clean Water Act requirements.

National Oil and Hazardous Substances Contingency Plan (NOHSCP/NCP): The federal regulation that guides determination of the sites to be corrected under both the Superfund program and the program to prevent or control spills into surface waters or elsewhere.

National Pollutant Discharge Elimination System (NPDES): A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money from the Trust Fund for remedial action.

National Response Team (NRT): Representatives of 13 federal agencies that, as a team, coordinate federal responses to nationally significant incidents of pollution-an oil spill, a major chemical release, or a Superfund response action-and provide advice and technical assistance to the responding agency(ies) before and during a response action.

National Response Center: The federal operations center that receives notifications of all releases of oil and hazardous substances into the environment; open 24 hours a day, is operated by the U.S. Coast Guard, which evaluates all reports and notifies the appropriate agency.

Navigable Waters: Traditionally, waters sufficiently deep and wide for navigation by all, or specified vessels; such waters in the United States come under federal jurisdiction and are protected by certain provisions of the Clean Water Act.

Necrosis: Death of plant or animal cells or tissues. In plants, necrosis can discolor stems or leaves or kill a plant entirely.

Negotiations: (Under Superfund) After potentially responsible parties are identified for a site, EPA coordinates with them to reach a settlement that will result in the PRP paying for or conducting the cleanup under EPA supervision. If negotiations fail, EPA can order the PRP to conduct the cleanup or EPA can pay for the cleanup using Superfund monies and then sue to recover the costs.

Nematocide: A chemical agent which is destructive to nematodes.

Neutralization: Decreasing the acidity or alkalinity of a substance by adding alkaline or acidic materials, respectively.

New Source Performance Standards (NSPS): Uniform national EPA air emission and water effluent standards which limit the amount of pollution allowed from new sources or from modified existing sources.modified.

New Source: Any stationary source built or modified after publication of final or proposed regulations that prescribe a given standard of performance.

Nitrate: A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and domestic animals.

Nitric Oxide (NO): A gas formed by combustion under high temperature and high pressure in an internal combustion engine; changes into nitrogen dioxide in the ambient air and contributes to photochemical smog.

Nitrification: The process whereby ammonia in wastewater is oxidized to nitrite and then to nitrate by bacterial or chemical reactions.

Nitrilotriacetic Acid (NTA): A compound now replacing phosphates in detergents:

Nitrite: 1. An intermediate in the process of nitrification. 2. Nitrous oxide salts used in food preservation

Nitrogen Dioxide (NO_2): The result of nitric oxide combining with oxygen in the atmosphere; major component of photochemical smog.

Nitrogen Oxide (NO_x): Product of combustion from transportation and stationary sources and a major contributor to the formation of ozone in the troposphere and to acid deposition.

Nitrogenous Wastes: Animal or vegetable residues that contain significant amounts of nitrogen.

Nitrophenols: Synthetic organopesticides containing carbon, hydrogen, nitrogen, and oxygen.

No Further Remedial Action Planned: Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under CERCLA.

Noise: Product-level or product-volume changes occurring during a test that are not related to a leak but may be mistaken for one.

Non-Attainment Area: Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Non-Binding Allocations of Responsibility (NBAR): Process for EPA to propose a way for potentially responsible parties to allocate costs among themselves.

Non-Community Water System: A public water system that is not a community water system, e.g., the water supply at a camp site or national park.

Non-Conventional Pollutant: Any pollutant not statutorily listed or which is poorly understood by the scientific community.

No Further Remedial Action Planned: Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under CERCLA.

Non-Point Source: Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. Common non-point sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, saltwater intrusion, and city streets.

Non-Contact Cooling Water: Water used for cooling which does not come into direct contact with any raw material, product, byproduct, or waste.

Non-degradation: An environmental policy which disallows any lowering of naturally occurring quality regardless of established health standards.

Non-ionizing Electromagnetic Radiation: 1. Radiation that does not change the structure of atoms but does heat tissue and may cause harmful biological effects. 2. Microwaves, radio waves, and low-frequency electromagnetic fields from high-voltage transmission lines.

Nondischarging Treatment Plant: A treatment plant that does not discharge treated wastewater into any stream or river. Most are pond systems that dispose of the total flow they receive by means of evaporation or percolation to groundwater, or facilities that dispose of their effluent by recycling or reuse (e.g., spray irrigation or groundwater discharge).

Nonfriable Asbestos-containing Materials: Any material containing more than one percent asbestos (as determined by Polarized Light Microscopy) that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Non-Road Emissions: Pollutants emitted by combustion engines on farm and construction equipment, gasoline-powered lawn and garden equipment, and power boats and outboard motors.

Notice of Deficiency: An EPA request to a facility owner or operator requesting additional information before a preliminary decision on a permit application can be made.

Notice of Intent to Deny: Notification by EPA of its preliminary intent to deny a permit application.

No Till: Planting crops without prior seedbed preparation, into an existing cover crop, sod, or crop residues, and eliminating subsequent tillage operations.

Nuclear Reactors and Support Facilities: Uranium mills, commercial power reactors, fuel reprocessing plants, and uranium enrichment facilities.

Nuclear Winter: Prediction by some scientists that smoke and debris rising from massive fires of a nuclear war could block sunlight for weeks or months, cooling the earth's surface and producing climate changes that could, for example, negatively effect world agricultural and weather patterns.

Nutrient: Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

O

Ocean Discharge Waiver: A variance from Clean Water Act requirements for discharges into marine waters.

Off-Site Facility: A hazardous waste treatment, storage or disposal area that is located away from the generating site.

Oil Fingerprinting: A method that identifies sources of oil and allows spills to be traced to their source.

Oil Spill: An accidental or intentional discharge of oil which reaches bodies of water. Can be controlled by chemical dispersion, combustion, mechanical containment, and/or adsorption. Spills from tanks and pipelines can also occur away from water bodies, contaminating the soil, getting into sewer systems and threatening underground water sources.

Oligotrophic Lakes: Deep clear lakes with few nutrients, little organic matter and a high dissolved-oxygen level.

On-Scene Coordinator (OSC): The predesignated EPA, Coast Guard, or Department of Defense official who coordinates and directs Superfund removal actions or Clean Water Act oil-or hazardous-spill response actions.

On-Site Facility: A hazardous waste treatment, storage or disposal area that is located on the generating site.

Onboard Controls: Devices placed on vehicles to capture gasoline vapor during refueling and route it to the engines when the vehicle is starting so that it can be efficiently burned.

Opacity: The amount of light obscured by particulate pollution in the air; clear window glass has zero opacity, a brick wall is 100 percent opaque. Opacity is an indicator of changes in performance of particulate control systems.

Open Burning: Uncontrolled fires in an open dump.

Open Dump: An uncovered site used for disposal of waste without environmental controls. (See: dump.)

Operable Unit: Term for each of a number of separate activities undertaken as part of a Superfund site cleanup. A typical operable unit would be removal of drums and tanks from the surface of a site.

Operating Conditions: Conditions specified in a RCRA permit that dictate how an incinerator must operate as it burns different waste types. A trial burn is used to identify operating conditions needed to meet specified performance standards.

Operation And Maintenance: 1. Activities conducted after a Superfund site action is completed to ensure that the action is effective. 2. Actions taken after construction to assure that facilities constructed to treat waste water will be properly operated and maintained to achieve normative efficiency levels and prescribed effluent limitations in an optimum manner. 3. Ongoing asbestos management plan in a school or other public building, including regular inspections, various methods of maintaining asbestos in place, and removal when necessary.

Oral Toxicity: Ability of a pesticide to cause injury when ingested.

Organic: 1. Referring to or derived from living organisms. 2. In chemistry, any compound containing carbon.

Organic Chemicals/Compounds: Animal or plant-produced substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Organophosphates: Pesticides that contain phosphorus; short-lived, but some can be toxic when first applied.

Organotins: Chemical compounds used in anti-foulant paints to protect the hulls of boats and ships, buoys, and pilings from marine organisms such as barnacles.

Original AHERA Inspection/Original Inspection/Inspection: Examination of school buildings arranged by Local Education Agencies to identify asbestos-containing-materials, evaluate their condition, take samples of materials suspected to contain asbestos; performed by EPA-accredited inspectors

Original Generation Point: Where regulated medical or other material first becomes waste.

Outfall: The place where effluent is discharged into receiving waters.

Overburden: Rock and soil cleared away before mining.

Overfire Air: Air forced into the top of an incinerator or boiler to fan the flames.

Overland Flow: A land application technique that cleanses waste water by allowing it to flow over a sloped surface. As the water flows over the surface, contaminants are absorbed and the water is collected at the bottom of the slope for reuse.

Oversized Regulated Medical Waste: Medical waste that is too large for plastic bags or standard containers.

Overturn: One complete cycle of top to bottom mixing of previously stratified water masses. This phenomenon may occur in spring or fall, or after storms, and results in uniformity of chemical and physical properties of water at all depths.

Oxidant: A substance containing oxygen that reacts chemically in air to produce a new substance; the primary ingredient of photochemical smog.

Oxidation: The addition of oxygen that breaks down organic waste or chemicals such as cyanides, phenols, and organic sulfur compounds in sewage by bacterial and chemical means.

Oxidation Pond: A man-made body of water in which waste is consumed by bacteria, used most frequently with other waste-treatment processes; a sewage lagoon.

Oxygenated Fuels: Gasoline which has been blended with alcohols or ethers that contain oxygen in order to reduce carbon monoxide and other emissions.

Oxygenated Solvent: An organic solvent containing oxygen as part of the molecular structure. Alcohols and ketones are oxygenated compounds often used as paint solvents.

Ozone (O^3): Found in two layers of the atmosphere, the stratosphere and the troposphere. In the *stratosphere* (the atmospheric layer 7 to 10 miles or more above the earth's surface) ozone is a natural form of oxygen that provides a protective layer shielding the earth from ultraviolet radiation.In the *troposphere* (the layer extending up 7 to 10 miles from the earth's surface), ozone is a chemical oxidant and major component of photochemical smog. It can seriously impair the respiratory system and is one of the most widespread of all the criteria pollutants for which the Clean Air Act required EPA to set standards. Ozone in the troposphere is produced through complex chemical reactions of nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling and processing of petroleum products; and sunlight.

Ozonator: A device that adds ozone to water.

Ozone Depletion: Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

Ozone Hole: Thinning break in the stratospheric ozone layer. Designation of amount of such depletion as a "ozone hole" is made when detected amount of depletion exceeds fifty percent. seasonal ozone holes have been observed over both the Antarctic region and the Arctic region and part of canada and the extreme northeastern United States.

P

Packaging: The assembly of one or more containers and any other components necessary to assure minimum compliance with a program's storage and shipment packaging requirements. Also, the containers, etc., involved.

Packed Bed Scrubber: An air pollution control device in which emissions pass through alkaline water to neutralize hydrogen chloride gas.

Packed Tower: A pollution control device that forces dirty air through a tower packed with crushed rock or wood chips while liquid is sprayed over the packing material. The pollutants in the air stream either dissolve or chemically react with the liquid.

Pandemic: A Widespread throughout an area, nation or the world.

Parameter: A variable, measurable property whose value is a determinant of the characteristics of a system; e.g., temperature, pressure, and density are parameters of the atmosphere.

Paraquat: A standard herbicide used to kill various types of crops, including marijuana.

Part A Permit, Part B Permit: (See: Interim Permit Status.)

Particulate Loading: The mass of particulates per unit volume of air or water.

Participation Rate: Portion of population participating in a recycling program.

Particulates: Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Partition Coefficient: Measure of the sorption phenomenon, whereby a pesticide is divided between the soil and water phase; also referred to as adsorption partition coefficient.

Parts Per Billion (ppb)/Parts Per Million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Pathogens: Microorganisms that can cause disease in other organisms or in humans, animals and plants (e.g., bacteria, viruses, or parasites) found in sewage, in runoff from farms or rural areas populated with domestic and wild animals, and in water used for swimming. Fish and shellfish contaminated by pathogens, or the contaminated water itself, can cause serious illness.

Peak Electricity Demand: The maximum electricity used to meet the cooling load of a building or buildings in a given area.

Peak Levels: Levels of airborne pollutant contaminants much higher than average or occurring for short periods of time in response to sudden releases.

Percolation: The movement of water downward and radially through sub-surface soil layers, usually continuing downward to ground water; can also involve upward movement of water.

Performance Data (for incinerators): Information collected, during a trial burn, on concentrations of designated organic compounds and pollutants found in incinerator emissions. Data analysis must show that the incinerator meets performance standards under operating conditions specified in the RCRA permit. (See: trial burn; performance standards.)

Performance Standards: (1) Regulatory requirements limiting the concentrations of designated organic compounds, particulate matter, and hydrogen chloride in emissions from incinerators. (2) Operating standards established by EPA for various permitted pollution control systems, asbestos inspections, and various program operations and maintenance requirements.

Permeability: The rate at which liquids pass through soil or other materials in a specified direction.

Permit: An authorization, license, or equivalent control document issued by EPA or an approved state agency to implement the requirements of an environmental regulation; e.g., a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Persistence: Refers to the length of time a compound stays in the environment, once introduced. A compound may persist for less than a second or indefinitely.

Persistent Pesticides: Pesticides that do not break down chemically or break down very slowly and remain in the environment after a growing season.

Personal Air Samples: Air samples taken with a pump is directly attached to the worker with the collecting filter and cassette placed in the worker's breathing zone (required under OSHA asbestos standards and EPA worker protection rule).

Pest: An insect, rodent, nematode, fungus, weed or other form of terrestrial or aquatic

Pesticide Tolerance: The amount of pesticide residue allowed by law to remain in or on a harvested crop. EPA sets these levels well below the point where the compounds might be harmful to consumers.

Pesticide: Substances or mixture there of intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant.

Phenols: Organic compounds that are byproducts of petroleum refining, tanning, and textile, dye, and resin manufacturing. Low concentrations cause taste and odor problems in water; higher concentrations can kill aquatic life and humans.

Phosphates: Certain chemical compounds containing phosphorus.

Phosphogypsum Piles (stacks): Principal byproduct generated in production of phosphoric acid from phosphate rock. These piles may generate radioactive radon gas.

Phosphorous Plants: Facilities using electric furnaces to produce elemental phosphorous for commercial use, such as high grade phosphoric acid, phosphate-based detergent, and organic chemicals use.

Phosphorus: An essential chemical food element that can contribute to the eutrophication of lakes and other water bodies. Increased phosphorus levels result from discharge of phosphorus-containing materials into surface waters.

Photochemical Oxidants: Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

Photochemical Smog: Air pollution caused by chemical reactions of various pollutants emitted from different sources.

Photosynthesis: The manufacture by plants of carbohydrates and oxygen from carbon dioxide mediated by chlorophyll in the presence if sunlight.

Physical and Chemical Treatment: Processes generally used in large-scale wastewater treatment facilities. Physical processes may include air-stripping or filtration. Chemical treatment includes coagulation, chlorination, or ozonation. The term can also refer to treatment of toxic materials in surface and ground waters, oil spills, and some methods of dealing with hazardous materials on or in the ground.

Phytoplankton: That portion of the plankton community comprised of tiny plants, e.g., algae, diatoms.

Phytotoxic: Harmful to plants.

Picocuries Per Liter pCi/L): A unit of measure for levels of radon gas.

Pilot Tests: Testing a cleanup technology under actual site conditions to identify potential problems prior to full-scale im-

Plankton: Tiny plants and animals that live in water.

Plasma-arc Reactor: An incinerator that operates at extremely high temperatures; treats highly toxic wastes that do not burn easily.

Plasmid: A circular piece of DNA that exists apart from the chromosome and replicates independently of it. Bacterial plasmids carry information that renders the bacteria resistant to antibiotics. Plasmids are often used in genetic engineering to carry desired genes into organisms.

Plastics: Non-metallic chemoreactive compounds molded into rigid or pliable construction materials, fabrics, etc.

Plate Tower Scrubber: An air pollution control device that neutralizes hydrogen chloride gas by bubbling alkaline water through holes in a series of metal plates.

Plugging: Act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

Plume: 1. A visible or measurable discharge of a contaminant from a given point of origin. Can be visible or thermal in water, or visible in the air as, for example, a plume of smoke. 2 The area of radiation leaking from a damaged reactor. 3. Area downwind within which a release could be dangerous for those exposed to leaking fumes.

Plutonium: A radioactive metallic element chemically similar to uranium.

PM-10: A new standard for measuring the amount of solid or liquid matter suspended in the atmosphere, i.e. the amount of particulate matter over 10 micrometers in diameter; smaller PM-10 particles penetrate to the deeper portions of the lung, affecting sensitive population groups such as children and individuals with respiratory ailments.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution, e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Pollen: The fertilizing element of flowering plants; background air pollutant.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution Prevention: The active process of identifying areas, processes, and activities which create excessive waste byproducts for the purpose of substitution, alteration, or elimination of the process to prevent waste generation.

Pollutant Standard Index (PSI): Measure of adverse health effects of air pollution levels in major cities.

Pollution: Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.

Polonium: A radioactive element that occurs in pitchblende and other uranium-containing ores.

Polyelectrolytes: Synthetic chemicals that help solids to clump during sewage treatment.

Polymer: Basic molecular ingredients in plastic.

Polyvinyl Chloride (PVC): A tough, environmentally indestructible plastic that releases hydrochloric acid when burned.

Population: A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.

Post-Closure: The time period following the shutdown of a waste management or manufacturing facility; for monitoring purposes, often considered to be 30 years.

Post-Consumer Recycling: Reuse of materials generated from residential and consumer waste, e.g. converting wastepaper from offices into corrugated boxes or newsprint.

Potable Water: Water that is safe for drinking and cooking.

Potentially Responsible Party (PRP): Any individual or company-including owners, operators, transporters or generators-potentially responsible for, or contributing to a spill or other contamination at a Superfund site. Whenever possible, through administrative and legal actions, GPA requires PRPs to clean up hazardous sites they have contaminated.

Precipitate: A solid that separates from a solution.

Precipitation: Removal of hazardous solids from liquid waste to permit safe disposal; removal of particles from airborne emissions.

Precipitator: Pollution control device that collects particles from an air stream.

Precursor: In photochemistry, a compound antecedent to a volatile organic compound (VOC). Precursors react in sunlight to form ozone or other photochemical oxidants.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release.

Pressure Sewers: A system of pipes in which water, wastewater, or other liquid is pumped to a higher elevation.

Pretreatment: Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non-domestic sources before they are discharged into publicly owned treatment works (POTWs).

Prevalent Level Samples: Air samples taken under normal conditions (also known as ambient background samples).

Prevalent Levels: Levels of airborne contaminant occurring under normal conditions.

Prevention of Significant Deterioration (PSD): EPA program in which state and/or federal permits are required in order to restrict emissions from new or modified sources in places where air quality already meets or exceeds primary and secondary ambient air quality standards.

Primary Drinking Water Regulation: Applies to public water systems and specifies a contaminant level, which, in the judgment of the EPA Administrator, will not adversely affect human health.

Primary Waste Treatment: First steps in wastewater treatment; screens and sedimentation tanks are used to remove most materials that float or will settle. Primary treatment removes about 30 percent of carbonaceous biochemical oxygen demand from domestic sewage.

Principal Organic Hazardous Constituents (POHCs): Hazardous compounds monitored during an incinerator's trial burn, selected for high concentration in the waste feed and difficulty of combustion.

Probability of Detection : The likelihood, expressed as a percentage, that a test method will correctly identify a leaking tank.

Process Verification: Verifying that process raw materials, water usage, waste treatment processes, production rate and other facts relative to quantity and quality of pollutants contained in discharges are substantially described in the permit application and the issued permit.

Process Wastewater: Any water that comes into contact with any raw material, product, byproduct, or waste.

Process Weight: Total weight of all materials, including fuel, used in a manufacturing process; used to calculate the allowable particulate emission rate.

Product Level: The level of a product in a storage tank.

Products of Incomplete Combustion (PICs): Organic compounds formed by combustion. Usually generated in small amounts and sometimes toxic, PICs are heat-altered versions of the original material fed into the incinerator (e.g., charcoal is a P.C. from burning wood).

Propellant: Liquid in a self-pressurized pesticide product that expels the active ingredient from its container.

Proposed Plan: A plan for a site cleanup that is available to the public for comment.

Proteins: Complex nitrogenous organic compounds of high molecular weight made of amino acids; essential for growth and repair of animal tissue. Many, but not all, proteins are enzymes.

Protocol: A series of formal steps for conducting a test.

Protoplast: A membrane-bound cell from which the outer wall has been partially or completely removed. The term often is applied to plant cells.

Protozoa: One-celled animals that are larger and more complex than bacteria. May cause disease.

Public Comment Period: The time allowed for the public to express its views and concerns regarding an action by EPA (e.g., a *Federal Register* Notice of proposed rulemaking, a public notice of a draft permit, or a Notice of Intent to Deny).

Public Hearing: A formal meeting wherein EPA officials hear the public's views and concerns about an EPA action or proposal. EPA is required to consider such comments when evaluating its actions. Public hearings must be held upon request during the public comment period.

Public Notice: 1. Notification by EPA informing the public of Agency actions such as the issuance of a draft permit or scheduling of a hearing. EPA is required to ensure proper public notice, including publication in newspapers and broadcast over radio stations. 2. In the safe drinking water program, water suppliers are required to publish and broadcast notices when pollution problems are discovered.

Public Water System: A system that provides piped water for human consumption to at least 15 service connections or regularly serves 25 individuals.

Publicly Owned Treatment Works: A waste-treatment works owned by a state, unit of local government, or Indian tribe, usually designed to treat domestic wastewaters.

Pumping Station: Pumping devices installed in sewer or water systems or other liquid-carrying pipelines to move the liquids to a higher level.

Putrescible: Able to rot quickly enough to cause odors and attract flies.

Pyrolysis: Decomposition of a chemical by extreme heat.

Q

Quality Assurance/Quality Control: A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

Quench Tank: A water-filled tank used to cool incinerator residues or hot materials during industrial processes.

R

Radiation Standards: Regulations that set maximum exposure limits for protection of the public from radioactive materials.

Radio Frequency Radiation: (See Nonionizing Radiation.)

Radioactive Substances: Substances that emit ionizing radiation.

Radioisotopes: Chemical variants of an element with potentially oncogenic, teratogenic, and mutagenic effects on the human body.

Radionuclide: Radioactive particle, manmade or natural, with a distinct atomic weight number. Can have a long life as soil or water pollutants.

Radius of Vulnerability Zone: The maximum distance from the point of release of a hazardous substance in which the airborne concentration could reach the level of concern under specified weather conditions.

Radon Decay Products: A term used to refer collectively to the immediate products of the radon decay chain. These include Po-218, Pb-214, Bi-214, and Po-214, which have an average combined half-life of about 30 minutes.

Radon: A colorless naturally occurring, radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks.

Rasp: A machine that grinds waste into a manageable material and helps prevent odor.

Raw Sewage: Untreated wastewater and its contents.

Raw Water: Intake water prior to any treatment or use.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technological and other measures for pollution control.

Reasonably Available Control Technology (RACT): Control technology that is both reasonably available, and both technologically and economically feasible. Usually applied to existing sources in nonattainment areas; in most cases is less stringent than new source performance standards.

Receiving Waters: A river, lake, ocean, stream or other watercourse into which wastewater or treated effluent is discharged.

Recharge: The process by which water is added to a zone of saturation, usually by percolation from the soil surface, e.g., the recharge of an aquifer.

Recharge Area: A land area in which water reaches the zone of saturation from surface infiltration, e.g., where rainwater soaks through the earth to reach an aquifer.

Recombinant Bacteria: A microorganism whose genetic makeup has been altered by deliberate introduction of new genetic elements. The offspring of these altered bacteria also contain these new genetic elements, i.e. they "breed true."

Recombinant DNA: The new DNA that is formed by combining pieces of DNA from different organisms or cells.

Recommended Maximum Contaminant Level (RMCL): The maximum level of a contaminant in drinking water at which no known or anticipated adverse affect on human health would occur, and that includes an adequate margin of safety. Recommended levels are nonenforceable health goals. (See: maximum contaminant level.)

Reconstructed Source: Facility in which components are replaced to such an extent that the fixed capital cost of the new components exceed 50 percent of the capital cost of constructing a comparable brand-new facility. New-source performance standards may be applied to sources reconstructed after the proposal of the standard if it is technologically and economically feasible to meet the standard.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used at National Priorities List sites where, under CERCLA, Trust Funds pay for the cleanup.

Recovery Rate: Percentage of usable recycled materials that have been removed from the total amount of municipal solid waste generated in a specific area or by a specific business.

Reclamation: (In recycling) Restoration of materials found in the waste stream to a beneficial use which may be for purposes other than the original use.

Recycle/Reuse: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e. recycling of aluminum cans, paper, and bottles, etc.).

Red Bag Waste: (See: infectious waste.)

Red Border: An EPA document undergoing review before being submitted for final management decision-making.

Red Tide: A proliferation of a marine plankton toxic and often fatal to fish, perhaps stimulated by the addition of nutrients. A tide can be red, green, or brown, depending on the coloration of the plankton.

Reentry Interval: The period of time immediately following the application of a pesticide during which unprotected workers should not enter a field.

Reference Dose (RfD): The concentration of a chemical known to cause health problems; also be referred to as the ADI, or acceptable daily intake.

Reformulated Gasoline: Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) that cuts air pollutants.

Refuse Reclamation: Conversion of solid waste into useful products, e.g., composting organic wastes to make soil conditioners or separating aluminum and other metals for recycling.

Refuse: (See: solid waste.)

Regeneration: Manipulation of cells to cause them to develop into whole plants.

Regional Response Team (RRT): Representatives of federal, local, and state agencies who may assist in coordination of activities at the request of the On-Scene Coordinator before and during a significant pollution incident such as an oil spill, major chemical release, or a Superfund response.

Registrant: Any manufacturer or formulator who obtains registration for a pesticide active ingredient or product.

Registration: Formal listing with EPA of a new pesticide before it can be sold or distributed. Under the Federal Insecticide, Fungicide, and Rodenticide Act. EPA is responsible for registration (pre-market licensing) of pesticides on the basis of data demonstrating no unreasonable adverse effects on human health or the environment when applied according to approved label directions.

Registration Standards: Published documents which include summary reviews of the data available on a pesticide's active ingredient, data gaps, and the Agency's existing regulatory position on the pesticide.

Regulated Asbestos-Containing Material (RACM): Friable asbestos material or nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, or been pulverized or reduced to powder in the course of demolition or renovation operations.

Regulated Medical Waste: Under the Medical Waste Tracking Act of 1988, any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals. Included are cultures and stocks of infectious agents; human blood and blood products; human pathological body wastes from surgery and autopsy; contaminated animal carcasses from medical research; waste from patients with communicable diseases; and all used sharp implements, such as needles and scalpels, etc., and certain unused sharps. (See; treated medical waste; untreated medical waste; destroyed medical waste.)

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous or toxic chemical or extremely hazardous substance.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Remedial Design: A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

Remedial Investigation: An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary alternatives for remedial action; and support technical and cost analyses of alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS".

Remedial Project Manager (RPM): The EPA or state official responsible for overseeing on-site remedial action.

Remedial Response: Long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to public health.

Remediation: 1. Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site; 2. for the Asbestos Hazard Emergency Response program, abatement methods including evaluation, repair, enclosure, encapsulation, or removal of greater than 3 linear feet or square feet of asbestos-containing materials from a building.

Remote Sensing: The collection and interpretation of information about an object without physical contact with the object; e.g., satellite imaging and aerial photograph.

Removal Action: Short-term immediate actions taken to address releases of hazardous substances that require expedited response. (See: cleanup.)

Reportable Quantity (RQ): Quantity of a hazardous substance that triggers reports under CERCLA. If a substance exceeds its RQ, the release must be reported to the National Response Center, the SERC, and community emergency coordinators for areas likely to be affected.

Repowering: Replacement of an existing coal-fired boiler with one or more clean coal technologies in order to achieve significantly greater emission reduction relative to the performance of technology in widespread use at the time the Clean Air Act amendments of 1990 were enacted. (See: Clean coal technology.)

Reregistration: The reevaluation and relicensing of existing pesticides originally registered prior to current scientific and regulatory standards. EPA reregisters pesticides through its Registration Standards Program.

Reserve Capacity: Extra treatment capacity built into solid waste and wastewater treatment plants and interceptor sewers to accommodate flow increases due to future population growth.

Reservoir: Any natural or artificial holding area used to store, regulate, or control water.

Residual: Amount of a pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after it passes through a scrubbing or other process.

Residual Risk: The extent of health risk from air pollutants remaining after application of the Maximum Achievable Control Technology (MACT).

Resistance: For plants and animals, the ability to withstand poor environmental conditions or attacks by chemicals or disease. May be inborn or acquired.

Resource Recovery: The process of obtaining matter or energy from materials formerly discarded.

Response Action: 1. Generic term for actions taken in response to actual or potential health-threatening environmental events such as spills, sudden releases, and asbestos abatement/management problems; 2. A CERCLA-authorized action involving either a short-term removal action or a long-term removal response. This may include but is not limited to: removing hazardous materials from a site to an EPA-approved hazardous waste facility for treatment, containment or treating the waste on-site, identifying and removing the sources of ground-water contamination and halting further migration of contaminants; 3. Any of the following actions taken in school buildings in response to AHERA to reduce the risk of exposure to asbestos: removal, encapsulation, enclosure, repair, and operations and maintenance. (See: cleanup) .

Responsiveness Summary: A summary of oral and/or written public comments received by EPA during a comment period on key EPA documents, and EPA's response to those comments.

Restoration: Measures taken to return a site to pre-violation conditions.

Restricted Use: A pesticide may be classified (under FIFRA regulations) for restricted use if the it requires special handling because of its toxicity, and, if so, it may be applied only by trained, certified applicators or those under their direct supervision.

Restriction Enzymes: Enzymes that recognize specific regions of a long DNA molecule and cut it at those points.

Reuse: Using a product or component of municipal solid waste in its original form more than once, e.g., refilling a glass bottle that has been returned or using a coffee can to hold nuts and bolts.

Reverse Osmosis: A treatment process used in water systems by adding pressure to force water through a semi-permeable membrane. Reverse osmosis removes most drinking water contaminants. Also used in wastewater treatment. Large-scale reverse osmosis plants are being developed.

Ribonucleic Acid (RNA): A molecule that carries the genetic message from DNA to a cellular protein-producing mechanisms.

Ringlemann Chart: A series of shaded illustrations used to measure the opacity of air pollution emissions, ranging from light grey through black; used to set and enforce emissions standards.

Riparian Habitat: Areas adjacent to rivers and streams with a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

Riparian Rights: Entitlement of a land owner to certain uses of water on or bordering his property, including the right to prevent diversion or misuse of upstream waters. Generally a matter of state law.

Risk: A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Risk Communication: The exchange of information about health or environmental risks among risk assessors and managers, the general public, news media, interest groups, etc.

Risk Management: The process of evaluating and selecting alternative regulatory and non-regulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

River Basin: The land area drained by a river and its tributaries.

Rodenticide: A chemical or agent used to destroy rats or other rodent pests, or to prevent them from damaging food, crops, etc.

Rotary Kiln Incinerator: An incinerator with a rotating combustion chamber that keeps waste moving, thereby allowing it to vaporize for easier burning.

Rough Fish: Fish not prized for eating, such as gar and suckers. Most are more tolerant of changing environmental conditions than game species.

Rubbish: Solid waste, excluding food waste and ashes, from homes, institutions, and work-places.

Run-Off: That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

S

Safener: A chemical added to a pesticide to keep it from injuring plants.

Salinity: The percentage of salt in water.

Salt Water Intrusion: The invasion of fresh surface or ground water by salt water. If it comes from the ocean it may be called sea water intrusion.

Salts: Minerals that water picks up as it passes through the air, over and under the ground, or from households and industry.

Salvage: The utilization of waste materials.

Sanctions: Actions taken by the federal government for failure to plan or implement a State Improvement Plan (SIP). Such action may be include withholding of highway funds and a ban on construction of new sources of potential pollution.

Sand Filters: Devices that remove some suspended solids from sewage. Air and bacteria decompose additional wastes filtering through the sand so that cleaner water drains from the bed.

Sanitary Landfill: (See: landfills.)

Sanitary Sewers: Underground pipes that carry off only domestic or industrial waste, not storm water.

Sanitary Survey: An on-site review of the water sources, facilities, equipment, operation and maintenance of a public water system to evaluate the adequacy of those elements for producing and distributing safe drinking water.

Sanitary Water (Also known as gray water): Water discharged from sinks, showers, kitchens, or other nonindustrial operations, but not from commodes.

Sanitation: Control of physical factors in the human environment that could harm development, health, or survival.

Saturated Zone: A subsurface area in which all pores and cracks are filled with water under pressure equal to or greater than that of the atmosphere.

Scrap: Materials discarded from manufacturing operations that may be suitable for reprocessing.

Screening: Use of screens to remove coarse floating and suspended solids from sewage.

Science Advisory Board (SAB): A group of external scientists who advise EPA on science and policy.

Scrubber: An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Secondary Drinking Water Regulations: Non-enforceable regulations applying to public water systems and specifying the maximum contamination levels that, in the judgment of EPA, are required to protect the public welfare. These regulations apply to any contaminants that may adversely affect the odor or appearance of such water and consequently may cause people served by the system to discontinue its use.

Secondary Materials: Materials that have been manufactured and used at least once and are to be used again.

Secondary Treatment: The second step in most publicly owned waste treatment systems in which bacteria consume the organic parts of the waste. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 percent of the oxygen-demanding substances and suspended solids. Disinfection is the final stage of secondary treatment. (See: primary, tertiary treatment.)

Secure Chemical Landfill: (See: landfills.)

Secure Maximum Contaminant Level: Maximum permissible level of a contaminant in water delivered to the free flowing outlet of the ultimate user, or of contamination resulting from corrosion of piping and plumbing caused by water quality.

Sedimentation Tanks: Wastewater tanks in which floating wastes are skimmed off and settled solids are removed for disposal.

Sedimentation: Letting solids settle out of wastewater by gravity during treatment.

Sediments: Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers and harbors, destroying fish and wildlife habitat, and clouding the water so that sunlight cannot reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to wash off the land after rainfall.

Seed Protectant: A chemical applied before planting to protect seeds and seedlings from disease or insects.

Seepage: Percolation of water through the soil from unlined canals, ditches, laterals, watercourses, or water storage facilities.

Selective Pesticide: A chemical designed to affect only certain types of pests, leaving other plants and animals unharmed.

Semi-Confined Aquifer: An aquifer partially confined by soil layers of low permeability through which recharge and discharge can still occur.

Senescence: The aging process. Sometimes used to describe lakes or other bodies of water in advanced stages of eutrophication.

Septic Tank: An underground storage tank for wastes from homes not connected to a sewer line. Waste goes directly from the home to the tank, where it is decomposed by bacteria. The sludge settles to the bottom and is pumped out periodically, but effluent flows into the ground through drains.

Service Connector: The pipe that carries tap water from a public water main to a building.

Settleable Solids: Material heavy enough to sink to the bottom of a wastewater treatment tank.

Settling Chamber: A series of screens placed in the way of flue gases to slow the stream of air, thus helping gravity to pull particles into a collection device.

Settling Tank: A holding area for wastewater, where heavier particles sink to the bottom for removal and disposal.

7Q10: Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.

Sewage: The waste and wastewater produced by residential and commercial sources and discharged into sewers.

Sewage Lagoon: (See: lagoon.)

Sewage Sludge: Sludge produced at a Publicly Owned Treatment Works, the disposal of which is regulated under the Clean Water Act.

Sewer: A channel or conduit that carries wastewater and storm-water runoff from the source to a treatment plant or receiving stream. "Sanitary" sewers carry household, industrial, and commercial waste. "Storm" sewers carry runoff from rain or snow. "Combined" sewers handle both.

Sewerage: The entire system of sewage collection, treatment, and disposal.

Sharps: Hypodermic needles, syringes (with or without the attached needle) pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes used in animal or human patient care or treatment, or in medical, research or industrial laboratories. Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips, and unused hypodermic and suture needles, syringes, and scalpel blades.

Signal: The volume or product-level change produced by a leak in a tank.

Signal Words: The words used on a pesticide label-Danger, Warning, Caution-to indicate level of toxicity.

Significant Deterioration: Pollution resulting from a new source in previously "clean" areas. (See: prevention of significant deterioration.)

Significant Municipal Facilities: Those publicly owned sewage treatment plants that discharge a million gallons per day or more and are therefore considered by states to have the potential for to substantially effect the quality of receiving waters.

Significant Non-Compliance: (See Significant Violations.)

Significant Violations: Violations by point source dischargers of sufficient magnitude or duration to be a regulatory priority.

Silviculture: Management of forest land for timber. Sometimes contributes to water pollution, as in clear-cutting.

Sinking: Controlling oil spills by using an agent to trap the oil and sink it to the bottom of the body of water where the agent and the oil are biodegraded.

Site Assessment Program: A means of evaluating hazardous waste sites through preliminary assessments and site inspections to develop a Hazard Ranking System score.

Site Inspection: The collection of information from a Superfund site to determine the extent and severity of hazards posed by the site. It follows and is more extensive than a preliminary assessment. The purpose is to gather information necessary to score the site, using the Hazard Ranking System, and to determine if it presents an immediate threat requiring prompt removal.

Site Safety Plan: A crucial element in all removal actions, it includes information on equipment being used, precautions to be taken, and steps to take in the event of an on-site emergency.

Siting: The process of choosing a location for a facility.

Skimming: Using a machine to remove oil or scum from the surface of the water.

Slow Sand Filtration: Passage of raw water through a bed of sand at low velocity, resulting in substantial removal of chemical and biological contaminants.

Sludge: A semi-solid residue from any of a number of air or water treatment processes; can be a hazardous waste.

Sludge Digester: Tank in which complex organic substances like sewage sludges are biologically dredged. During these reactions, energy is released and much of the sewage is converted to methane, carbon dioxide, and water.

Slurry: A watery mixture of insoluble matter resulting from some pollution control techniques.

Small Quantity Generator (SQG-sometimes referred to as "Squeegee"): Persons or enterprises that produce 220-2200 pounds per month of hazardous waste; are required to keep more records than conditionally exempt generators. The largest category of hazardous waste generators, SQGs include automotive shops, dry cleaners, photographic developers, and a host of other small businesses. (See: conditionally exempt generators).

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution. "Smelting" is the process involved.

Smog: Air pollution associated with oxidants. (See: photochemical smog.)

Smoke: Particles suspended in air after incomplete combustion.

Soft Detergents: Cleaning agents that break down in nature.

Soft Water: Any water that does not contain a significant amount of dissolved minerals such as salts of calcium or magnesium.

Soil Adsorption Field: A sub-surface area containing a trench or bed with clean stones and a system of piping through which treated sewage may seep into the surrounding soil for further treatment and disposal.

Soil and Water Conservation Practices: Control measures consisting of managerial, vegetative, and structural practices to reduce the loss of soil and water.

Soil Conditioner: An organic material like humus or compost that helps soil absorb water, build a bacterial community, and take up mineral nutrients.

Soil Erodibility: An indicator of a soil's susceptibility to raindrop impact, runoff, and other erosive processes.

Soil Gas: Gaseous elements and compounds in the small spaces between particles of the earth and soil. Such gases can be moved or driven out under pressure.

Soil Sterilant: A chemical that temporarily or permanently prevents the growth of all plants and animals. depending on the chemical.

Sole-Source Aquifer: An aquifer that supplies 50-percent or more of the drinking water of an area.

Solid Waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Solid Waste Disposal: The final placement of refuse that is not salvaged or recycled.

Solid Waste Management: Supervised handling of waste materials from their source through recovery processes to disposal.

Solidification and Stabilization: Removal of wastewater from a waste or changing it chemically to make it less permeable and susceptible to transport by water.

Soot: Carbon dust formed by incomplete combustion.

Sorption: The action of soaking up or attracting substances; process used in many pollution control systems.

Source Reduction: Reducing the amount of materials entering the waste stream by redesigning products or patterns of production or consumption (e.g., using returnable beverage containers). Synonymous with waste reduction.

Source Separation: Segregating various wastes at the point of generation (e.g., separation of paper, metal and glass from other wastes to make recycling simpler and more efficient.)

Special Review: Formerly known as Rebuttable Presumption Against Registration (RPAR), this is the regulatory process through which existing pesticides suspected of posing unreasonable risks to human health, non-target organisms, or the environment are referred for review by EPA. Such review requires an intensive risk/benefit analysis with opportunity for public comment. If risk is found to outweigh social and economic benefits, regulatory actions ranging from label revisions and use-restriction to cancellation or suspended registration can be initiated.

Special Waste: Items such as household hazardous waste, bulky wastes (refrigerators, pieces of furniture, etc.) tires, and used oil.

Species: A reproductively isolated aggregate of interbreeding organisms.

Spill Prevention Control and Countermeasures Plan (SPCP): Plan covering the release of hazardous substances as defined in the Clean Water Act.

Spoil: Dirt or rock removed from its original location-destroying the composition of the soil in the process-as in strip-mining, dredging, or construction.

Sprawl: Unplanned development of open land.

Spray Tower Scrubber: A device that sprays alkaline water into a chamber where acid gases present to aid in the neutralizing of the gas.

Stable Air: A motionless mass of air that holds instead of dispersing pollutants.

Stabilization: Conversion of the active organic matter in sludge into inert, harmless material.

Stack: A chimney, smokestack, or vertical pipe that discharges used air.

Stabilization Ponds: (See: lagoon.)

Stack Effect: Air, as in a chimney, that moves upward because it is warmer than the ambient atmosphere.

Stack Gas: (See: flue gas.)

Stage II Controls: Systems placed on service station gasoline pumps to control and capture gasoline vapors during refuelling.

Stagnation: Lack of motion in a mass of air or water that holds pollutants in place.

Standards: Norms that impose limits on the amount of pollutants or emissions produced. EPA establishes minimum standards, but states are allowed to be stricter.

Start of a Response Action: The point in time when there is a guarantee or set-aside of funding either by EPA, other federal agencies, states or Principal Responsible Parties in order to begin response actions at a Superfund site.

State Emergency Response Commission (SERC): Commission appointed by each state governor according to the requirements of SARA Title III. The SERCs designate emergency planning districts, appoint local emergency planning committees, and supervise and coordinate their activities.

State Implementation Plans (SIP): EPA - approved state plans for the establishment, regulation, and enforcement of air pollution standards.

Stationary Source: A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes.

Storage: Temporary holding of waste pending treatment or disposal, as in containers, tanks, waste piles, and surface impoundments.

Storm Sewer: A system of pipes (separate from sanitary sewers) that carries only water runoff from buildings and land surfaces.

Stratification: Separating into layers.

Stratosphere: The portion of the atmosphere 10-to-25 miles above the earth's surface.

Strip-Cropping: Growing crops in a systematic arrangement of strips or bands that serve as barriers to wind and water erosion.

Strip-Mining: A process that uses machines to scrape soil or rock away from mineral deposits just under the earth's surface.

Structural Deformation: Distortion in walls of a tank after liquid has been added or removed.

Sulfur Dioxide (SO_2): A pungent, colorless, gaseous pollutant formed primarily by the combustion of fossil fuels.

Sump: A pit or tank that catches liquid runoff for drainage or disposal.

Supercritical Water: A type of thermal treatment using moderate temperatures and high pressures to enhance the ability of water to break down large organic molecules into smaller, less toxic ones. Oxygen injected during this process combines with simple organic compounds to form carbon dioxide and water.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising the cleanup and other remedial actions.

Superfund Innovative Technology Evaluation: EPA program to promote development and use of innovative treatment technologies in Superfund site cleanups.

Surface Impoundment: Treatment, storage, or disposal of liquid hazardous wastes in ponds.

Surface Uranium Mines: Strip mining operations for removal of uranium-bearing ore.

Surface Water: All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors directly influenced by surface water.

Surfacing ACM: Asbestos-containing material that is sprayed or troweled on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members.

Surfacing Material: Material sprayed or troweled onto structural members (beams, columns, or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes textured plaster, and other textured wall and ceiling surfaces.

Surfactant: A detergent compound that promotes lathering.

Surveillance System: A series of monitoring devices designed to check on environmental conditions.

Suspect Material: Building material suspected of containing asbestos, e.g., surfacing material, floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials.

Suspended Loads: Sediment particles maintained in the water column by turbulence and carried with the flow of water.

Suspended Solids: Small particles of solid pollutants that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

Suspension: Suspending the use of a pesticide when EPA deems it necessary to prevent an imminent hazard resulting from its continued use. An emergency suspension takes effect immediately; under an ordinary suspension a registrant can request a hearing before the suspension goes into effect. Such a hearing process might take six months.

Suspension Culture: Cells growing in a liquid nutrient medium.

Swamp: A type of wetland dominated by woody vegetation but without appreciable peat deposits. Swamps may be fresh or salt water and tidal or non-tidal. (See: wetlands.)

Synthetic Organic Chemicals (SOCs): Man-made organic chemicals. Some SOCs are volatile, others tend to stay dissolved in water instead of evaporating.

Systemic Pesticide: A chemical absorbed by an organism that makes the organism toxic to pests.

T

Tailings: Residue of raw material or waste separated out during the processing of crops or mineral ores.

Tail Water: The runoff of irrigation water from the lower end of an irrigated field.

Technical Assistance Grant (TAG): As part of the Superfund program, Technical Assistance Grants of up to $50,000 are provided to citizens' groups to obtain assistance in interpreting information related to cleanups at Superfund sites or those proposed for the National Priorities List. Grants are used by such groups to hire technical advisors to help them understand the site-related technical information for the duration of response activities.

Technology-Based Limitations: Industry-specific effluent limitations applied to a discharge when it will not cause a violation of water quality standards at low stream flows. Usually applied to discharges into large rivers.

Technology-Based Standards: Effluent limitations applicable to direct and indirect sources which are developed on a category-by-category basis using statutory factors, not including water-quality effects.

Terracing: Dikes built along the contour of sloping farm land that hold runoff and sediment to reduce erosion.

Tertiary Treatment: Advanced cleaning of wastewater that goes beyond the secondary or biological stage, removing nutrients such as phosphorus, nitrogen, and most BOD and suspended solids.

Thermal Pollution: Discharge of heated water from industrial processes that can kill or injure aquatic organisms.

Thermal System Insulation (TSI): Asbestos-containing material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

Thermal Treatment: Use of elevated temperatures to treat hazardous wastes. (See: incineration; pyrolysis.)

Threshold Limit Value (TLV): The concentration of an airborne substance that an average person can be repeatedly exposed to without adverse effects. TLVs may be expressed in three ways: TLV-TWA-Time weighted average, based on an allowable exposure averaged over a normal 8-hour workday or 40-hour workweek; TLV-STEL-Short-term exposure limit or maximum co .centration for a brief specified period of time, depending on a specific chemical (TWA must still be met); and TLV-C-Ceiling Exposure Limit or maximum exposure concentration not to be exceeded under any circumstances. (TWA must still be met.)

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers notification by facilities to the State Emergency Response Commission that such facilities are subject to emergency planning requirements under SARA Title III.

Tidal Marsh: Low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation; normally, the only vegetation present is salt-tolerant bushes and grasses. (See: wetlands.)

Time-weighted Average (TWA): In air sampling, the average air concentration of contaminants during a given period.

Tolerances: Permissible residue levels for pesticides in raw agricultural produce and processed foods. Whenever a pesticide is registered for use on a food or a feed crop, a tolerance (or exemption from the tolerance requirement) must be established. EPA establishes the tolerance levels, which are enforced by the Food and Drug Administration and the Department of Agriculture.

Tonnage: The amount of waste that a landfill accepts, usually expressed in tons per month. The rate at which a landfill accepts waste is limited by the landfill's permit.

Topography: The physical features of a surface area including relative elevations and the position of natural and man-made features.

Total Dissolved Phosphorous: The total phosphorous content o all material that will pass through a filter, which is determined as orthophosphate without prior digestion or hydrolysis. Also called soluble P. or ortho P.

Total Dissolved Solids (TDS): All material that passes the standard glass river filter; now called total filtrable reside. Term is used to reflect salinity.

Total Suspended Solids (TSS): A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids." (See: suspended solids.)

Toxic Chemical Release Form: Information form required of facilities that manufacture, process, or use (in quantities above a specific amount) chemicals listed under SARA Title III.

Toxic Chemical: Any chemical listed in EPA rules as "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986."

Toxic Chemical Use Substitution: Replacing toxic chemicals with less harmful chemicals in industrial processes.

Toxic Cloud: Airborne plume of gases, vapors, fumes, or aerosols containing toxic materials.

Toxic Pollutants: Materials that cause death, disease, or birth defects in organisms that ingest or absorb them. The quantities and exposures necessary to cause these effects can vary widely.

Toxic Release Inventory: Database of toxic releases in the United States compiled from SARA Title III section 313 reports.

Toxic Substance: A chemical or mixture that may present an unreasonable risk of injury to health or the environment.

Toxic Waste: A waste that can produce injury if inhaled, swallowed, or absorbed through the skin.

Toxicity Testing: Biological testing (usually with an invertebrate, fish, or small mammal) to determine the adverse effects of a compound or effluent.

Toxicological Profile: An examination, summary, and interpretation of a hazardous substance to determine levels of exposure and associated health effects.

Transpiration: The process by which water vapor is lost to the atmosphere from living plants. The term can also be applied to the quantity of water thus dissipated.

Transportation Control Measures (TCMs): Steps taken by a locality to adjust traffic patterns (e.g., bus lanes, turnout, right turn on red) or reduce vehicle use (ride sharing, high-occupancy vehicle lanes) to cut vehicular emissions.

Trash: Material considered worthless or offensive that is thrown away. Generally defined as dry waste material, but in common usage it is a synonym for garbage, rubbish, or refuse.

Treatability Studies: Tests of potential cleanup technologies conducted in a laboratory (See: bench-scale tests.)

Trash-to-Energy Plan: Burning trash to produce energy.

Treated Regulated Medical Waste: Medical waste treated to substantially reduce or eliminate its pathogenicity, but that has not yet been destroyed.

Treatment Plant: A structure built to treat wastewater before discharging it into the environment.

Treatment, Storage, and Disposal Facility: Site where a hazardous substance is treated, stored, or disposed of. TSD facilities are regulated by EPA and states under RCRA.

Treatment: (1) Any method, technique, or process designed to remove solids and/or pollutants from solid waste, wastestreams, effluents, and air emissions. (2) methods used to change the biological character or composition of any regulated medical waste so as to substantially reduce or eliminate its potential for causing disease.

Trial Burn: An incinerator test in which emissions are monitored for the presence of specific organic compounds, particulates, and hydrogen chloride.

Trichloroethylene (TCE): A stable, low boiling-point colorless liquid, toxic if inhaled. Used as a solvent or metal decreasing agent, and in other industrial applications.

Trickling Filter: A coarse treatment system in which wastewater is trickled over a bed of stones or other material covered with bacteria that break down the organic waste and produce clean water.

Trickle Irrigation: Method in which water drips to the soil from perforated tubes or emitters.

Trihalomethane (THM): One of a family of organic compounds named as derivative of methane. THMs are generally by-products of chlorination of drinking water that contains organic material.

Trust Fund (CERCLA): A fund set up under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to help pay for cleanup of hazardous waste sites and for legal action to force those responsible for the sites to clean them up.

Tundra: A type of ecosystem dominated by lichens, mosses, grasses, and woody plants. Tundra is found at high latitudes (arctic tundra) and high altitudes (alpine tundra). Arctic tundra is underlain by permafrost and is usually saturated. (See: wetlands.)

Turbidimeter: A device that measures the density of suspended solids in a liquid.

Turbidity: 1. Haziness in air caused by the presence of particles and pollutants. 2. A cloudy condition in water due to suspended silt or organic matter.

U

Ultra Clean Coal (UCC): Coal that is washed, ground into fine particles, then chemically treated to remove sulfur, ash, silicone, and other substances; usually briquetted and coated with a sealant made from coal.

Ultraviolet Rays: Radiation from the sun that can be useful or potentially harmful. UV rays from one part of the spectrum (UV-A) enhance plant life and are useful in some medical and dental procedures; UV rays from other parts of the spectrum (UV-B) can cause skin cancer or other tissue damage. The ozone layer in the atmosphere partly shields us from ultraviolet rays reaching the earth's surface.

Underground Injection Control (UIC): The program under the Safe Drinking Water Act that regulates the use of wells to pump fluids into the ground.

Underground Sources of Drinking Water: Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solids content of 10,000 milligrams per liter or less, and are not "exempted aquifers." (See: exempted aquifer.)

Underground Storage Tank: A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

Unreasonable Risk: Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), "unreasonable adverse effects" means any unreasonable risk to man or the environment, taking into account the medical, economic, social, and environmental costs and benefits of any pesticide.

Unsaturated Zone: The area above the water table where soil pores are not fully saturated, although some water may be present.

Uranium Mill Tailings Piles: Former uranium ore processing sites that contain leftover radioactive materials (wastes), including radium and unrecovered uranium.

Uranium Mill-Tailings Waste Piles: Licensed active mills with tailings piles and evaporation ponds created by acid or alkaline leaching processes.

Urban Runoff: Storm water from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters.

Utility Load: The total electricity demand for a utility district.

V

Vapor Capture System: Any combination of hoods and ventilation system that captures or contains organic vapors so they may be directed to an abatement or recovery device.

Vapor Dispersion: The movement of vapor clouds in air due to wind, thermal action, gravity spreading, and mixing.

Vapor Plumes: Flue gases visible because they contain water droplets.

Variance: Government permission for a delay or exception in the application of a given law, ordinance, or regulation.

Vector: 1. An organism, often an insect or rodent, that carries disease. 2. Plasmids, viruses, or bacteria used to transport genes into a host cell. A gene is placed in the vector; the vector then "infects" the bacterium.

Vehicle Miles Travelled (VMT): A measure of the extent of motor vehicle operation; the total number of vehicle miles travelled within a specific geographic area over a given period of time.

Ventilation/Suction: The act of admitting fresh air into a space in order to replace stale or contaminated air; achieved by blowing air into the space. Similarly, suction represents the admission of fresh air into an interior space by lowering the pressure outside of the space, thereby drawing the contaminated air outward.

Venturi Scrubbers: Air pollution control devices that use water to remove particulate matter from emissions.

Vinyl Chloride: A chemical compound, used in producing some plastics, that is believed to be oncogenic.

Virgin Materials: Resources extracted from nature in their raw form, such as timber or metal ore.

Volatile: Any substance that evaporates readily.

Volatile Organic Compound (VOC): Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Volatile Synthetic Organic Chemicals: Chemicals that tend to volatilize or evaporate.

Volume Reduction: Processing waste materials to decrease the amount of space they occupy, usually by compacting or shredding, incineration, or composting.

Volumetric Tank Test: One of several tests to determine the physical integrity of a storage tank: the volume of fluid in the tank is measured directly or calculated from product-level changes. A marked drop in volume indicates a leak.

Vulnerable Zone: An area over which the airborne concentration of a chemical accidentally released could reach the level of concern.

Vulnerability Analysis: Assessment of elements in the community that are susceptible to damage should a release of hazardous materials occur.

W

Waste: 1. Unwanted materials left over from a manufacturing process. 2. Refuse from places of human or animal habitation.

Waste Characterization: Identification of chemical and microbiological constituents of a waste material.

Waste Exchange: Arrangement in which companies exchange their wastes for the benefit of both parties.

Waste Feed: The continuous or intermittent flow of wastes into an incinerator.

Waste Load Allocation: The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be, violated. The portion of a stream's total assimilative capacity assigned to an individual discharge.

Waste Minimization: Measures or techniques that reduce the amount of wastes generated during industrial production processes; term is also applied to recycling and other efforts to reduce the amount of waste going into the waste stream.

Waste Reduction: Using source reduction, recycling, or composting to prevent or reduce waste generation.

Waste Stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that are recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."

Waste Treatment Lagoon: Impoundment made by excavation or earth fill for biological treatment of wastewater.

Waste Treatment Plant: A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed from water.

Waste Treatment Stream: The continuous movement of waste from generator to treater and disposer.

Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Wastewater Infrastructure: The plan or network for the collection, treatment, and disposal of sewage in a community. The level of treatment will depend on the size of the community, the type of discharge, and/or the designated use of the receiving water.

Wastewater Operations and Maintenance: Actions taken after construction to assure that facilities constructed to treat wastewater will be operated, maintained, and managed to reach prescribed effluent levels in an optimum manner.

Water Pollution: The presence in water of enough harmful or objectionable material to damage the water's quality.

Water Purveyor: A public utility, mutual water company, county water district, or municipality that delivers drinking water to customers.

Water Quality Criteria: Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water Quality Standards: State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water Quality-Based Limitations: Effluent limitations applied to dischargers when mere technology-based limitations would cause violations of water quality standards. Usually applied to discharges into small streams.

Water Quality-Based Permit: A permit with an effluent limit more stringent than one based on technology performance. Such limits may be necessary to protect the designated use of receiving waters (i.e., recreation, irrigation, industry or water supply).

Water Solubility: The maximum possible concentration of a chemical compound dissolved in water. If a substance is water soluble it can very readily disperse through the environment.

Water Supplier: One who owns or operates a public water system.

Water Supply System: The collection, treatment, storage, and distribution of potable water from source to consumer.

Water Table: The level of groundwater.

Watershed: The land area that drains into a stream.

Well Injection: The subsurface emplacement of fluids into a well.

Well Monitoring: Measurement by on-site instruments or laboratory methods of well water quality.

Well Plug: A watertight, gastight seal installed in a bore hole or well to prevent movement of fluids.

Wellhead Protection Area: A protected surface and subsurface zone surrounding a well or wellfield supplying a public water system to keep contaminants from reaching the well water.

Wetlands: An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

Wildlife Refuge: An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

Wood-Burning-Stove Pollution: Air pollution caused by emissions of particulate matter, carbon monoxide, total suspended particulates, and polycyclic organic matter from wood-burning stoves.

Wood Treatment Facility: An industrial facility that treats lumber and other wood products for outdoor use. The process employs chromated copper arsenate, which is regulated as a hazardous material.

Working Level Month (WLM): A unit of measure used to determine cumulative exposure to radon.

Working Level (WL): A unit of measure for documenting exposure to radon decay products, the so-called "daughters". One working level is equal to approximately 200 picocuries per liter.

X Y Z

Xenobiote: Any biotum displaced from its normal habitat; a chemical foreign to a biological system.

Yard Waste: The part of solid waste composed of grass clippings, leaves, twigs, branches, and garden refuse.

Yellow-Boy: Iron oxide flocculent (clumps of solids in waste or water); usually observed as orange-yellow deposits in surface streams with excess iron content. (See: floc, flocculation.)

Z-list: OSHA's tables of toxic and hazardous air contaminants.

Zone of Saturation: (See: saturated zone.)

Zooplankton: Tiny aquatic animals eaten by fish.

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

EXECUTIVE SUMMARY

DRAFT FINAL PHASE II REMEDIAL INVESTIGATION/ FEASIBILITY STUDY ADDENDUM SITE 25 – MAJOR DRAINAGES MARINE CORPS AIR STATION EL TORO, CALIFORNIA

CTO-0073/0335

April 1997

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Date: 4/28/97

EXECUTIVE SUMMARY

This report presents the results of the Phase II Remedial Investigation (RI) conducted at Site 25, the Major Drainages, designated as one of the two sites in Operable Unit (OU)-2A for the Marine Corps Air Station (MCAS) El Toro in Orange County, California. The investigation was conducted on behalf of the United States Department of the Navy, Southwest Division Naval Facilities Engineering Command. It was performed in accordance with the Navy Installation Restoration Program under the Comprehensive Long-Term Environmental Action Navy II Program, contract No. N68711-92-D-4670.

Site 25 was once thought to be a potential source of regional volatile organic compound groundwater contamination in the Irvine Groundwater Subbasin and it was included in OU-2A. Investigation data presented in the draft final Phase II RI for Site 24 demonstrated that Site 24 and not Site 25 is responsible for the observed volatile organic compound groundwater contamination.

BACKGROUND

MCAS El Toro lies in a semiurban agricultural area in Southern California, approximately 8 miles southeast of the city of Santa Ana and 12 miles northeast of the city of Laguna Beach. Land northwest of the Station is used for agricultural purposes. The land to the south and northeast is used mainly for commercial, light-industrial, and residential purposes. Surrounding residential areas are the cities of Lake Forest, Irvine, and Laguna Hills. The farthest upstream reaches of the Site 25 watersheds are undeveloped.

MCAS El Toro was commissioned in 1943 as a Marine Corps pilot fleet operation training facility. In 1950, the Station was selected for development as a master jet station and permanent center for Marine Corps aviation on the west coast. The Station mission has involved the operation and maintenance of military aircraft and ground-support equipment. Much of the industrial activity supporting this mission took place within Site 24.

Site 25 consists of four main drainage channels that flow through or adjacent to the Station. The channels are Agua Chinon Wash, Bee Canyon Wash, Borrego Canyon Wash, and Marshburn Channel. Three of these drainages are continuations of natural washes that originate in the Santa Ana Mountains (Agua Chinon Wash, Bee Canyon Wash, Borrego Canyon Wash). Surface drainage from the hills and upgradient irrigated farmland combines with runoff generated from extensive paved surfaces on the Station. The on-Station storm sewer system discharges into the drainage channels, which then flow into San Diego Creek. San Diego Creek discharges into upper Newport Bay, about 7 miles downstream from its intersection with Marshburn Channel. The channels are mostly lined and/or culverted through the Station.

PHASE I INVESTIGATION

The Phase I RI determined that no chemicals of potential concern from shallow soil, sediment, or surface water exceeded the human-health recreational risk-based concentrations (Jacobs Engineering 1993a). Ecological screening criteria were exceeded for 4,4'-dichlorodiphenyldichloroethene and mercury in sediment samples collected from Marshburn Channel. Reported concentrations of aluminum and copper exceeded ecological screening criteria in all four washes and San Diego Creek. Reported concentrations of cadmium exceeded ecological screening criteria in Bee Canyon Wash, Borrego Canyon Wash, and San Diego Creek; reported concentrations of zinc exceeded ecological screening criteria in all washes except Agua Chinon and San Diego Creek; reported concentrations of cyanide exceeded criteria in Marshburn Channel; and reported concentrations of gamma-chlordane, beryllium, lead, and mercury exceeded criteria in San Diego Creek.

Elevated concentrations of total petroleum hydrocarbons (TPH) in the gasoline and diesel range were reported in soil samples from angle borings drilled beneath Agua Chinon Wash. Elevated diesel-range hydrocarbons were reported in soil samples collected from angle borings drilled beneath Bee Canyon Wash.

FINAL TECHNICAL MEMORANDUM BACKGROUND AND REFERENCE LEVELS

The Final Technical Memorandum on Background and Reference Levels compiled sample results that represent background soil conditions at MCAS El Toro. Appropriate statistical procedures were applied and background concentrations and reference levels for metals, pesticides, herbicides, and organic compounds were calculated (BNI 1996a). Phase I and Phase II analytical results were compared to these calculated background concentrations to evaluate the potential contribution of contaminants from Station activities.

PHASE II REMEDIAL INVESTIGATION SCOPE

The scope of the Site 25 RI included sampling and analyzing soil, soil gas, sediment, and surface-water samples. Also included was a review and incorporation of applicable Phase I data. This report summarizes the Phase I and Phase II data evaluation, presents the results of human-health and ecological risk assessments, and presents conclusions and recommendations for Site 25.

SUMMARY OF RESULTS

The findings of the Site 25 Phase II RI are summarized below, including nature and extent of contamination for sediment, surface water, and subsurface soil as well as the results from the human-health and ecological risk assessments.

EXECUTIVE SUMMARY (continued)

Sediment

Phase I and Phase II RI downstream sediment analytical results were compared to upstream concentrations and to regional background values reported in the Final Technical Memorandum on Background and Reference Levels (BNI 1996a). The following analytes from downstream sediment samples exceeded the upstream concentration and regional background levels:

- mercury—maximum reported concentration exceeded the background level by a factor of 2.04; and
- dichloroprop—maximum concentration exceeded the background level by a factor of 7.16.

In addition, the following analytes had detection limits that were higher than the regional background levels:

- silver—highest detection limit exceeded the background level by a factor of 1.08; and
- endosulfan sulfate—highest detection limit exceeded the background level by a factor of 1.45.

A review of Phase I and Phase II sediment sample analytical results, regional land use, and the geology of the individual drainage watersheds suggests that the pesticide, dichloroprop, may be attributed to agricultural practices in the general area of MCAS El Toro. Sodium is a common rock-forming element, and mercury is also naturally occurring in the area; both of these elements in Site 25 sediment can be attributed to natural geologic processes.

Silver and endosulfan sulfate (a pesticide) both have detection limits that slightly exceed the background level. However, since the detection limits are only slightly above the background level, these analytes are not considered a problem in Site 25 sediment.

Surface Water

Surface-water results were evaluated for potential Station contribution of semivolatile organic compounds, pesticides/herbicides, TPH, and metals. Results from surface-water sampling indicate that there is no significant Station contribution beyond what is expected in an urban environment. Motor oil was reported at low concentrations in the downstream samples from Agua Chinon, Bee Canyon, and Borrego Canyon Washes. These low concentrations are typical of storm runoff from parking lots and roadways.

Total metal concentrations reported in the water samples are higher than dissolved metal concentrations. This is attributed to the nitric acid preservative used for all metals samples. Because the total metals samples are not filtered, sample acidification causes metals to leach from suspended soil particles present in the stormwater of each drainage. The metals that leach from the soil particles are then analyzed in the water sample, and

the result is a higher total metals concentration compared to dissolved metals. The metals that leach from the soil particles are indicative of the chemical character of the geologic formations within the watersheds. A review of the Phase I and Phase II surface-water analytical results does not indicate significant anthropogenic sources of metals within the Site 25 watersheds.

Low concentrations of pesticides were reported in Phase II surface-water samples from Agua Chinon Wash, Marshburn Channel, and San Diego Creek. These low concentrations are typical considering the historical agricultural land use in the MCAS El Toro area.

Subsurface Soil

Petroleum hydrocarbons were reported in soil samples collected from Phase I angle borings drilled beneath Agua Chinon and Bee Canyon Washes. One soil sample collected from beneath Agua Chinon Wash had a reported concentration of 131,000 milligrams per kilogram (mg/kg) TPH as gasoline and 15,300 mg/kg TPH as diesel at a depth of 17 feet below ground surface. The soil sample collected at 9 feet and 26 feet below ground surface did not contain TPH above the detection limit. Phase I soil samples collected below this sample did not have elevated concentrations of TPH. Phase II soil borings placed adjacent to the Phase I boring locations by a licensed surveyor and sampled continuously had only minor concentrations of TPH in the soil samples at Agua Chinon Wash. Only minor concentrations of toluene and xylenes were reported from Phase I and Phase II soil gas sampling in the area. Benzene, a volatile component of gasoline, was not reported in any of the soil gas samples collected near Agua Chinon Wash. These data suggest a localized extent of the TPH contamination.

There are no active sources of petroleum, such as underground storage tanks or fueling facilities, near Agua Chinon or Bee Canyon Washes. Possible release mechanisms for the TPH in soil beneath the washes are direct discharge to the wash and infiltration through the soil profile. However, contamination was not reported at shallower levels, which is not consistent with infiltration from the surface. Even though the release mechanism is not clear, the TPH-contaminated soil was delineated horizontally and vertically by collecting and analyzing soil and soil gas samples. Based on an analysis of Phase I and Phase II soil sample analytical results, the elevated TPH concentrations reported in Phase I angle boring soil samples appear to be very localized in extent.

A review of the reported concentrations of dissolved hydrocarbons in groundwater from monitoring wells installed near the downstream reaches of Agua Chinon and Bee Canyon Washes indicates that TPH as diesel has been reported in groundwater samples at levels ranging from below the detection limit to approximately 1 milligram per liter. Releases of hydrocarbons to the washes do not appear to significantly affect groundwater quality based on the apparent localized extent of hydrocarbons in soil and the low concentrations of dissolved hydrocarbons in groundwater samples collected from nearby wells.

EXECUTIVE SUMMARY (continued)

HUMAN-HEALTH RISK ASSESSMENT

A quantitative baseline human-health risk assessment for a recreational scenario was performed as part of the Phase II RI to assess potential impacts from surface water at San Diego Creek. The cancer risk from dermal exposure to surface water at San Diego Creek was estimated at 3.8×10^{-7} and 1.8×10^{-6} for United States Environmental Protection Agency and California Environmental Protection Agency cancer toxicity factors, respectively. Arsenic is the primary risk contributor to the United States Environmental Protection Agency-derived risk. Chromium, evaluated as hexavalent chromium, is the primary contributor to the California Environmental Protection Agency risk.

A hazard index of 1.2 was estimated for dermal exposures to the surface water at San Diego Creek. This noncarcinogenic risk is primarily associated with aluminum. The total metals concentration of aluminum was used for this calculation. The elevated aluminum concentrations (total metals) are due to suspended soil particles in the surface water (mostly aluminum silicate minerals). When acid is added to the surface-water samples as a preservative, aluminum is dissolved from the suspended soil particles. Under ordinary pH conditions, the aluminum exists as aluminum silicate, and therefore, this is not available for dermal contact under normal conditions.

A qualitative human-health risk assessment was performed for sediment at the drainages and the creek to strengthen the Phase I RI results, which showed that the cumulative excess cancer risk from sediment was less than 1×10^{-6} and the noncarcinogenic hazard indices were less than 1.0 (Jacobs Engineering 1993b). These Phase II sediment data were compared to the Phase I data and to background values established in the Final Technical Memorandum on Background and Reference Levels (BNI 1996a). This comparison showed that among the Phase II downstream sediment sample results, only copper (11.6 mg/kg) exceeded the background level of 10.5 mg/kg. The Phase II result for copper was less than the Phase I concentration of 12.4 mg/kg. These data corroborate the Phase I results and suggest that the additional sample results would not increase the cumulative cancer risk to a level greater than 1×10^{-6} and the hazard index would remain less than 1.

ECOLOGICAL RISK ASSESSMENT

The following conclusions can be drawn from the ecological risk assessment.

- Metal concentrations in surface water may be impacting wildlife receptors in San Diego Creek; however, potential impacts to wildlife receptors may be associated with natural background conditions rather than past activities on MCAS El Toro.
- Metals identified as risk drivers detected in sediment in the washes and San Diego Creek do not exceed regional background metal levels, except for mercury in Marshburn Channel and San Diego Creek sediment.

- No adverse impacts to wildlife receptors are expected from exposure to mercury in sediment.
- Mercury concentrations in Marshburn Channel may impact wildlife receptors; however, low-quality habitat limits the use of the channel by wildlife receptors.
- No chemicals of potential ecological concern were identified in Borrego Canyon Wash and Agua Chinon Wash sediment.
- Potential impacts to invertebrate and plant receptors are more likely associated with agriculture and natural geological conditions than past activities from the station.
- Only bis(2-ethylhexyl)phthalate was selected as a chemical of potential ecological concern in sediment for Bee Canyon Wash; however no adverse impacts to wildlife receptors are expected from exposure to bis(2-ethylhexyl)phthalate.
- Because regional background concentrations for 4,4'-dichlorodiphenyldichloroethane, 4,4'- dichlorodiphenyldichloroethene, and 4,4'-dichlorodiphenyltrichloroethane are greater than concentrations in Marshburn Channel and San Diego Creek sediment, potential adverse impacts to avian receptors are not associated with past or current activities specific to MCAS El Toro.
- Adverse effects due to exposure to dalapon by the American robin are not likely associated with past or current activities on MCAS El Toro.
- Chemicals of potential ecological concern are not biomagnifying to higher-trophic-level organisms through trophic-level transfer.

CONCLUSIONS

Phase I and Phase II RI data suggest that historical agricultural practices and natural geologic conditions can account for most of the chemicals reported in surface-water and sediment samples in the Site 25 drainages. Minor concentrations of oil can be attributed to runoff from parking areas and roadways. These chemical characteristics appear to be similar to other drainages in the area, as shown by samples taken in San Diego Creek upstream from MCAS El Toro. These data suggest that activities at MCAS El Toro do not contribute a significant adverse effect on surface water or sediment beyond what is expected given the geologic character of the watershed, the historical agricultural practices, and fairly heavy motor vehicle traffic. The Station is currently monitoring surface water and is in compliance with its National Pollutant Discharge Elimination System permit. For these reasons, Site 25 is recommended for no further action.

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COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

EXECUTIVE SUMMARY

DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT OU-3A SITES MARINE CORPS AIR STATION EL TORO, CALIFORNIA

CTO-0079/0391

June 1997

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EXECUTIVE SUMMARY

This report presents the results of the Remedial Investigation (RI) conducted at the operable unit (OU)-3A sites at the Marine Corps Air Station (MCAS) El Toro in Orange County, California. The investigation was conducted on behalf of the Department of the Navy, Southwest Division Naval Facilities Engineering Command. It was performed in accordance with the Navy Installation Restoration Program under the Comprehensive Long-Term Environmental Action Navy II Program, contract No. N68711-92-D-4670.

BACKGROUND

MCAS El Toro lies in a semiurban agricultural area in southern California, approximately 8 miles southeast of the city of Santa Ana and 12 miles northeast of the city of Laguna Beach. Land northwest of the Station is used for agricultural purposes. The land to the south and northeast is used mainly for commercial, light-industrial, and residential purposes. Surrounding residential areas are the cities of Lake Forest, Irvine, and Laguna Hills.

MCAS El Toro was commissioned in 1943 as a Marine Corps pilot fleet-operation training facility. In 1950, the Station was selected for development as a master jet station and permanent center for Marine Corps aviation on the west coast. The Station mission has involved the operation and maintenance of military aircraft and ground-support equipment. Historical activities on the Station include aircraft maintenance and repair. These activities have generated waste oils, solvents, paint residues, hydraulic fluid, used batteries, and other wastes (MCAS El Toro 1991).

The OU-3A sites (Installation Restoration Program Sites 4, 6, 8, 9 through 13, 15, 16, 19 through 22) are located throughout the Station (Figure ES-1). The sites consist of former drop tank drainage areas, crash crew training pits, a former wastewater-treatment facility and associated sludge-drying beds, a Defense Reutilization and Marketing Office storage yard, and other industrial facilities supporting the operation and maintenance of military aircraft and ground-support equipment at the Station (Table ES-1). Most of these sites are not currently active, and the operations that contaminated the sites have ceased.

PREVIOUS INVESTIGATIONS

A significant amount of data collection and interpretation has already been completed as the result of previous investigations at the OU-3A sites. The Phase I RI analyzed samples from shallow soil, deeper subsurface soil, and groundwater and identified numerous chemicals of potential concern (COPCs) in each of these media.

REMEDIAL INVESTIGATION SCOPE

The overall goal of the RI for the OU-3A sites was to collect sufficient data to determine the nature and extent of contamination and conduct a human-health risk assessment at the individual sites or site units. The data collected were also used to support decisions

regarding the need for and scope of future remediation at the OU-3A sites. Specific goals were expressed in the form of data quality objectives (DQOs) developed to assure that adequate information was collected to successfully support these decisions. The DQOs were designed to address the following questions.

- Do COPCs in shallow soil (less than 10 feet below ground surface [bgs]) within each unit exceed established background concentrations and preliminary remediation goals, and/or do they present an unacceptable risk to human health or the environment?
- Has the extent of impacted soil been defined for the shallow-soil interval?
- Does the impacted soil extend greater than 10 feet bgs?
- Do the media being evaluated for a response action qualify for early action?

To complete the characterization efficiently, data and results from previous investigations are incorporated into this RI.

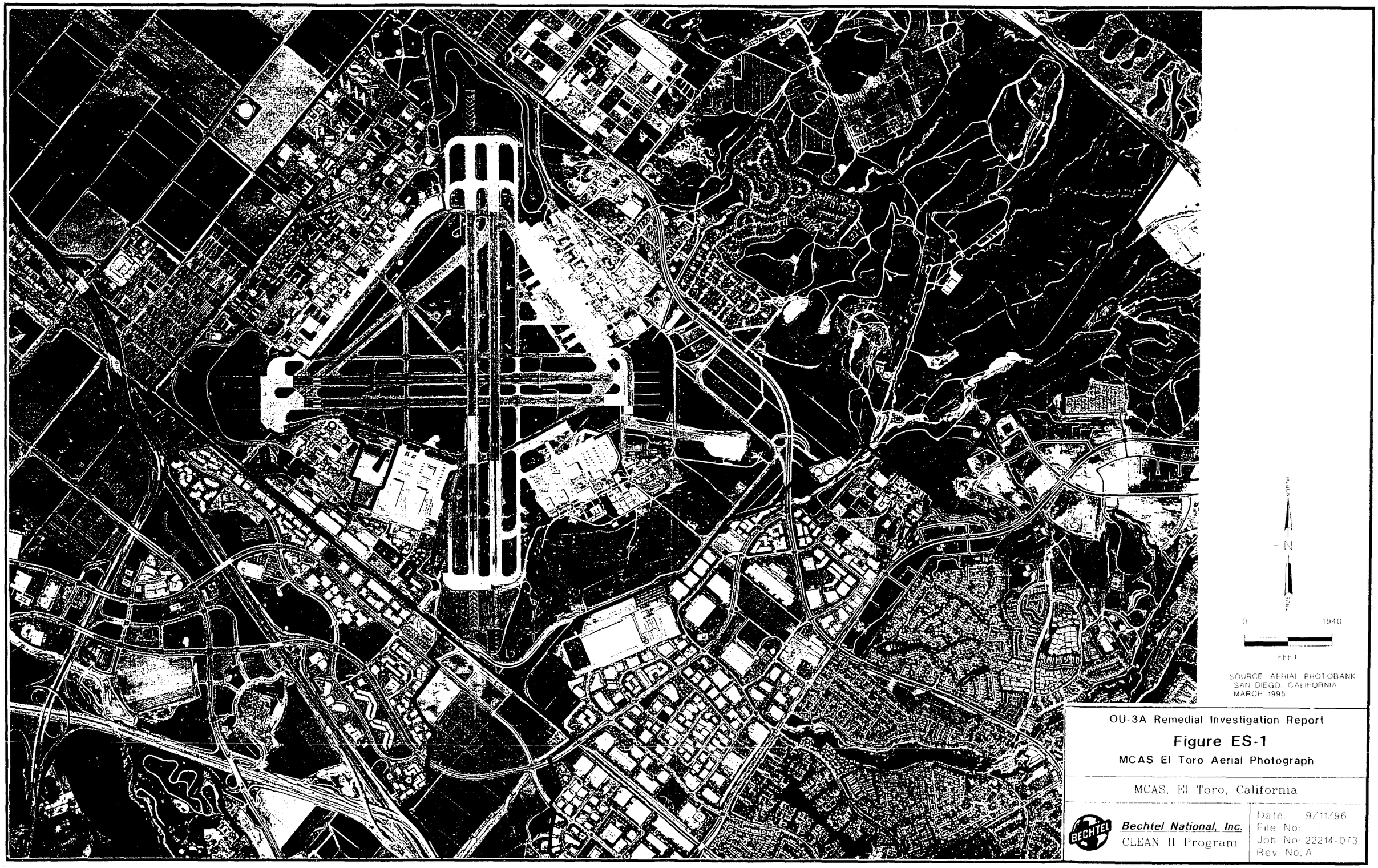
STUDY AREA INVESTIGATION

The soil investigations at OU-3A sites were designed so that when Phase I and II RI data were evaluated together, an estimate of the nature and extent of COPCs and human-health risk assessment could be conducted at each site unit. The basis and approach for the number of boring locations and associated samples collected at these locations is outlined below and presented in the Final Work Plan Phase II RI/FS (BNI 1995a).

Historical site activities, previous site investigation results, and regulatory comments were used to formulate the Phase II RI/Feasibility Study (FS) sampling approach. Human-health risk and extent of contamination were the primary objectives of the Phase II RI/FS. The three-tiered sampling approach used to address these objectives at the OU-3A sites is summarized below.

- The Tier 1 sampling approach consisted of collecting shallow-soil samples (less than 10 feet bgs) from a specific number of sampling locations within the unit so an assessment of human-health risk could completed for the unit.
- The Tier 2 sampling approach also focused on shallow soil; however, the primary objective was to refine the horizontal extent of shallow soil that has been impacted by site activities.
- The Tier 3 sampling approach was designed to estimate the horizontal and vertical extent of impacted deep subsurface soil (greater than 10 feet bgs). Groundwater was also investigated if potential impacts to groundwater were believed possible.

To provide resource-effective soil sampling, four different sampling designs were used during the Phase II RI. Each OU-3A site had a site-specific sampling program that used one or more of the four sampling designs that are summarized below (BNI 1995a).



OU-3A Remedial Investigation Report

Figure ES-1

MCAS El Toro Aerial Photograph

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 9/11/96
File No:
Job No: 22214-073
Rev No. A

Table ES-1
Installation Restoration Program Operable Unit-3A Site Characteristics

Site	Site Name	Approximate Site Area (square feet)	Approximate Depth to Groundwater (feet bgs[a])	Waste Type	Constituents Identified During Phase I and II Investigations	Units of Site Investigated During Phase II RI
4	Ferrocene Spill Area	5,000	225 – 240	Ferrocene with hydrocarbon carrier, miscellaneous fuels, waste oil	VOCs[b], SVOCs[c], TPH[d], pesticides, metals[e]	None (site not investigated as part of Phase II RI/FS)
6	Drop Tank Area No. 1	123,000	140 – 150	JP-5[f], lube oil, waste oil, possibly solvents	VOCs, SVOCs, metals, TPH	Units 1, 2, and 3 (entire site)
8	DRMO[g] Storage Area	290,000	120 – 125	PCB[h] oil, fuels, solvents, lube oil	VOCs, SVOCs, TPH, metals, pesticides, PCBs,	Units 1, 2, 3, 4, and 5 (entire site)
9	Crash Crew Pit No. 1	50,000	120 – 125	JP-5, other aviation fuels, waste oil, hydraulic fluid	VOCs, SVOCs, TPH, metals, dioxins	Units 1 and 2 (entire site)
10	Petroleum Disposal Area	1,219,000	110 – 120	Waste oil, antifreeze, hydraulic/transmission fluids, solvents	VOCs, SVOCs, TPH, metals	Units 1, 2, 3, and 4 (entire site)
11	Transformer Storage Area	30,000	120	PCB oil	Pesticides, PCBs	Units 1, 2, and 3 (entire site)
12	Sludge Drying Beds	217,000	95 – 105	Municipal waste, sludges, plating shop liquid waste	VOCs, SVOCs, TPH, metals, pesticides, PCBs, herbicides	Units 1, 2, 3, and 4 (entire site)
13	Oil Change Area	34,000	135 – 140	Waste oil, solvents	VOCs, metals, pesticides	None (site not investigated as part of Phase II RI/FS)
15	Suspended Fuel Tanks	11,000	125 – 130	Diesel fuel and possibly waste oil solvents	VOCs, TPH, metals	Unit 2
16	Crash Crew Pit No. 2	57,100	165 – 185	JP-5, other aviation fuels, waste oil, hydraulic fluid	VOCs, SVOCs, TPH, metals	Units 1, 2, and 3 (entire site)
19	Aircraft Expeditionary Refueling Site	180,000	150 – 160	JP-5, other aviation fuels	VOCs, SVOCs, TPH, metals	Units 2 and 3

(table continues)

Table ES-1 (continued)

Site	Site Name	Approximate Site Area (square feet)	Approximate Depth to Groundwater (feet bgs[a])	Waste Type	Constituents Identified During Phase I and II Investigations	Units of Site Investigated During Phase II RI
20	Hobby Shop	20,000	185 – 190	Waste oil, solvents, kerosene	VOCs, SVOCs, TPH, metals, pesticides	Units 1 and 4
21	Materials Management Group	14,000	95	Waste oil, paint, solvents, herbicides, pesticides, PCB oil	VOCs, SVOCs, TPH, metals, pesticides, herbicides	Unit 1 (entire site)
22	Tactical Air Fuel Dispensing System	80,000	110 – 120	JP-5, other aviation fuels, pesticides	VOCs, SVOCs, TPH, pesticides, metals	Units 1 and 2 (entire site)

Notes:
[a] bgs – below ground surface
[b] VOC – volatile organic compound
[c] SVOC – semivolatile organic compound
[d] TPH – total petroleum hydrocarbons
[e] metals – indicated where any target analyte list metal concentration exceeded background level as established during Phase II RI
[f] JP-5 – jet propulsion fuel, grade 5
[g] DRMO – Defense Reutilization and Marketing Office
[h] PCB – polychlorinated biphenyl

- Judgmental Sampling: Sample locations were selected using professional judgment and experience; no statistical analysis was involved.
- Stratified Random Sampling: Sample locations were randomly located within the area being investigated.
- Systematic Random Sampling Along an Axis: Sample locations were evenly spaced in a linear pattern to match the area investigated (i.e., drainage ditch) with a random starting point.
- Areal Random Sampling Based on a Grid: Sample locations were randomly located within equal-area square grids. The starting point for the grid area was also randomly located.

SUMMARY OF RESULTS OF REMEDIAL INVESTIGATION

The findings of the Phase I and II RI for the OU-3A sites are summarized briefly below, including physical site characteristics, nature and extent of contamination, potential fate-and-transport mechanisms, the human-health risk assessments, and conclusions.

Physical Site Characteristics

An understanding of the surface features, meteorology, climatology, geology, and hydrogeology of the OU-3A sites is important because these characteristics help define the mobility of contaminants and the primary contaminant-migration pathways that pose the greatest potential to impact the environment.

The area of MCAS El Toro that contains the OU-3A sites is located on a broad alluvial valley called the Tustin Plain. OU-3A site elevations range from approximately 240 to 400 feet above mean sea level and are located adjacent to the runways and other industrialized areas of the station. The topography at each of the OU-3A sites is relatively flat. None of the OU-3A sites contain any significant ecological habitat, and several sites are partially or entirely covered by asphalt or concrete.

The climate of the area is characterized by moderate-to-warm temperature and relatively low humidity. Rainfall amounts are usually low and generally occur during the winter. Most of the OU-3A sites are covered by asphalt, concrete, or hard-packed soil that is partially vegetated. These conditions, coupled with the moderate permeability of the soil, are not conducive to leaching of contaminants to groundwater. Surface runoff from infrequent storm events can collect on the flat areas, resulting in localized ponding and some infiltration at sites not completely covered by pavement. However, with the exception of Site 12 (immediately adjacent to an exposed portion of Bee Canyon Wash), the OU-3A sites are not adjacent to the exposed portions of any of the major drainages that direct surface runoff away from the Station.

Nature and Extent of Contamination

Extensive soil sampling was performed at the OU-3A sites to characterize the nature and extent of contamination. Several types of COPCs were found. The classes of contaminants identified in soil during the Phase I and II RIs at each OU-3A site are presented in Table ES-1 and are briefly discussed in the following paragraphs. During the Phase II RI, groundwater sampling was conducted at one site (Site 16, Attachment J). The Phase II RI showed that volatile organic compounds (VOCs) in soil were present down to the groundwater. Therefore, as established in the DQOs presented in the Final Work Plan Phase II RI/FS MCAS El Toro, groundwater sampling was conducted at this site.

VOCs, semivolatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), dioxins, and target analyte list metals were reported in surface- (0 to 2 feet bgs), shallow- (0 to 10 feet bgs), and deeper subsurface- (greater than 10 feet bgs) soil samples at the OU-3A sites. Groundwater samples from Site 16 contained detectable concentrations of several VOCs.

Except for Site 16, where VOCs and fuels were identified below 10 feet bgs, most of the contamination identified at the OU-3A sites is present within the shallow-soil interval (0 to 10 feet bgs). Elevated concentrations (greater than 100 micrograms per kilogram [μg/kg]) of the VOCs, SVOCs/polynuclear aromatic hydrocarbons, pesticides, PCBs, and target analyte list metals were present in most OU-3A sites to a depth of approximately 5 feet bgs. Except for target analyte list metals, these chemicals generally diminished to trace (less than 10 μg/kg) concentrations below a depth of approximately 5 feet bgs.

Potential Fate-and-Transport Mechanisms

Organic contaminants at OU-3A sites can be transformed by several potential mechanisms as follows: biological; chemical; and photolytic.

Of these possible transformation mechanisms, biological mediation is predominant. Rates of biological transformation of the organic contaminants at the OU-3A sites are much more rapid than the rates of chemical transformation. Photolytic transformation is only relevant in surface soil or fugitive dust exposed to sunlight. Although biological transformation is the primary fate mechanism, most organic contaminants at OU-3A sites resist biotransformation and will remain in soil for years.

Contaminants can migrate from OU-3A sites by several potential mechanisms, or pathways, as follows.

- VOCs and contaminated fugitive dust may be transported in air.
- Contaminated soil may be transported by surface water from precipitation.
- Contaminants in shallow soil may leach through the vadose zone into groundwater.
- Contaminants may be transported by groundwater.

Of these possible migration mechanisms, fugitive dust and surface-water transport of COPCs are the primary transport pathways mobilizing COPCs at the OU-3A sites. The following discussion describes the pathways as they pertain to the OU-3A sites.

- Volatilization and fugitive dust. VOCs are present in shallow soil at very low concentrations, and volatilization is not expected. Asphalt/concrete covering also serves to minimize volatilization of COPCs in shallow soil and prevent generation of fugitive dust. At sites that lack vegetation or asphalt/concrete pavement, fugitive dust is a potential transport mechanism. In this case it was necessary to look further at types of contaminants present and their concentrations. The human-health risk assessment was performed assuming no surface covering at any of the sites.
- Surface-water transport. Surface-water runoff is infrequent at the Station. Low average rainfall, moderate soil permeability, and high evaporation rates minimize significant surface-water runoff, except during infrequent heavy storms. Several washes flow through the Station en route to San Diego Creek. These washes are normally dry, but they can contain surface water as a result of infrequent storm events. Runoff from the OU-3A sites could eventually empty into these drainage channels. Stationwide storm sewer systems and engineered surface drainages collect and conduct runoff to these washes, thereby preventing standing-water conditions except in limited areas. The storm sewer systems and engineered surface drainages are present near a majority of the OU-3A sites; however, storm drain inlets are only present within the boundaries of Sites 4, 6, 9, 12, 20, and 21.
- Vadose zone leaching. Chemicals in vadose zone soil can be leached downward to groundwater by percolating infiltration. Transport of COPCs by this pathway is minimized by the Station's low average infiltration rate (less than 5 inches per year) (BNI 1996a). Vadose zone leaching is further limited by the chemical characteristics of most of the COPCs which cause them to be tightly bound to the soil and resistant to leaching. Vadose zone leaching is only apparent at Site 16, where an artificially high annual infiltration rate coupled with highly mobile COPCs have allowed halogenated VOCs to reach groundwater.
- Groundwater transport. Chemicals dissolved in groundwater move along with the bulk flow of groundwater by a process know as advection. At Site 16, only halogenated VOCs have reached the groundwater. Groundwater transport is affected by the groundwater flow velocity, properties of the porous medium, and the organic carbon-partitioning coefficient of the solute. At Site 16 contaminants in groundwater have moved off-site (i.e., beyond Site 16 boundary).

Human-Health Risk Assessment

A baseline human-health risk assessment was performed as part of the RI to assess potential impacts from contaminants at the OU-3A sites on human health if no remedial

actions were taken. The baseline human-health risk assessment documents the hazards and provides the information necessary to make risk management decisions concerning the necessity for remedial actions.

The human-health risk assessment evaluated two scenarios.

- Industrial scenario. Industrial workers exposed to the surface soil (0 to 2 feet bgs) at areas of potential concern.
- Residential scenario. Children and adult residents exposed to shallow soil (0 to 10 feet bgs) at areas of potential concern.

Office/industrial workers at areas of potential concern could be exposed to COPCs in soil via the following exposure pathways:

- ingestion of surface soil,
- dermal contact with surface soil, and
- inhalation of vapors and particulates that have been released from surface soil.

Children and adult residents at areas of potential concern could be exposed to COPCs in the soil via the following exposure pathways:

- ingestion of shallow soil,
- dermal contact with shallow soil, and
- inhalation of vapors and particulates that have been released from shallow soil.

Children and adults living at Site 16 were assumed to use water for domestic purposes from a private well screened in the principal aquifer. Exposure to COPCs in the groundwater was evaluated via the following pathways:

- ingestion of groundwater,
- dermal contact with groundwater, and
- inhalation of volatiles from groundwater during household water use.

Exposure conditions used in the estimation of risk are chosen to represent what is known as "reasonable maximum exposure." Use of these exposure conditions tend to overestimate risk. This effort to overestimate risk is deliberate; it provides risk managers with a margin of safety when making cleanup decisions.

Data collected during the Phase I and Phase II RIs were combined, as appropriate, to conduct the baseline human-health risk assessment. Before COPCs were selected for inclusion into the risk assessment, all chemical analytical data obtained during the Phase II RI field activities were validated to satisfy Level IV (formerly Naval Energy and Environmental Support Activity Level D) requirements. Phase I data were used "as is" (they were not revalidated).

Following the validation process, COPCs were selected based on appropriate United States Environmental Protection Agency (U.S. EPA) guidance. The data-evaluation process begins with the listing of all chemicals positively identified in soil and groundwater samples. If the COPCs in the soil are depth related, each list is limited to chemicals found within the depth of concern. The procedure eliminates the chemicals that are unlikely to pose a risk to human health, including:

- naturally occurring inorganic chemicals (metals) for which the concentrations are within the range considered normal for MCAS El Toro; and
- essential nutritional elements of very low toxicity (i.e., calcium, iron, magnesium, potassium, or sodium) present at low concentrations.

Surface-soil data (0 to 2 feet bgs) and shallow-soil data (0 to 10 feet bgs), considered to be best data for evaluating exposures at the OU-3A sites, were used in selecting COPCs in the baseline human-health risk assessment. Both Phase I and II RI data were used to identify the COPCs in soil.

To aid in the risk assessment identification and definition of important source areas at each of the OU-3A sites, several of the site units within a site were grouped, as appropriate, into areas of potential concern. This association was based on the following criteria:

- common historical activities (e.g., Site 8 Units 1 and 4 were combined into one area of potential concern in part because of the storage of electrical panels);
- location of the site units relative to each other (e.g., Site 8 Unit 4 is contained within Unit 1);
- the nature and magnitude of the chemical contaminants at contiguous units (e.g., Site 8 Units 1 and 4 both contain PCBs in shallow soil); and
- the physiographic characteristics of the various units (e.g., Site 8 Units 1 and 4 are level, unpaved, unvegetated areas within the fenced storage yard).

At each of the OU-3A sites, resulting areas of potential concern consisted of the following.

- Site 4, Ferrocene Spill Area
  - Unit 1, addressed individually as an area of potential concern
  - Unit 2, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 6, Drop Tank Drainage Area No. 1
  - Units 1 through 3, grouped into an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 8, Defense Reutilization and Marketing Office Storage Yard
  - Units 1 and 4, grouped into an area of potential concern

  - Units 2 and 3, grouped into an area of potential concern
  - Unit 5, addressed individually as an area of potential concern
- Site 9, Crash Crew Pit No. 1
  - Units 1 and 2, grouped into an area of potential concern
- Site 10, Petroleum Disposal Area
  - Units 1 through 3, grouped into an area of potential concern
  - Unit 4, addressed individually as an area of potential concern
- Site 11, Transformer Storage Area
  - Unit 1, addressed individually as an area of potential concern
  - Unit 2, addressed individually as an area of potential concern
  - Unit 3, addressed individually as an area of potential concern
- Site 12, Sludge Drying Beds
  - Unit 1, addressed individually as an area of potential concern
  - Units 2 and 4, grouped into an area of potential concern
  - Unit 3, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 13
  - Units 1 and 2 grouped into an area of potential concern
- Site 15, Suspended Fuel Tanks
  - Unit 2, addressed individually as an area of potential concern
- Site 16, Crash Crew Pit No. 2
  - Units 1 and 2, grouped into an area of potential concern
  - Unit 3, addressed individually as an area of potential concern
  - Groundwater addressed individually as an area of potential concern
- Site 19, Aircraft Expeditionary Refueling Site
  - Units 2 and 3, grouped into an area of potential concern
- Site 20, Hobby Shop
  - Unit 1, addressed individually as an area of potential concern
  - Unit 4, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 21, Materials Management Shop
  - Unit 1, addressed individually as an area of potential concern

- catch basin addressed individually as an area of potential concern

- Site 22, Tactical Air Fueling Dispensing System
  - Unit 1, addressed individually as an area of potential concern
  - Unit 2, addressed individually as an area of potential concern

The analyses presented in the human-health risk assessment estimate the potential on-site risk associated with these areas of potential concern (i.e., site units or site unit groups) so that remedial actions, if needed, can be developed for relatively localized remediation targets.

Risk estimates for the identified receptors were calculated based on exposure to soil and sediments (e.g., inhalation, ingestion, dermal) and gases (e.g., inhalation). At Site 16, it was assumed that the resident could also be exposed to groundwater from an on-site well.

The human-health risk assessment conclusions are presented on Table ES-2. Carcinogenic risks from soil in the residential and industrial scenarios ranged from approximately 2.0×10^{-4} (residential scenario for catch basin at Site 21) to 1.0×10^{-8} (industrial scenario for Unit 1 at Site 20). Noncarcinogenic risks (hazard indices) for the residential and industrial scenarios ranged from 0.0036 (industrial scenario for Unit 3 at Site 11) to 5.9 (residential scenario for Unit 3 at Site 12). Also listed on Table ES-2 are the risk drivers associated with each area of concern at the OU-3A sites.

A habitat assessment was performed for the OU-3A sites in May 1995. The results of this assessment indicated an absence of significant plant and wildlife habitat at the OU-3A sites. Therefore, an ecological risk assessment was not performed as part of the Phase II RI/FS for the OU-3A sites. The specific results of the habitat assessment are presented in Appendix L.

The results of the risk assessment were used together with the other information obtained during the Phase II RI to evaluate whether any further action was necessary at an area of concern at each of the OU-3A sites.

CONCLUSIONS

The Phase II RI was conducted using the seven-step U.S. EPA DQO process (U.S. EPA 1993). Using this process, four site-specific DQOs were developed for the OU-3A sites. The Phase II RI has successfully met these DQOs as summarized in the site-specific attachments and discussed below. Although DQOs are site-specific, they have been answered below in generalized manner for the OU-3A sites. Table ES-2 presents the results of the site-specific investigations performed for the Phase II RI.

1. *Do contaminants in shallow soil (less than 10 feet bgs) within each unit exceed established background concentrations and preliminary remediation goals, and/or do they present an unacceptable risk to human health or the environment?*

   No. Target analyte list metals above their respective background concentrations, VOCs, SVOCs, PCBs, and pesticides in shallow soil at the OU-3A sites do not appear to pose an unacceptable risk to a potential on-site resident (or on-site industrial worker) at most of the OU-3A sites, based upon the reported range of concentrations in shallow soil and the calculated risk values.

2. *Has the nature of the impacted soil been defined for the shallow-soil interval?*

   Yes. The nature and extent of contaminants has been defined in shallow soil. The Base Realignment and Closure Cleanup Team (BCT) agreed that the nature and extent of shallow-soil contamination associated with COPCs at all the OU-3A sites has been defined in a sufficient manner to reach a decision for future actions.

3. *Does the impacted soil extend below a depth of 10 feet bgs?*

   No. In general, impacted soil does not extend below 10 feet bgs at OU-3A sites. At most OU-3A sites, the BCT agreed that sampling below depths of 10 feet bgs was not necessary. At Sites 8, 12, and 16, soil sampling was performed below 10 feet bgs. At all of three of these sites, the BCT agreed that the sampling performed was sufficient to define the nature and extent of contamination below 10 feet bgs. The analytical data, site conditions, and the fate-and-transport analysis suggest that the COPCs do not pose a threat to groundwater at any of the OU-3A sites except Site 16.

4. *Do the media being evaluated for a response action qualify for early action?*

   No. None of the contaminants identified at the OU-3A sites pose an imminent risk to human health or the environment; they are stable in the physical system and are not expected to migrate from the site. Contaminated groundwater at Site 16 has moved off-site, but the vertical and horizontal extent of migration is very limited. At the present time, because this site is located in the middle of the runways at the Station, it is unlikely a well will be constructed at this site and used for domestic purposes. Therefore, it appears that this groundwater is not an imminent risk to human health or the environment.

RECOMMENDED ACTIONS

The data collected during the Phase I and II RIs were sufficient to characterize the nature and extent of contamination, perform human-health risk assessment, and support decisions on the necessity for remedial actions at the OU-3A sites. The CERCLA (1980) requirements, the NCP, and applicable and relevant and appropriate requirements were used to formulate the site-specific recommendations presented here.

Table ES-2
OU[a]-3A Sites – Phase II RI[b] Results and Recommendations

				PHASE II RI RISK ASSESSMENT								
				EXCESS LIFETIME CANCER RISK				NONCANCER RISK (Hazard Index)				
Site Number	Site Name	Unit Number	Has Nature and Extent of Contamination Been Defined?	Residential Scenario (0 to 10 feet bgs[c])[d] U.S. EPA[e]/ Cal-EPA[f]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs) U.S. EPA/ Cal-EPA	Industrial Scenario Risk Drivers[g]	Residential Scenario (0 to 10 feet bgs)[h]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs)	Industrial Scenario Risk Drivers[g]	Recommendations
4	Ferrocene Spill Area	1	Yes[i]	1.9E-5[j]	arsenic (99%)	5.7E-6	arsenic (99%)	1.4	manganese (44%)	0.049	—	No Further Action
		2	Yes	3.0E-5/3.6E-5	arsenic (67%/56%) benzo(a)pyrene (23%/31%) dieldrin (6%/5%) benzo(k)fluoranthene (–/4%)	1.4E-5/1.8E-5	arsenic (57%/44%) benzo(a)pyrene (32%/41%) dieldrin (7%/6%)	0.75	—	0.12	—	No Further Action Recommended
		Catch Basin	Yes	1.9E-7/5.8E-7	—	3.0E-8/9.1E-8	—	0.31	—	0.021	—	No Further Action Recommended
6	Drop Tank Area No. 1	1, 2, 3[k]	Yes	1.9E-5/2.0E-5	arsenic (68%/65%) beryllium (23%/22%) benzo(a)pyrene (6%/9%)	1.1E-5/1.3E-5	benzo(a)pyrene (44%/55%) arsenic (28%/21%) dibenz(a,h)anthracene (12%/9%)	1.4	manganese (41%)	0.11	—	No Further Action Recommended
		Catch Basin	Yes	3.1E-8	—	1.6E-8	—	0.084	—	0.0072	—	No Further Action Recommended
8	Defense Reutilization and Marketing Office Storage Area	1, 4	Yes	1.7E-5/2.0E-5	Aroclor 1248 (57%/49%) benzo(a)pyrene (27%/38%)	1.3E-5/1.5E-5	Aroclor 1248 (49%/43%) benzo(a)pyrene (24%/33%) Aroclor 1260 (16%/14%)	0.79	—	0.21	—	Further Action Recommended
		2, 3	Yes	4.1E-5	Aroclor 1254 (32%) arsenic (27%) Aroclor 1248 (19%) Aroclor 1260 (17%)	4.5E-6	arsenic (82%/80%)	2.3	Aroclor 1254 (28%) manganese (22%) Aroclor 1248 (17%) Aroclor 1260 (15%) arsenic (8%)	0.078	—	Further Action Recommended
		5	Yes	1.0E-4	indeno(1,2,3-c,d)pyrene (96%) benzo(b)fluoranthene (7%) Aroclor 1260 (2%)	6.8E-5	indeno(1,2,3-c,d)pyrene (86%) benzo(b)fluoranthene (6%) arsenic (6%)	1.1	manganese (55%)	0.01	—	Further Action Recommended
9	Crash Crew Pit No. 1	1, 2	Yes	1.7E-5	arsenic (82%) benzo(a)pyrene (–/6%)	1.1E-5/1.3E-5	arsenic (50%/42%) benzo(a)pyrene (30%/42%)	1.4	manganese (45%)	0.11	—	No Further Action Recommended
10	Petroleum Disposal Area	1, 2, 3	Yes	1.3E-5	arsenic (92%)	1.3E-5/1.8E-5	benzo(a)pyrene (55%/67%) arsenic (26%/19%)	1.2	manganese (50%)	0.049	—	No Further Action Recommended
		4	Yes	3.2E-5	arsenic (75%) beryllium (23%)	5.8E-6	arsenic (98%)	2.2	manganese (42%) aluminum (24%)	0.036	—	No Further Action Recommended
11	Transformer Storage Area	1	Yes	9.1E-5	Aroclor 1260 (99%)	6.0E-5	Aroclor 1260 (99%)	4.5	Aroclor 1260 (99%)	1.1	Aroclor 1260 (99%)	Further Action Recommended
		2	Yes	5.9E-6	Aroclor 1260 (99%)	4.5E-5	Aroclor 1260 (99%)	0.30	—	0.83	—	Further Action Recommended
		3	Yes	3.0E-7	—	1.6E-8	—	0.017	—	0.00031	—	No Further Action Recommended

(table continues)

Table ES-2 (continued)

Site Number	Site Name	Unit Number	Has Nature and Extent of Contamination Been Defined?	PHASE II RI RISK ASSESSMENT: Excess Lifetime Cancer Risk: Residential Scenario (0 to 10 feet bgs[c])[d] U.S. EPA[e]/ Cal EPA[f]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs) U.S. EPA/ Cal-EPA	Industrial Scenario Risk Drivers[g]	Noncancer Risk (Hazard Index): Residential Scenario (0 to 10 feet bgs)[h]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs)	Industrial Scenario Risk Drivers[g]	Recommendations
12	Sludge Drying Beds	1	Yes	6.0E-5/7.6E-5	benzo(a)pyrene (35%/45%) arsenic (22%/17%) dibenz(a,h)anthracene (15%/12%) Aroclor 1254 (15%/12%) benzo(k)fluoranthene (–/4%) benzo(b)fluoranthene (4%/3%) benz(a)anthracene (4%/3%) indeno(1,2,3-c,d)pyrene (2%/2%)	3.1E-5/4.2E-5	benzo(a)pyrene (38%/46%) dibenz(a,h)anthracene (16%/13%) Aroclor 1254 (16%/13%) arsenic (16%/12%) benzo(k)fluoranthene (–/4%) benzo(b)fluoranthene (5%/4%) benz(a)anthracene (4%/3%)	4.6	MCPP[l] (52%) manganese (14%) Aroclor 1254 (10%) MCPA[m] (6%)	0.76	—	No Further Action Recommended
		2, 4	Yes	2.8E-5	arsenic (71%) beryllium (13%) dibenz(a,h)anthracene (5%) benzo(a)pyrene (–/4%)	2.1E-5/2.3E-5	arsenic (36%/32%) dibenz(a,h)anthracene (26%/23%) benzo(a)pyrene (11%/16%) Aroclor 1260 (10%/9%)	2.1	manganese (34%) MCPA (18%) arsenic (16%)	0.53	—	No Further Action Recommended
		3	Yes	4.5E-5/5.1E-5	arsenic (31%/27%) dibenz(a,h)anthracene (15%/13%) benzo(a)pyrene (14%/22%) dieldrin (12%/11%) DDT[n] (9%/8%) benzo(b)fluoranthene (6%/6%) Aroclor 1260 (6%/5%) benzo(k)fluoranthene (–/4%) Aroclor 1254 (4%/3%)	8.8E-5/9.3E-5	Aroclor 1254 (61%/58%) Aroclor 1260 (16%/15%) arsenic (5%/5%) benzo(a)pyrene (5%/8%) dieldrin (4%/3%) dibenz(a,h)anthracene (3%/3%) DDT (3%/3%) benzo(b)fluoranthene (2%/2%) benzo(k)fluoranthene (–/2%)	5.9	MCPP (66%) manganese (12%) aluminum (5%)	2.3	Aroclor 1254 (49%) MCPP (36%) Aroclor 1260 (11%)	Further Action Recommended
		Catch Basin	Yes	9.9E-7	—	5.7E-7	—	0.18	—	0.02	—	No Further Action Recommended
13	Oil Change Area	1, 2	Yes	1.8E-5/2.3E-5	arsenic (53%/42%) benzo(a)pyrene (36%/48%)	5.3E-6/8.8E-6	benzo(a)pyrene (81%/80%)	1.1	manganese (53%)	0.012	—	No Further Action Recommended
15	Suspended Fuel Tank Area	2	Yes	4.2E-6/5.1E-6	dibenz(a,h)anthracene (40%/33%) benzo(a)pyrene (29%/37%) Aroclor 1260 (24%/20%)	1.1E-5/1.2E-5	arsenic (70%/64%) dibenz(a,h)anthracene (10%/9%) benzo(a)pyrene (–/11%)	1.1	manganese (54%)	0.12	—	No Further Action Recommended
16	Crash Crew Pit No. 2	1, 2	Yes	1.7E-6/2.0E-6	dibenz(a,h)anthracene (38%/33%) benzo(a)pyrene (18%/26%) vinyl chloride (18%/15%) indeno(1,2,3-c,d)pyrene (13%/11%)	1.6E-6/1.8E-6	dibenz(a,h)anthracene (41%/34%) benzo(a)pyrene (38%/51%) indeno(1,2,3-c,d)pyrene (12%/10%)	0.13	—	0.0068	—	Further Action Recommended
		3	Yes	1.9E-5/2.0E-5	arsenic (68%/65%) dibenz(a,h)anthracene (19%/19%) beryllium (11%/11%)	6.7E-6/6.9E-6	arsenic (55%/54%) dibenz(a,h)anthracene (36%/35%)	1.3	manganese (50%)	0.11	—	No Further Action Recommended
		Groundwater	Yes	8.0E-5	trichloroethene (99%)	NA[o]	NA	8.4	trichloroethene (99%)	NA	NA	Further Action Recommended
19	Aircraft Expeditionary Refueling Site	2, 3	Yes	1.3E-5	arsenic (85%) dibenz(a,h)anthracene (8%)	3.9E-6/4.1E-6	arsenic (92%/88%)	0.95	manganese (60%)	0.036	—	No Further Action Recommended

(table continues)

Table ES-2 (continued)

Site Number	Site Name	Unit Number	Has Nature and Extent of Contamination Been Defined?	PHASE II RI RISK ASSESSMENT: Excess Lifetime Cancer Risk: Residential Scenario (0 to 10 feet bgs[c])[d] U.S. EPA[e]/ Cal-EPA[f]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs) U.S. EPA/ Cal-EPA	Industrial Scenario Risk Drivers[g]	Noncancer Risk (Hazard Index): Residential Scenario (0 to 10 feet bgs)[h]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs)	Industrial Scenario Risk Drivers[g]	Recommendations
20	Hobby Shop	1	Yes	1.5E-5	arsenic (93%)	1.3E-8/4.0E-8	—	1.3	manganese (45%)	0.086	—	No Further Action Recommended
		4	Yes	3.4E-6/3.5E-6	Aroclor 1254 (88%/86%)	2.2E-6	Aroclor 1254 (91%)	0.61	—	0.043	—	No Further Action Recommended
		Catch Basin	Yes	4.7E-6/6.0E-6	bis(2-ethylhexyl)phthalate (83%/65%) cadmium (–/30%)	2.4E-6/2.6E-6	bis(2-ethylhexyl)phthalate (96%/88%)	1.2	cadmium (45%)	0.098	—	No Further Action Recommended
21	Materials Management Group	1	Yes	2.5E-5	arsenic (88%) Aroclor 1260 (8%)	1.1E-5	arsenic (91%)	2.0	manganese (33%) MCPP (21%) arsenic (19%)	0.15	—	No Further Action Recommended
		Catch Basin	Yes	1.3E-4/1.8E-4	benzo(a)pyrene (48%/56%) dibenz(a,h)anthracene (14%/10%) arsenic (25%/18%) benzo(k)fluoranthene (–/5%) benzo(b)fluoranthene (5%/4%) benz(a)anthracene (4%/3%) indeno(1,2,3-c,d)pyrene (3%/2%) chrysene (–/1%)	7.5E-5/1.1E-4	benzo(a)pyrene (55%/61%) dibenz(a,h)anthracene (16%/11%) arsenic (15%/10%) benzo(k)fluoranthene (–/6%) benzo(b)fluoranthene (6%/4%) benz(a)anthracene (5%/3%) indeno(1,2,3-c,d)pyrene (3%/2%) chrysene (–/1%)	0.91	arsenic (60%)	0.11	—	No Further Action Recommended
22	Tactical Air Fuel Dispensing System	1	Yes	2.7E-5/3.5E-5	arsenic (52%/40%) benzo(a)pyrene (37%/46%) benzo(k)fluoranthene (–/3%) benz(a)anthracene (4%/3%) benzo(b)fluoranthene (4%/3%)	1.4E-5/1.9E-5	benzo(a)pyrene (46%/58%) arsenic (36%/26%)	0.52	—	0.048	—	No Further Action Recommended
		2	Yes	2.3E-8/9.8E-8	—	4.7E-6	arsenic (100%)	1.2	manganese (59%)	0.031	—	No Further Action Recommended

Notes:
- [a] OU – operable unit
- [b] RI – Remedial Investigation
- [c] bgs – below ground surface
- [d] cancer risk results shown are for the hypothetical residential adult; adult cancer risk results are higher than the child cancer risk
- [e] U.S. EPA – United States Environmental Protection Agency
- [f] Cal-EPA –California Environmental Protection Agency
- [g] as determined by human-health risk assessment, number in parentheses is percentage of risk the risk driver accounts for (U.S. EPA/Cal-EPA)
- [h] systemic toxicity results shown are for the hypothetical resident child; child noncancer risks are higher than the adult cancer risk
- [i] as agreed by the Base Realignment and Closure Cleanup Team
- [j] risk listed once when U.S. EPA derived risks equal state derived risks
- [k] multiple units listed under Unit Number column are addressed as one area of concern
- [l] MCPP – 2-(2-methyl-4-chlorophenoxy)-propionic acid
- [m] MCPA – (2-methyl-4-chlorophenoxyacetic) acid
- [n] DDT – dichlorodiphenyltrichloroethane
- [o] NA – not applicable

The following sites are recommended for no further action:

- Site 4, Ferrocene Spill Area;
- Site 6, Drop Tank Drainage Area No. 1:
- Site 9, Crash Crew Pit No. 1;
- Site 10, Petroleum Disposal Area;
- Site 11, Transformer Storage Area (Unit 3);
- Site 12, Sludge Drying Beds (Units 1, 2, 4);
- Site 13, Oil Change Area;
- Site 15, Suspended Fuel Tanks;
- Site 19, Aircraft Expeditionary Refueling Site;
- Site 20, Hobby Shop;
- Site 21, Materials Management Group; and
- Site 22, Tactical Air Fuel Dispensing System.

The following sites are recommended for remedial action:

- Site 8, DRMO Storage Yard, RAO is to reduce or eliminate exposure to contaminated soil at the site;
- Site 11, Transformer Storage Area, RAO is to reduce or eliminate exposure to contaminated soil at the site (Units 1 and 2);
- Site 12, Sludge Drying Beds, RAO is to reduce or eliminate the likelihood of contaminated soil at Unit 3 from being transported off-site; and
- Site 16, Crash Crew Pit No. 2, RAOs are to perform pilot tests to evaluate the applicability of SVE and air sparging to remove VOCs at the site; to perform pilot tests to evaluate the feasibility groundwater extraction and reinjection; and to refine groundwater monitoring well network to enhance tracking of contaminated groundwater moving off-site.

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United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

Directive: 9335.3-02FS-1
May 1990

EPA

A Guide to Developing Superfund Records of Decision

Office of Emergency and Remedial Response
Hazardous Site Control Division

Quick Reference Fact Sheet

EPA issues the Record of Decision (ROD) as the final remedial action plan for a site or operable unit. The ROD summarizes the problems posed by the conditions at a site, the alternative remedies considered for addressing those problems, and the comparative analysis of those alternatives against nine evaluation criteria. The ROD then presents the selected remedy and provides the rationale for that selection, specifically explaining how the remedy satisfies the requirements of section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

This guide provides ROD preparers with a quick reference to the essential ROD components. The information to be included in each of the three major sections of a ROD is summarized below. Close attention should be given to the sections in which alternatives are described, risk information is presented, the comparative analysis against the nine evaluation criteria is summarized, and the declaration of statutory determinations is made. Additional information on ROD preparation is provided in Chapters 6, 7, and 9 of the "Interim Final Guidance on Preparing Superfund Decision Documents" (the "ROD Guidance") (OSWER Directive 9335.3-02, November, 1989, EPA/540/G-89/007).

THE DECLARATION

The Declaration is a formal statement signed by the EPA Regional Administrator (RA) or Assistant Administrator (AA) of the Office of Solid Waste and Emergency Response (OSWER) that identifies the selected remedy and indicates that the selection was carried out in accordance with the statutory and regulatory requirements of the Superfund program. The State Director may also sign the Declaration, if appropriate. The Declaration should be approximately two pages long and should include the information provided in **Highlight 1**.

Highlight 1: Outline and Sample Language for the Declaration of the Record of Decision

Site Name and Location

Statement of Basis and Purpose

"This decision document presents the selected remedial action for the [site], in [location], which was chosen in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site."

"The State/Commonwealth of _____ concurs with the selected remedy."

Assessment of the Site

"Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment."

Description of the Selected Remedy

- Describe the role of this operable unit within the overall site strategy. (Does this operable unit address the principal threats posed by the site?)
- Describe the major components of the selected remedy in bullet fashion.

Statutory Determinations

- When the selected remedy satisfies the statutory preference for treatment as a principal element by addressing the principal threat(s) at the site with treatment, the Declaration should state:

  "The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action [or "a waiver can be justified for whatever Federal and State applicable or relevant and appropriate requirement that will not be met"], and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technology to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element."

  (or)

- When a remedy involving little or no treatment is selected (i.e., treatment is not utilized to address the principal threat(s)), CERCLA, as amended by SARA, requires a statement and rationale explaining why a remedial action involving such reductions was not selected. The Declaration should state:

  "The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action [or "a waiver can be justified for whatever Federal and State applicable or relevant and appropriate requirement that will not be met"], and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies, to the maximum extent practicable for this site. However, because treatment of the principal threats of the site was not found to be practicable [or "within the limited scope of this action"], this remedy does not satisfy the statutory preference for treatment as a principal element."

- If the remedy will leave hazardous substances on-site above health-based levels, the Declaration should include the following:

  "Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment."

  (or)

- If the remedy will not leave hazardous substances on-site above health-based levels, the Declaration should include the following:

  "Because this remedy will not result in hazardous substances remaining on-site above health-based levels, the five-year review will not apply to this action."

_____
(Signature of Assistant/Regional Administrator)

_____
(Signature of State Director (if appropriate))

_____
Date

(Note: Attach the State's letter of concurrence to the Record of Decision package)

THE DECISION SUMMARY

The Decision Summary provides an overview of the problems posed by the conditions at a site, the remedial alternatives, and the analysis of those options. The Decision Summary explains the rationale for the selection and how the selected remedy satisfies statutory requirements. The information to be presented in each of the sections of the Decision Summary is outlined below. In most cases, much of the information presented can be summarized from the Remedial Investigation/Feasibility Study (RI/FS).

Site Name, Location, and Description. Briefly describe the site in terms of:

- Name, location, address (include maps, a site plan, or other graphic descriptions, as appropriate);
- Area and topography of the site, especially if it is located within a floodplain or wetlands;
- Adjacent land uses;
- Natural resource uses;
- Location and distance to nearby human populations;
- General surface-water and ground-water resources; and
- Surface and subsurface features (e.g., number and volume of tanks, lagoons, drums, or other structures).

History and Enforcement Activities. Summarize the ing:

- History of site activities that led to current problems;
- History of Federal and State site investigations and removal and remedial actions conducted under CERCLA or other authorities; and
- History of CERCLA enforcement activities at the site, including:
  - The results of searches for potentially responsible parties (PRPs); and
  - Whether special notices have been issued to PRPs.

Highlights of Community Participation. Summarize the major public participation activities, as follows:

- Describe how the public participation requirements of CERCLA sections 113(k)(2)(B)(i-v) and 117 were met in the remedy selection process.

Note: Community response to the selected remedy should be addressed under the "community acceptance" criterion in the Comparative Analysis section of the ROD. Responses to community concerns should be addressed in the "Responsiveness Summary" of the ROD.

Scope and Role of Operable Unit [or Response Action] Within Site Strategy.

- Describe the role of the remedial action within the overall site clean-up strategy.
- Summarize the scope of the problems addressed by the remedial action selected. Will the action address any of the principal threats posed by conditions at the site?

Note: The Statutory Determinations section of the ROD should explain whether or not the selected remedy satisfies the statutory preference for remedies employing treatment that reduces toxicity, mobility, or volume as a principal element. By indicating whether the principal threat(s) will be addressed by the action, the Scope and Role section of the Decision Summary should provide the basis for that statutory determination.

Summary of Site Characteristics. Highlight the following factors:

- All known or suspected sources of contamination;
- Contamination and affected media, including:
  - Types and characteristics (e.g., toxic, mobile, carcinogenic, non-carcinogenic) of contaminants;
  - Volume of contaminated material; and
  - Concentrations of contaminants;
- Location of contamination and known or potential routes of migration, including:
  - Population and environmental areas that could be affected, if exposed;
  - Lateral and vertical extent of contamination; and
  - Potential surface and subsurface pathways of migration.

Include maps, charts, tables, and other graphic descriptions, as appropriate.

Summary of Site Risks. Summarize the results of the baseline risk assessment conducted for the site.

Human Health Risks:

- Identify the concentrations of the contaminants (indicator chemicals) of concern in each medium of exposure;
- Summarize results of the exposure assessment;
- Summarize the toxicity assessment of contaminants of concern;
- Summarize risk characterization for each pathway by population and the total risk for the site, including:
  - Potential or actual carcinogenic risks;
  - Noncarcinogenic risks; and
  - Brief explanation of the meaning of key risk terms.

Environmental Risks:

- Summarize the effects of the contamination on critical habitats; and
- Summarize the effects of the contamination on any endangered species.

Note: This summary of the baseline risk assessment provides the rationale for the lead agency's either undertaking a response action or taking no action.

Description of Alternatives. The objective of this section is to provide an understanding of the remedial alternatives developed for the site and their specific components. Each alternative should be described in terms of the components listed below. **Figure 1** is an example of elements to be addressed in this section.

- **Treatment components.** Describe the following, as appropriate:
  - Treatment technologies (e.g., thermal destruction) that will be used;
  - Type and volume of waste to be treated;
  - Process sizing; and
  - Primary treatment levels (e.g., best demonstrated available technology [BDAT], percentage or order of magnitude of concentration reductions expected).
- **Containment or storage components.** Describe the following, as appropriate:
  - Type of storage (e.g., landfill, tank, surface impoundment, containers);
  - Type of closure that will be implemented (RCRA Subtitle C clean closure, landfill closure, Subtitle D solid waste closure);
  - Type and quantity of waste to be stored; and
  - Quantity of untreated waste and treatment residuals to be disposed off-site or managed on-site in a

containment system (cap., minimum technology unit, etc.) and the degree of hazard remaining in such waste.

- **Ground-water component.** Describe the following, as appropriate:
  - Ground-water classification (e.g., Class I, II, or III);
  - Remediation goals (e.g., Maximum Contaminant Levels [MCLs]);
  - Estimated restoration timeframe; and
  - Area of attainment
- **General components.** Describe the following, as appropriate, for each of the three previous components:
  - Contaminated media addressed (and physical location at the site);
  - Risk reduction (including initial risk);
  - Whether treatability testing has been or will be conducted;
  - Implementation requirements;
  - Institutional controls;
  - Residual levels (e.g., delisting, BDAT);
  - Assumptions, limitations, uncertainties;
  - Estimated implementation timeframe; and
  - Estimated capital, O&M, and present-worth costs.
- **The major applicable or relevant and appropriate requirements (ARARs), risk-based levels, and other "to be considered" (TBCs) being met/utilized for the specific components of the remedial alternative.**
  - The description should summarize how the specific components of the alternative will comply with the major ARARs, as well as briefly describe why the standard is applicable or relevant and appropriate (e.g., placing a RCRA characteristic waste, thus RCRA closure is applicable).

Summary of Comparative Analysis of Alternatives. In this section, summarize the relative performance of the alternatives by highlighting the key differences among the alternatives in relation to the nine evaluation criteria. An effective way of organizing this section is to present a series of paragraphs headed by each criterion. Under each criterion, the alternative that performs best in that category should be discussed first, with other options discussed in sequence. Refer to the RI/FS and ROD guidance documents for additional information on the factors included in each of the nine criteria. The nine evaluation criteria are summarized below.

Threshold Criteria

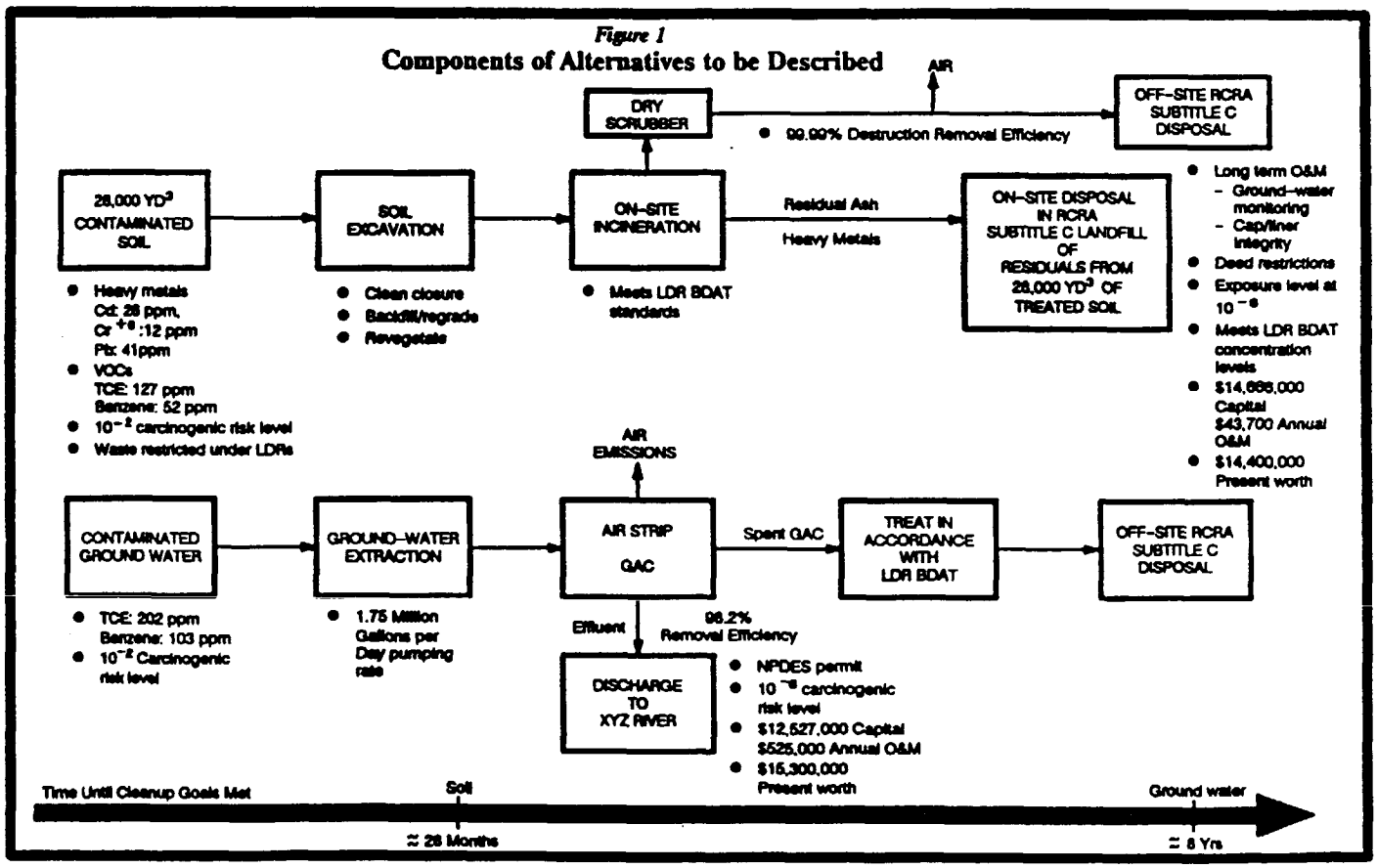
- **Overall protection of human health and the environment** addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- **Compliance with applicable or relevant and appropriate requirements (ARARs)** addresses whether a remedy will meet all of the ARARs of other Federal and State environmental laws and/or justifies a waiver.

Primary Balancing Criteria

- **Long-term effectiveness and permanence** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met.
- **Reduction of toxicity, mobility, or volume through treatment** is the anticipated performance of the treatment technologies a remedy may employ.
- **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until clean-up goals are achieved.
- **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- **Cost** includes estimated capital and O&M costs, as well as present-worth costs.

Figure 1

Components of Alternatives to be Described



Modifying Criteria

- **State/Support Agency Acceptance** should be used to indicate the support agency's comments. Where the State or Federal agency is the lead for the ROD, EPA's acceptance of the selected remedy should be addressed under this criterion.

- **Community Acceptance** summarizes the public's general response to the alternatives described in the Proposed Plan and RI/FS Report. The specific responses to public comments should be addressed in the Responsiveness Summary section of the ROD.

Notes: In addressing the long-term effectiveness and permanence of an alternative, the term "permanence" should be used carefully. Permanence is viewed along a continuum; an alternative can be described as offering a greater or lesser degree of long-term effectiveness and permanence. Alternatives generally should not be described as "permanent" or "impermanent."

Only reductions achieved through treatment should be addressed under the "reduction of toxicity, mobility, or volume through treatment" criterion. Reductions of mobility accomplished through containment should be addressed under "overall protection of human health and the environment."

The Selected Remedy. In this section of the ROD, identify the selected remedy and remediation goals and state:

- The carcinogenic risk level to be attained and the rationale for it; and
- The specific points of compliance, as appropriate, for the media being addressed (e.g., "MCLs will be met at the edge of the waste management area").

The Statutory Determinations. The remedy selected must satisfy the requirements of section 121 of CERCLA to:

- Protect human health and the environment;
- Comply with ARARs (or justify a waiver);
- Be cost-effective;
- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- Satisfy the preference for treatment as a principal element or justify not meeting the preference.

A description of how the selected remedy satisfies each of the statutory requirements should be provided. Points to address for each of these requirements are presented in **Highlight 2**.

Documentation of Significant Changes. CERCLA section 117(b) requires an explanation of any significant changes from the preferred alternative originally presented in the Proposed Plan. If the selected remedy reflects significant changes from the preferred alternative, the ROD should:

- Identify the preferred alternative originally presented in the Proposed Plan;
- Describe the significant changes; and
- Explain the reason(s) for such changes.

THE RESPONSIVENESS SUMMARY

The final component of the ROD is the Responsiveness Summary, which serves two purposes. First, it provides lead agency decisionmakers with information about community preferences regarding both the remedial alternatives and general concerns about the site. Second, it demonstrates to members of the public how their comments were taken into account as an integral part of the decision making process.

Guidance on preparing Responsiveness Summaries is available in Community Relations in Superfund: A Handbook (OSWER Directive 9230.0-3B, June 1988). That document details the process of preparing the Responsiveness Summary and includes a sample Responsiveness Summary.

Highlight 2: The Statutory Determinations

Protection Of Human Health And The Environment

- Describe how the selected remedy will eliminate, reduce, or control risks posed through each pathway through treatment, engineering controls, or institutional controls, to ensure adequate protection of human health and the environment (including that the site risk will be reduced to within the 10-4 to 10-6 range for carcinogens, and that the Hazard Indices for non-carcinogens will be less than one).
- Indicate that no unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy.

Compliance with ARARs

- State whether the selected remedy will comply with ARARs. When appropriate, state the waiver that is being invoked and justify the waiver. Organize the ARARs according to chemical-specific, location-specific, and action-specific.
- List and describe the Federal and State ARARs that the selected remedy will attain, distinguishing applicable from relevant and appropriate requirements, as necessary. **Note:** Cite the specific section of the statute or regulation that contains the requirement and provide a brief synopsis of the requirement.
- List and provide the rationale for using any "to be considered" (TBCs). **Note:** TBCs are not ARARs, but they may be used to design a remedy or set clean-up levels if no ARARs address the site, or if existing ARARs do not ensure protectiveness.

Cost-Effectiveness

- Describe how the selected remedy provides overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money to be spent.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable ("MEP")

- Describe the rationale for the remedy selection, explaining that the remedy selected provides the best balance of tradeoffs among the alternatives with respect to the evaluation criteria, especially the five balancing criteria.
- Discuss those criteria that were most critical in the selection decision (i.e., those that distinguish the alternatives most).
- Highlight the tradeoffs among the alternatives with respect to the five balancing criteria.
- Describe the role of the State and community acceptance considerations in the decision-making process (modifying criteria).
- Provide a general statement that the selected remedy meets the statutory requirement to utilize permanent solutions and treatment technologies, to the maximum extent practicable.

Note: For a remedy that does not employ any treatment or resource recovery technologies, the explanation of the rationale should discuss the reasons why treatment was found to be impracticable or acknowledge that treatment was not within the limited scope of the action (e.g., an interim action).

Preference for Treatment as a Principal Element

- Describe how the preference for treatment is satisfied if the remedy uses treatment to address the principal threat(s) posed by conditions at the site; or
- Explain why the preference is not satisfied if treatment is not used to address the principal threats. This explanation will refer back to the explanation under the "MEP" finding that explains why treatment of the principal threats was found to be either impracticable or not within the limited scope of the action.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 5, 1997

Mr. Joseph Joyce
BRAC Environmental Coordinator
AC/S Environment (1AU)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001

Re: U.S. EPA Comfort Letter Clarifying NPL Listing, Uncontaminated Parcel Identifications, and CERCLA Liability Issues Involving Transfers of Federally Owned Property

Dear Mr. Joyce:

The U.S. Environmental Protection Agency (EPA) recognizes that some potential buyers and redevelopers may be concerned about purchasing and redeveloping property at a military installation part or all of which has been placed on EPA's National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). EPA believes that the best way to respond to buyers' and redevelopers' concerns is to address some common misunderstandings about NPL listing and CERCLA liability, and highlight certain provisions about the transfer of federally owned property. Importantly, as is discussed below, whether property is part of an NPL site is unrelated to CERCLA liability.

National Priorities List

The purpose of the NPL is to identify releases of hazardous substances or pollutants and contaminants that are priorities for further evaluation. Hence, the NPL is a list of releases. When a site is added to the NPL, through a federal rulemaking process, it is necessary to define the release (or releases) encompassed within the listing. While sites, including Federal facilities, have sometimes been described in the rulemaking process with reference to a geographic area (e.g., Hanscom Air Force Base), sometimes referred to as "fenceline to fenceline," it is only the areas of

contamination that are part of the NPL site. The boundaries of the installation are not necessarily the "boundaries" of the NPL site. Rather, the site consists of all contaminated areas within the area used to define the site, and any other location to or from which contamination from that area has come to be located. Area types 1 & 2 identified on pages 3-35, 3-36 and on page 3-185 (figure 3-185) of the March, 1997 Base Realignment and Closure Plan (BCP) for MCAS El Toro would therefore not be part of the NPL site.

It should be noted that where there is adequate information for EPA to determine that only certain portions of a military installation are contaminated by these releases, EPA could list only the contamination from those discrete areas of the installation. However, because of the extensive size of most military installations, the military services generally have not completed their assessment of all releases or potential releases to provide EPA with data sufficient to further define the NPL site. Such data are provided as the installations go through subsequent remedial investigations at later dates.

CERCLA Liability

Whether property is part of an NPL site is unrelated to CERCLA liability. Liability under CERCLA is determined under section 107, which makes no reference to NPL listing. Placing a site on the NPL does not create CERCLA liability where it would not otherwise exist. Rather, liability on the basis of property ownership arises if the property is part of a CERCLA "facility". CERCLA section 101(9) defines the term "facility" to include "any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located." Hence, the mere fact that a parcel lies within the area used to describe an NPL site does not impose liability on the owner or subsequent purchaser; liability is based on a release or threatened release of a hazardous substance from a facility.

As for lenders, CERCLA provides that a lender who holds a security interest in contaminated property will not be considered an owner or operator for purposes of CERCLA liability provided the lender does not participate in the management of the facility. See CERCLA section 101(20)(A). Again, the NPL status of the mortgaged property does not impose liability on the lender; liability is based on the actions of the lender in the management of the facility.

Property Transfer, Covenants, and Uncontaminated Parcel Identifications

A Federal agency must comply with the provisions of CERCLA section 120(h)(3) before conveying any real property on which any hazardous substances were known to have been released, or disposed of. Except as noted below, each deed conveying such real property must contain the following:

1) Information regarding the hazardous substances;

2) A covenant that all remedial action necessary to protect human health and the environment with respect to any hazardous substances remaining on the property has been taken before the date of transfer. (A remedial action "has been taken" if the approved remedy has been constructed and has been demonstrated to EPA to be operating "properly and successfully." In other words, a transfer may occur even if the remediation levels specified for the remedy have not been achieved as, for example, in the case of groundwater remediation, where a pump and treat system has been shown to be working "properly and successfully", but the system may still need to operate for a number of years.) Under certain circumstances, however, contaminated property may be conveyed by deed before all remedial action has been taken. Section 120(h)3(C) of CERCLA sets forth the conditions under which the EPA Administrator with the concurrence of the Governor (for property on the National Priorities List) or the Governor (for property not on the NPL) may defer the requirement of providing a covenant that all necessary remedial action has been taken prior to the date of transfer. In such cases, once the United States has completed all necessary remedial action, it must issue a warranty that satisfies that covenant requirement. A transferee of property conveyed under Section 120(h)(3)(C) also receives assurances at the time of transfer that all necessary remedial action will be taken in the future;

3) A covenant that additional remedial action found to be necessary after the date of the transfer will be conducted by the United States; and

4) A clause granting the United States access to the property in any case in which a response action is found to be necessary after the transfer of such property.

A Federal agency planning to terminate operations on real property which the United States owns -- including military base closures -- must comply with the provisions of CERCLA section 120(h)(4). Specifically, section 120(h)(4)(A) directs a Federal agency to identify parcels of land at the discontinuing installation (e.g., the closing base) where no hazardous substances or petroleum products or their derivatives were known to have been released, or disposed of. For parcels that are part of a site on the NPL, EPA must concur in the parcel identification. For parcels that are not part of a site on the NPL, the appropriate State official must concur in the parcel identification. A Federal agency seeking to convey real property identified as uncontaminated under section 120(h)(4), must include in the deed conveying such property a covenant that any response action found to be necessary after the date of transfer will be conducted by the United States.

Therefore, a purchaser of real property that was part of a closing base receives from the Federal government a deed covenant that if any further remedial action is found to be necessary after the date of transfer, the United States will conduct such actions. Importantly, CERCLA section 120(h)(3) and (4) requirements apply regardless of whether the real property being conveyed is part of an NPL site. Additionally, a Federal agency would continue to have obligations under CERCLA section 120(e) ("Required Action by Department") and any existing applicable Federal Facility Agreement for conveyed real property that is part of an NPL site.

In conjunction with its obligation to concur on uncontaminated parcel identifications at NPL sites under CERCLA section 120(h)(4), EPA issued on May 27, 1997, a policy entitled, "Military Base Closures:Revised Guidance on EPA Concurrence in the Identification of Uncontaminated Parcels under CERCLA Section 120(h)(4)" (copy enclosed). EPA notes in the policy that there may be instances in which it would be appropriate to concur with the military service that certain parcels can be identified as uncontaminated under CERCLA section 120(h)(4), although some limited quantity of hazardous substances or petroleum products have been released or disposed of on the parcel. The policy reflects EPA's committment to protect human health and the environment while also achieving Congress's goal of expeditiously transferring uncontaminated real property to communities for economic redevelopment. EPA's CERCLA section 120(h)(3) determination that a remedy is operating properly and successfully, and concurrence on uncontaminated parcel identifications under CERCLA section 120(h)(4) do not affect NPL

status, because such actions do not constitute Agency rulemaking, but are, instead, Agency statements based on the facts known to exist at that time. Property that has not been contaminated (i.e., no releases), unlike property where a response has been completed, can be characterized as never having been part of the NPL site.

Leasing of Property

EPA supports the leasing of real property that is not available for immediate deed conveyance as a mechanism for providing expeditious appropriate civilian use of such property. EPA and the Department of Defense (DoD) have entered into a Memorandum of Understanding in which there is an agreement to use the September 9, 1993 "DoD Policy on the Environmental Review Process to Reach a Finding of Suitability to Lease (FOSL)" to ensure that the leasing of property at closing bases does not result in an unacceptable risk to human health or the environment. The procedures laid out in that guidance calls for regulatory agency participation in DoD's FOSL conclusions. The procedures apply to all leasing of property at closing bases, regardless of whether the property is part of an NPL site.

Indemnification

Although not part of CERCLA, additional protection is afforded to transferees of base closure property by Section 330 of the National Defense Authorization Act for Fiscal Year 1993, as amended. Section 330 provides indemnification of such transferees for claims arising from the release or threatened release of any hazardous substance, pollutant, petroleum product or contaminant as a result of Department of Defense activities at any military installation (or portion thereof) that is closed pursuant to a base closure law.

EPA's Programs with Mortgage and Banking Associations

In response to expressed concerns, EPA is initiating programs with both Federal agencies and national mortgage and banking associations to address the often unwarranted alleged stigma of NPL listing. We are emphasizing that the listing only includes those areas that are contaminated. We do not believe that NPL listing should hinder appropriate redevelopment of uncontaminated portions of military installations. In fact, a number of redevelopers have indicated that NPL listing is not a hindrance to such redevelopment because, as discussed above, the Department of Defense, or other

responsible Federal agency, remains responsible for any additional necessary remedial actions should contamination subsequently be found at these sites.

To reiterate, the fact that a parcel lies within the area used to describe an NPL site does not impose liability on the purchaser; liability is based on the presence of contamination.

In conclusion, we believe that the above explanations should help resolve most questions about NPL site listing issues and a purchaser's or redeveloper's potential liability involving the reuse of closing military bases. If you have any questions concerning these issues, please contact Glenn Kistner of my staff, who can be reached at (415) 744-2210.

Sincerely,

Daniel D. Opalski
Chief
Federal Facilities Cleanup Branch

Enclosure

cc: Tayseer Mahmoud, DTSC
Larry Vitale, RWQCB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 27 1997

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: Military Base Closures: Revised Guidance on EPA Concurrence in the Identification of Uncontaminated Parcels under CERCLA Section 120 (h)(4)

FROM: Timothy Fields, Jr.
Acting Assistant Administrator

TO: Regional Superfund Policy Managers, Region I-X
Regional RCRA Policy Managers, Region I-X
Regional Counsels, Regions I-X
Federal Facilities Leadership Council
Base Realignment and Closure Program Managers, Region I-X

This memorandum is intended to provide guidance concerning the implementation of CERCLA section 120 (h)(4), as amended in 1996. Specifically, it addresses the approach EPA should use in determining whether to concur that a parcel has been properly identified by a military service as "uncontaminated" and therefore transferrable pursuant to CERCLA section 120 (h)(4).

Background

In October 1992, Congress enacted the Community Environmental Response Facilitation Act (CERFA) which, among other things, added a new subsection (4) to CERCLA section 120 (h). Congress found that the closure of Federal facilities is having adverse effects on the economies of local communities and that environmental remediation requirements are frequently a constraint to the reuse of the facilities. The Act further states that Federal agencies should "expeditiously identify real property that offers the greatest opportunity for reuse and redevelopment..." CERCLA section 120 (h)(4) directed Federal agencies with jurisdiction over real property on which Federal government operations are to be terminated to identify parcels of the real property:

> "on which no hazardous substances and no petroleum products or their derivatives were stored for one year or more, known to have been released, or disposed of."

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October 1996. Congress amended this language via the Defense Authorization Act of ı' 1997, by deleting the "storage" provision. The language now reads:

> "on which no hazardous substances and no petroleum products or their derivatives were known to have been released, or disposed of."

ERFA and this guidance refer to such parcels as "uncontaminated". The reference to "storage" as deleted to allow property where hazardous substances or petroleum products had been stored ıt no release or disposal had occurred, to meet the "uncontaminated" criteria in order to cilitate the transfer, reuse and redevelopment of real property. The identification must be based ı an investigation of the property including minimum requirements set forth in CERCLA ction 120 (h)(4)(A). For parcels of property that are part of a facility on the National Priorities ist, the identification is not complete until the EPA concurs in the results. For other parcels, the entification is not complete until the appropriate State official concurs in the results.

The identification of a parcel is based on a review of available information. The military rvice remains obligated to address any contamination found to pose a threat to human health or e environment. Although parcels that are identified as satisfying the CERCLA section 20 (h) (4) requirements can be sold or otherwise transferred expeditiously, any such transfer ıust include a covenant committing the United States to perform any remedial action or orrective action found to be necessary after the date of the transfer.

For real property that is part of a military base which was slated for closure prior to ERFA's enactment, the identification and concurrence is to be completed within 18 months of ERFA's enactment. For real property on military bases designated for closing subsequent to ERFA, the identification and concurrence is to be completed within 18 months of the esignation.[1] The mandated period for BRAC 1995 installations to identify parcels expires larch 28, 1997. For parcels not identified prior to the statutory deadline the military service has continuing opportunity to identify these parcels and seek regulatory concurrence. EPA believes ıat the identification of such parcels by the military service, with regulatory concurrence, will acilitate their reuse by providing the transferee with the CERCLA section 120 (h)(4) covenant. This position is consistent with DoD's May 18, 1996 policy statement on CERFA mplementation.

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[1] For property subject to Public Law 103-160, Base Closure Community Assistance Act, Section 2910 (November 30, 1993) concurrence may be mandated at an earlier point in time. This section provides that "the concurrence required under Section 120 (h)(4)(b) of such Act, hall be made not later than the earlier of--(1) the date that is 9 months after the day of submittal, f any, to the transition coordinator for the installation concerned of a specific use proposed for ll or a portion of the real property of the installation; or (2) the date specified in Section 120 h)(4)(C)(iii) of such Act".

II. Purpose

In meeting its obligation under CERCLA section 120 (h)(4), EPA is concerned with both ɔtecting human health and the environment and achieving Congress' goal of expeditiously nsferring uncontaminated real property to communities for economic redevelopment. :erpreting CERCLA section 120 (h)(4) to allow the expeditious transfer of parcels where there no indication that the release or disposal of hazardous substances or petroleum products poses hreat to human health or the environment would aid Congress' intent by increasing the amount real property which would be available for expedited reuse and redevelopment.

EPA believes that there may be instances in which it would be appropriate to concur with ɜ military service that certain parcels can be identified as uncontaminated under CERCLA ction 120 (h)(4) although some limited quantity of hazardous substances or petroleum products ıve been released or disposed of on the parcel. If the information available indicates that lease or disposal was associated with activities which would not be expected to pose a threat to ıman health or the environment, such parcels should be eligible for expeditious reuse and development.

III. Guidance

The determination of whether to concur in the identification of an uncontaminated parcel, here the information provided by the military service reveals some level of release or disposal f hazardous substances or petroleum products, should be made on a case-by-case basis. The ɜcision-maker should apply best professional judgement based on the available information in aking determinations under CERCLA section 120 (h)(4). The objective should be to include ırcels where there is no indication that the release or disposal of hazardous substances or etroleum products has resulted in an environmental condition that poses a threat to human ealth or the environment. The decision-maker should assume that the real property may be ansferred to the public or private sector without any environmental response action being taken n the property.

EPA's ability to concur with the identification of parcels will depend on the information vailable concerning the current and historical uses of the parcel, the proximity of the parcel to ources of contamination requiring response actions, and the nature of the threat, if any, easonably associated with the type of activity or contamination associated with the parcel. Vhere the information presented by the military service does not provide a sufficient basis for oncurrence, the EPA Region may elect to withhold concurrence until sufficient information is vailable. EPA's response to the request for concurrence should specify the additional nformation required to support concurrence.

The following are examples of three categories of parcels where EPA would generally oncur:

Housing: In housing areas, it is likely that hazardous substances and petroleum products contained in heating oil and household products have been released or disposed of; but it is unlikely that, in the absence of evidence of significant releases (e.g. fuel spills), such materials would pose a threat to human health or the environment.

Stained Pavement: There may be evidence of incidental releases of petroleum products on roadways and parking lots, but no indication that such releases pose a threat to human health or the environment.

Pesticides: In the absence of evidence indicating a threat to human health or the environment, e.g., contamination of surface or groundwater, or proximity to sensitive habitat, the routine application of pesticides in a manner consistent with the standards for licensed application should not disqualify a parcel under CERCLA section 120 (h)(4). If information concerning the use of the parcel indicates extensive application of pesticides, EPA may determine that the particular circumstances require that its concurrence be conditioned on further information concerning the nature and quantities of pesticides applied or the results of confirmatory sampling to assure that residual levels do not pose a threat to human health or the environment.

The examples and guidance described above are intended to provide assistance to the decision-maker, but not to strictly limit the application of the policy. The authority to make these determinations has been delegated to the Regions. For questions or further information concerning this revised guidance, please contact Lisa Tychsen at 202/260-9926.

NOTICE: The policies set out in this memorandum do not represent final agency action and are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. Remedy selection decisions are made and justified on a case-specific basis. The Agency also reserves the right to change this guidance at any time without public notice .

cc: S. Herman
J. Cannon
M. Stahl
M. Shapiro
B. Breen
C. Hooks
J. Woolford
S. Luftig
S. Goodman, DoD

OPERABLE UNIT 3
(OU-3)

MCAS EL TORO

Bernie Lindsey, Remedial Project Manager

OPERABLE UNIT (OU) 3

- Operable Unit 3 consists of 17 sites
- Primarily surface releases (spills) and shallow soil contamination
- Variety of chemicals: fuels, waste oil, metals, solvents

SITE INVESTIGATIONS

- All OU-3 sites were sampled
- Work approved by State and Federal regulatory agencies
- Results presented in Remedial Investigation Reports (RI Reports)

RESULTS

THREE CATEGORIES

- Further Investigation being considered: OU-3B sites

- Further Action planned: Sites being addressed in Feasibility Study

- No Further Action: No Risk Sites

FURTHER INVESTIGATION PLANNED: OU-3B SITES

Sites 1, 7, 14, and 16

- Site 1: to be addressed after site activities have ceased.
- Sites 7 and 14: additional sampling under consideration
- Site 16: remediation pilot testing planned

Further Action Planned: Feasibility Study

Sites 8, 11, and 12

- Feasibility Study underway to evaluate remedial alternatives

- Report available in late 1997

No Further Action Sites

Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, & 22

- No unacceptable risk based on sampling results and risk assessment
- Results presented in Remedial Investigation Report (RI Report)
- State and Federal regulatory agencies agreed to No Action

RISK ASSESSMENT

- Conservative assumptions
- Based on soil sampling results
- Regulatory agencies and technical experts agreed on results

WHAT'S NEXT ?

- Additional work for OU-3B sites
- Feasibility Study Report due late 1997 to evaluate remedial alternatives for sites with some risk
- Proposed Plan and Record of Decision due Summer 1997 for No Further Action Sites

MCAS EL TORO
Presentation
Records of Decision

8/6/97 RAB Meeting

Andy Piszkin

1

Decision Documentation

- Proposed Remedial Action Plan
  - Presents the lead agency's proposed remedial alternative (from Feasibility Study)
- Record of Decision (ROD)
  - Formal and legal documentation of the remedy selection process
- Administrative Record (AR)
  - Response action selection based upon AR

2

Record of Decision

- Dept. of the Navy Lead Agency
  - U.S. EPA retains final authority (NPL sites)
  - State support agency (non-NPL sites)
- Categories:
  - No action, petroleum exclusion
  - Action, interim action, contingency
- Changes:
  - Scope, performance, cost
  - Non-significant, significant, fundamental

3

Administrative Record

- Decisions Based upon AR
- *Maintained at or Near the Facility*
- U.S. EPA Guidance
- Standard of Judicial Review

Record of Decision
Document Contents

- *Declaration & Signatures*
- History of Site
- Community Participation
- Site Characteristics (Summary)
- Risk Assessment (Summary)
- Alternatives (Summary)

Record of Decision
Document Contents (continued)

- Comparative Analysis of Alternatives
- Selected Remedy
- *Statutory Determinations*
- Documentation of Significant Changes
- Responsiveness Summary
- Administrative Record Index

MCAS EL TORO
Schedule Update
Federal Facility Agreement

8/6/97 RAB Meeting

Andy Piszkin

c:rabffa.978

VOC Groundwater
Source & Regional (tentative)

- **Proposed Plan** - Agency Review
  - October 16 - December 4, 1997
- **Public Comment Period**
  - February 6 - March 6, 1997
- **Record of Decision** - Agency Review
  - April 28 - June 23, 1998
- **Record of Decision** - Anticipated Signing
  - September 23, 1998

Further Action OU-3A Sites
(8, 11, & 12)

- **Feasibility Study** - Agency Review
  - Comments due September 11, 1997
- **Proposed Plan** - Agency Review
  - February 19 - April 21, 1998
- **Public Comment Period**
  - June 30 - July 30, 1998
- **Record of Decision** - Agency Review
  - September 15 - November 16, 1998

OU-3B Sites
(1, 7, 14, & 16)

- **Feasibility Study** - Agency Review
  - September - November, 1998
- **Proposed Plan** - Agency Review
  - April - June, 1999
- **Public Comment Period**
  - September - October, 1999
- **Record of Decision** - Agency Review
  - November 1999 - January 2000

VOC Source Area
Vadose Zone Soils

- **Public Comment Period**
  - April 30 - May 30, 1997
  - Public Meeting: May 15
- **Record of Decision** - Agency Review
  - July 2 - August 1, 1997
- **Record of Decision** - Anticipated Signing
  - September 22, 1997

Proposed OU-3A
No Further Action Sites

- **Public Comment Period**
  - June 16 - August 16, 1997
  - Public Meeting: July 31, 1997
- **Record of Decision** - Agency Review
  - August 22 - September 12, 1997
- **Record of Decision** - Anticipated Signing
  - October 31, 1997

Landfill Sites
(2 & 17 and 3 & 5) tentative

- **Proposed Plan** - Agency Review
  - September 9 - November 3, 1997
- **Public Comment Period**
  - January 6 - February 6, 1998
- **Record of Decision** - Agency Review
  - March 18 - May 18, 1998
- **Record of Decision** - Anticipated Signing
  - August 19, 1998

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 17, 1997

Mr. Joseph Joyce
BRAC Environmental Coordinator
AC/S, Environment (1AU)
MCAS El Toro
P. O. Box 95001
Santa Ana, CA 92709-5001

Re: EPA Comments on June, 1997 Draft Ground Water Remediation Pilot Test Work Plan, Marine Corps Air Station El Toro, Ca

Dear Mr. Joyce:

Please find attached to this cover letter, the United States Environmental Protection Agency's (EPA) comments to the document referenced above. Comments have been provided by Herb Levine, EPA's hydrogeologist. If you have any questions, please feel free to contact me at (415) 744-2210.

Sincerely,

Glenn R. Kistner
Remedial Project Manager
Federal Facilities Cleanup Branch

Attachment

cc: Tayseer Mahmoud, DTSC
Larry Vitale, RWQCB

June 17, 1997

MEMORANDUM

SUBJECT: Review of Draft Groundwater Remediation Pilot Test Work Plan
Marine Corps Air Station El Toro, CA

TO: Glenn Kistner, RPM
Navy Section

FROM: Herbert Levine, Hydrogeologist
Technical Support Team

I have reviewed this document for technical adequacy and consistency with previous discussion with SWDIV and their contractor. I have several items of concern which should be addressed.

The first item is related to the scope of this project. It is my recollection that we had discussed several times investigating where and how the shallow groundwater unit interacts with the principle aquifer. During previous technical meetings with SWDIV, their contractor presented this as an objective which we had consensus on. Now it is missing from this plan. I recommend that we pursue this as part of this field effort.

The second item is related to groundwater sampling. It is my understanding that previous sampling efforts had used a submersible pump to collect all groundwater samples. This plan proposes using a bailer to collect VOCs and a pump to collect the remaining analytes. I recommend not using a bailer and collecting all samples using a submersible pump. This would ensure consistency and likely produce more reliable and data. The concern here is the potential for loss of VOCs while using the bailer and a potential for the bailer to act as a surge block and introduce formation materials.

The third item is related to the proposal to test a recirculating well. It has been our experience that recirculating wells work in homogeneous and transmissive environments. The heterogeneity found at El Toro along with the associated difficulties encountered during aquifer pumping tests and the air sparging tests raises concerns with me that this technology might not be suited for application at El Toro. I raised these concerns with SWDIV and their contractor and we had a discussion regarding these concerns. We discussed raising these issues with the vendor who would install this technology and ask them to provide interpretations and conclusions of other applications at military installations. SWDIV also further explained their objectives for trying this technology. I agree with their objectives and understand the limitations they may face applying above ground treatment systems on an active base. I suggest that we have more

discussions with SWDIV on this issue as they develop the work plan addendum for the recirculating well test.

While these comments should be addressed before the document goes final, these issues do not preclude the Navy from initiating the CPT work.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

July 3, 1997

Mr. Joseph Joyce
BRAC Environmental Coordinator
AC/S, Environment (1AU)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001

Re: EPA Review Comments on Draft Ground Water Remediation Work Plan and Draft Quality Assurance Project Plan for MCAS El Toro, California

Dear Mr. Joyce:

The United States Environmental Protection Agency (EPA) has reviewed the documents referenced above. Agency comments are attached to this cover letter. Please note that EPA cannot approve the Work Plan or the Quality Assurance Project Plan until the comments have been satisfactorily addressed.

If you have have any questions, please contact Dave Taylor of EPA's Quality Assurance Program at (415) 744-1497.

Sincerely,

Glenn R. Kistner
Remedial Project Manager
Federal Facilities Cleanup Branch

Attachments

cc: Tayseer Mahmoud, DTSC
Larry Vitale, RWQCB
Bernie Lindsay, SWDIV
Pat Brooks, Bechtel
Dave Taylor, U. S. EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

July 2,1997

MEMORANDUM

SUBJECT: Draft Groundwater Remediation Pilot Test Work Plan and Draft Quality Assurance Project Plan for the Marine Corps Air Station (MCAS) Site, El Toro, California (EPA QA Program Document Control Numbers [DCNs] H6CA006W97VSF1 and H6CA007Q97VSF1)

FROM: David Taylor, Ph.D., Chemist
Quality Assurance Program, PMD-3

THROUGH: Vance S. Fong, P.E., Manager
Quality Assurance Program, PMD-3

TO: Glenn Kistner, Remedial Project Manager
Navy Section, SFD-8-2

The draft work plan (WP) and draft quality assurance project plan (QAPP), prepared by Bechtel National, Inc. (BNI) on behalf of the Department of the Navy, Southwest Division Naval Facilities Engineering Command and dated June 1997, were reviewed. The review was based on guidance provided in "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations" (EPA QA/R-5, August 1994), "Preparation of a U.S. EPA Region 9 Field Sampling Plan for Private and State-Lead Superfund Projects" (9QA-06-93, August 1993), and "Data Quality Objectives Process for Superfund" (EPA/540/G-93/071, September 1993).

The WP was reviewed for field sampling plan (FSP) elements. Although the WP includes some FSP information, a BNI final FSP dated 1995, is referenced for much of the field sampling

information. The QAPP includes most of the elements required by agency guidance and the WP describes the process used to establish data quality objectives for the project. A number of relatively minor concerns were identified and are included in the following comments.

The subject WP and QAPP cannot be approved by the Region 9 QA Program until the following concerns are addressed.

Concerns

1. [General] The WP references the 1995 BNI FSP and CLEAN II standard operating procedures (SOPs) for sampling related information. It is recommended that the WP indicate the specific sections of the 1995 BNI FSP being referenced. The WP should also state that the BNI 1995 FSP will be available on site.

1B. It is recommended that the QAPP include an approval page for signatures of those expected to officially approve the document. The QAPP should also include a distribution list of persons and organizations receiving copies of the approved documents and revisions.

2. [QAPP: Section 3.2.1, Detection Limits; Appendix B: Table B-1, Project Required Detection Limits by Methods] The QAPP discusses situations where detection limits are higher than the preliminary remediation goals (PRGs) listed in Table B-1 and states that the required compound list and performance criteria of the listed methods must be satisfied by alternative methods. However, the QAPP does not identify alternative methods for the instances where the detection limit is greater than the PRG. This issue should be resolved before sampling activities begin.

3. [QAPP: Section 6.2.2, Performance Evaluation Samples] Section 6.2.2 states that performance evaluation (PE) samples *may be* submitted to the fixed base laboratory through the routine NFESC evaluation process or through the Navy CLEAN Performance Evaluation and Proficiency Testing Program. The QAPP should state the conditions that double

blind PE samples will be submitted. It is recommended that the QAPP indicate that PE samples *will be* submitted.

4. [QAPP: Table 3-1, Tolerance Limits for Field Measurements; Appendix A: Table A-1, Field Screening Instruments and Typical Detection Ranges] Table 3-1 of the QAPP specifies a tolerance limit of ± 3nm (nanometers) for anion analysis and Table A-1 of Appendix A specifies a detection range of 400-900 nm for cation, anion, and bacteria analyses by Hach kits. Nanometers refer to the wavelength monitored by the colorimeter, not analyte concentration. These tables should be revised to indicate tolerance and detection limits in concentration units, e.g., mg/L.

5A. [QAPP: Table 4-1, Analytical Parameters, Sample Containers, Preservatives, and Holding Times for Organics and Inorganics] Table 4-1 should be revised to indicate that samples collected for total dissolved solids (TDS), total suspended solids (TSS), and alkalinity will be preserved by cooling to 4°C ±2°. Samples collected for these analytes should not be preserved with acid.

5B. The holding time for TDS and TSS in Table 4-1 should be revised from 28 to 7 days; the holding time for alkalinity should be revised from 28 to 14 days, as per Table II of Part 136.6 of 40 CFR. In addition, for samples where nitrate is not preserved, the holding time should be 48 hours.

5C. It is recommended that one vial from each aquifer be pH tested to confirm that sufficient hydrochloric acid has been added to the vial to obtain a sample pH of <2. The pH check vial should be discarded.

6. [QAPP: Section 6.3, Standard Operating Procedures] Section 6.3 lists the relevant SOPs for the project. Agency guidance requires that all SOPs be included with the QAPP. The QAPP should indicate that the SOPs are mandatory reading and will be available on site.

7A. [QAPP: Section 7.2, Data Verification and Validation] Section 7.2 indicates that an independent subcontractor will perform data validation. The subcontractor relationship should be depicted in the organization chart.

7B. It is recommended that this section include the documentation required from the laboratory. This should include the sufficient documentation to perform full data validation, including quality control (QC) summaries, bench sheets, sample and standard preparation logs, and raw data. The QAPP should also stipulate that gas chromatography/mass spectrometry (GC/MS) tapes will be made available upon request by EPA.

8. [QAPP: Section 8.1, Performance and System Audits] Section 8.1 should state that copies of laboratory audit reports summarizing auditing activities and findings, and any corresponding corrective actions that were implemented as a result of these audit activities, should be submitted to EPA Region IX.

9. [WP: Section 3.5.2, Laboratory Analysis] Section 3.5.2 lists alkalinity, carbonate, and bicarbonate by EPA Method 310.1. EPA Method 310.1 determines total alkalinity; if the carbonate and bicarbonate fractions are desired, it is recommended that the project utilize Standard Methods 2320.

10. [WP: Section 3.5.1, Groundwater Sampling Procedures] Section 3.5.1 indicates that filtered and unfiltered samples will be collected for metals analysis. The plan should indicate the pore size of the filter and whether the filtration will take place in the field. Section 4.3 of the QAPP indicates that preservatives will be added to the sample containers in the laboratory before sample collection. The samples must be filtered before addition of acid.

Cal/EPA

Department of
Toxic Substances
Control

245 West Broadway,
Suite 425
Long Beach, CA
90802-4444

June 24, 1997

Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

Mr. Joseph Joyce
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
P.O. Box 95001
Santa Ana, California 92709-5001

COMMENTS ON DRAFT GROUNDWATER REMEDIATION PILOT TEST WORK PLAN FOR MARINE CORPS AIR STATION (MCAS) El TORO

Dear Mr. Joyce:

The Department of Toxic Substances Control (DTSC) has completed the review of the above subject document dated June 1997 prepared by Bechtel National Inc. The Work Plan presents the rationale and methodology for completing groundwater remediation pilot test work at MCAS El Toro.

This letter is to transmit the enclosed DTSC comments on the document. If you have any questions, please call me at (562) 590-4891.

Sincerely,

Tayseer Mahmoud
Remedial Project Manager
Office of Military Facilities
Southern California Operations

Enclosure

cc: Mr. Glenn Kistner, SFD-8-2
Remedial Project Manager
U. S. Environmental Protection Agency
Region IX
Federal Facilities Cleanup Office
75 Hawthorne Street
San Francisco, California 94105-3901

cc: Mr. Lawrence Vitale
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Pat Brooks
Bechtel National, Inc.
401 West A street, Suite 1000
San Diego, California 92101-7905

Mr. Andy Piszkin
Remedial Project Manager
Naval Facilities Engineering Command
Southwest Division, Code 1831.AP
1220 Pacific Highway
San Diego, California 92132-5187

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Groundwater Remediation Pilot Test Work Plan
Marine Corps Air Station-El Toro
Dated June 1997

The list of comments below were prepared by Mr. Tayseer Mahmoud, Remedial Project Manager for Department of Toxic Substances Control (DTSC) and Ms. Sherrill Beard, Engineering Geologist from DTSC's Geological Services Unit (GSU). The comments are directed to the Department of Navy and their consultants.

1. Section 2, Figures Showing Groundwater Plumes

   The figures show data samples collected September 1992 to February 1993. Are there any recent data that can be plotted on the figures?

2. Section 3, Well Installation, Sampling, and Analysis, page 3-1

   The text mentions five extraction and three injection wells will be installed as shown on Figure 3-1. Please list proposed wells. Also, check the figure to ensure that all the wells and their tentative locations are shown.

3. Given the information currently available to GSU, in-well air stripping is not recommended as a remedial technology. GSU encourages conducting pilot test for alternative technologies, however, at MCAS El Toro, site conditions exhibit low hydraulic conductivities and heterogeneous stratigraphy which do not lend to in-well air stripping. Also, data from prior aquifer tests and the air sparging pilot test can be used to show an in-well air stripping pilot test has a low likelihood of success. Furthermore, the United States Environmental Protection Agency (U.S. EPA) staff brought to the attention of the participants of the June 16, 1997 meeting, that a similar pilot test was conducted at Edwards Air Force Base, with similar stratigraphy and higher hydraulic conductivities, which produced inconclusive results and no further interpretation of the data was conducted. However, during the site visit SWDIV informed the agencies that the scheduled addendum work plan outlining the details of the in-well air stripping pilot test would include, standard procedures, a discussion about case studies in similar geologic setting and interpretation of the results. Therefore, currently GSU does not concur with the implementation of an in-well air stripping pilot test, however, after the addendum work plan is submitted and reviewed, the addition information may show this type of pilot testing is applicable at MCAS El Toro, Site 24.

4. Currently, the base wide groundwater monitoring program does not use bailers to collect VOC samples. Therefore, to maintain consistency please follow the same groundwater sampling procedures as followed in the base wide groundwater monitoring program.

/EPA

partment of
ic Substances
ntrol

West Broadway,
ite 425
ng Beach, CA
302-4444

July 23, 1997

Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

Mr. Joseph Joyce
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
P.O. Box 95001
Santa Ana, California 92709-5001

COMMENTS ON DRAFT RECORD OF DECISION (ROD) FOR SITE 24, OPERABLE UNIT 2A - VADOSE ZONE, MARINE CORPS AIR STATION El TORO

Dear Mr. Joyce:

The Department of Toxic Substances Control (DTSC) has completed the review of the above subject document dated July 1997, prepared by Bechtel National Inc. The draft ROD presents the selected remedial action for vadose zone soil at Site 24, the volatile organic compound source area at the Station.

This letter is to transmit the enclosed DTSC comments on the document. If you have any questions, please call me at (562) 590-4891.

Sincerely,

Tayseer Mahmoud
Remedial Project Manager
Office of Military Facilities
Southern California Operations

cc: Mr. Glenn Kistner, SFD-8-2
Remedial Project Manager
U. S. Environmental Protection Agency
Region IX
Federal Facilities Cleanup Office
75 Hawthorne Street
San Francisco, California 94105-3901

cc: Mr. Lawrence Vitale
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Pat Brooks
Bechtel National, Inc.
401 West A street, Suite 1000
San Diego, California 92101-7905

Mr. Andy Piszkin
Remedial Project Manager
Naval Facilities Engineering Command
Southwest Division, Code 1831.AP
1220 Pacific Highway
San Diego, California 92132-5187

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Record of Decision (ROD) for Site 24, OU-2A Vadose Zone
Marine Corps Air Station-El Toro
Dated July 1997

1. **Declaration, Description of Remedy, page 2**

Add the following bullet from the text in Section 10.1:

"The vadose zone will be resampled at the conclusion of groundwater remediation. If the soils are found contaminated above the threshold limits, additional vadose zone remediation will be necessary."

2. **Declaration, Statutory Determination, page 3**

Please change the signature block for Department of Toxic Substances Control to read as follows:

Mr. John E. Scandura, Chief
Southern California Operations
Office of Military Facilities
Department of Toxic Substances Control

3. **Section 7.2, Alternative 2 - Soil Vapor Extraction, page 7-2**

Please revise the second paragraph from the bottom of page 7-2 that mentions deed restrictions. The suggested text deletions are crossed out text and additions are underlined.

Institutional controls, including deed restrictions and access restrictions, are not required <u>at this time</u> to protect human health because surface and near-surface soils have low levels of VOC contamination and present a very low incremental risk to human health. <u>Also, the remediation of the contaminated soil may be completed prior to property transfer.</u> However, <u>if the SVE system is still operating at the time of deed transfer,</u> deed restrictions will be used to protect the SVE wells and equipment ~~during remediation~~ <u>and provide access to operate the system</u>. <u>Land use restrictions will also be used to ensure that future development is protective of human health and does not interfere with the effectiveness of the remedy. These restrictions are not anticipated to</u> ~~will not~~ be required once remediation is complete.

4. Section 2.2.1, Description of the Soil Vapor Extraction System

Provide a statement that additional SVE wells may be added at the design stage to target the different areas of contamination shown on Figures 7-2 through 7-4.

5. Section 2.2.4, Monitoring

Add a new paragraph concerning vadose zone sampling at the conclusion of groundwater remediation (see Section 10.1).

6. Section 3, Highlights of Community Participation

See attached Memorandum dated July 21, 1997 from Ms. Marsha Mingay, our Public Participation Specialist.

7. Section 10.1, Protection of Human Health and the Environment, Page 10-1

The last sentence of this section implies that additional vadose zone remediation may be required in the future. The ROD should clearly disclose that there is the potential for additional remediation in the future which may impact reuse of the property. For example, the future land owner may have to accommodate SVE equipment and allow for access to operate and monitor the system.

8. Section 10.2, Compliance with ARARs, Table 10-3

Add Transportable Treatment Unit 22 CCR 67450 ARARs and the following Generator requirements:

- Manifesting 66262.20
- Packaging 66262.30
- Labeling 66262.31
- Marking 66262.32
- Placarding 66262.33
- Accumulation Time 66262.34
- Record Keeping 66262.40
- Biennial Report 66262.41
- Certification Requirement for Generators 66262.45

Cal/EPA

Department of
Toxic Substances
Control

245 West Broadway,
Suite 425
Long Beach, CA
90802-4444

Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

MEMORANDUM

TO: Mr. Tayseer Mahmoud
Remedial Project Manager

FROM: Ms. Marsha Mingay mgm
Public Participation Specialist

DATE: July 21, 1997

SUBJECT: **PUBLIC PARTICIPATION COMMENTS ON SECTION 3, OU-2A DRAFT INTERIM RECORD OF DECISION**

Thank you for the opportunity to comment on the above referenced document. Public Participation's comments for Section 3 are as follows.

1. First paragraph:

To clarify and reduce wording, rewrite the first paragraph to read,

> There are a total of 24 sites that are being investigated at MCAS El Toro. A Community Relations Plan was developed to document concerns identified during community interviews and provide a detailed description of the community relations activities planned in response to information received from the community. The initial plan was prepared in 1991, and revised in 1993 and 1996. The revisions incorporated the most recent assessment of community issues, concerns, and information needs related to the ongoing environmental investigation and cleanup program at MCAS El Toro.

The above wording eliminates duplicative wording which described why there have been revisions to the CRP.

2. Second paragraph, second sentence:

   a) substitute the word "performing" with "conducting",
   b) add "presentations to local groups", and
   c) rewrite to form a complete sentence.

3. Section 3.1, third sentence:

   Add "and regulatory" immediately after, "Marine Corps/Navy."

4. Section 3.2, first sentence:

   Substitute the word "assure" with "ensure".

5. Section 3.2, second sentence:

   To complete the list of categories who received fact sheets, rewrite to read, "... to city, state and federal officials, agencies, local groups and individuals ..."

6. Section 3.2, fourth sentence:

   To include a very important component of fact sheets, please rewrite to read, "... process, and ways that the public can participate in the investigation and clean up of MCAS El Toro."

7. Section 3.2, last sentence:

   To complete the list of recipients, reword to read, "... 1,800 households, businesses, public officials and agencies ..."

8. Section 3.3, first paragraph:

   a) capitalize "proposed plan" in the first sentence,
   b) the name of newspapers should be underlined (see first and second paragraphs), and
   c) if press releases were used, these should also be mentioned.
   d) The four sentences explaining the locations of records is very convoluted. Please simplify information.

9. Section 3.3, second paragraph:

   a) add "Proposed Plan" to the list of vehicles used to announce the meeting (see second sentence), and
   b) to be more precise, rewrite the third sentence to read, "... regulatory agencies answered questions about ... consideration and recorded verbal and written comments."
   c) Since the NCP is a regulation, it must be followed whenever applicable. Correct the second to the last sentence by deleting "to the extent practicable."
   d) To clarify the last sentence, add the words "information contained within" immediately after "... is based."

10. Table 3-1

    The fact sheet numbering contained within the table is incorrect as the November 1991 and December 1992 fact sheets were not numbered. To correct and clarify the information, please insert dashes versus a number for these two fact sheets. Fact Sheet number one, was issued in December 1993.