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Formerly Utilized Sites Remedial Action Program (FUSRAP)

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# ADMINISTRATIVE RECORD

for  
Niagara Falls Storage Site

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United States Government

Department of Energy

# memorandum

JUN 7 9 34 AM '94

DATE: MAY 19 1994


REPLY TO  
ATTN OF: EM-432 (T. Konopnicki, 3-7435)

SUBJECT: Placing Environmental Restoration Project Baselines in Public Reading Rooms

TO: Distribution

As part of the U.S. Department of Energy (DOE) Office of Environmental Management's (EM's) continuing commitment to openness and public involvement, I would like to ensure that a copy of the Environmental Restoration project baselines is available in DOE's public reading rooms. Operations Offices have different requirements for reviewing documents before they are placed in public reading rooms. Therefore, I am asking the individual Operations and Project Offices to coordinate the placement of project baselines in their respective reading rooms. In most cases, this will involve sending to the reading room a copy of the baseline documentation along with a memorandum authorizing the placement of the documents in the public domain. However, individual reading rooms may have additional procedures.

In addition, for those projects that do not have baselines approved by the Energy Systems Acquisition Advisory Board, I am requesting that a copy of the attached "disclaimer" be included. A short briefing package is also attached for the purpose of providing a summary level overview of the fundamental principles of the project management system and the use of baselines. Please notify me after your baselines have been accepted into their respective reading rooms, so that I can inform EM's Office of Strategic Planning and Analysis and Office of Public Accountability that the project baselines are available for public review. If you have any questions, please contact Thad Konopnicki at (301) 903-7435.

  
R. P. Whitfield  
Deputy Assistant Secretary  
for Environmental Restoration

## Attachments

cc w/attachments:

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6/6/94

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DISCLAIMER

These baselines have not been formally approved, but are "approved for use" by the Deputy Assistant Secretary for Environmental Restoration, pending review and approval by the Secretary of Energy and the Energy Systems Acquisition Advisory Board (currently scheduled for July 1994). These baselines are subject to change, and the versions represented here may not exactly represent the most recently available data, as changes may have been approved, or may be in the approval process, for most of the baselines.



**U.S. DEPARTMENT OF ENERGY**

**PROJECT PLAN  
(REVISION 3)**

**FORMERLY UTILIZED SITES  
REMEDIAL ACTION PROGRAM**

**PREPARED BY  
DOE OAK RIDGE FIELD OFFICE  
FOR THE  
OFFICE OF ENVIRONMENTAL RESTORATION  
AND WASTE MANAGEMENT**

**APRIL 1992**

U.S. DEPARTMENT OF ENERGY

PROJECT PLAN  
(REVISION 3)

FORMERLY UTILIZED SITES  
REMEDIAL ACTION PROGRAM

MAJOR SYSTEM ACQUISITION PROJECT 142

PREPARED BY  
DOE OAK RIDGE FIELD OFFICE

FOR THE  
OFFICE OF ENVIRONMENTAL RESTORATION  
AND WASTE MANAGEMENT

APRIL 1992

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You are hereby authorized to continue FUSRAP as described in this plan, subject to annual budget approvals.

### APPROVALS:

Leo P. Dwyer  
Assistant Secretary for Environmental Restoration and Waste Management

7-3-92  
Date

Brenda G. Austin  
Acquisition Executive, Department of Energy

10/5/92  
Date

## **PREFACE**

This document revises the technical/scope, schedule, and resource components of the baseline for the U.S. Department of Energy (DOE) Formerly Utilized Sites Remedial Action Program (FUSRAP). Previous baselines were completed in March 1984, April 1985 (revision 1), and September 1987 (revision 2). This document also serves as the project management plan for FUSRAP.

Since September 1987, substantial changes in the project have occurred that significantly affected the project baseline technical/scope, schedule, and resource components of the plan. The major changes include:

1. Delay in the project completion date because of funding constraints and activities required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA). The scheduled completion date has been extended from fiscal year (FY) 2002 to FY 2016; costs for disposal site surveillance and maintenance, escalation, program support, and disposal siting have increased accordingly.
2. Part of the additional scope involves response action at three new FUSRAP sites and the inclusion of an existing disposal site that had previously been included under the Surplus Facilities Management Program (SFMP). The characterization effort on FUSRAP sites has now progressed to approximately 65 percent completion, compared with approximately 20 percent when the Energy Systems Acquisition Project Plan (revision 2) was approved. As a result, the estimated volume of waste requiring excavation, transportation, and disposal has increased with attendant increases in cost.
3. Based on the determination that the baseline resources plan should include an estimate for risk and uncertainties, an allowance has been made for cost risk and uncertainty within the resource plan. Also, the annual escalation rate was increased from 3.8 to 4.5 percent.
4. Other factors have contributed to the increase in the total estimated cost. For example, requirements for project support have increased, and Hanford disposal costs have tripled. There are also resultant increases in contingency on all of the additional costs.

The projected increase in total estimated cost/total project cost and the extension of the overall scheduled completion date have been reported in FUSRAP progress reports and in briefings to DOE Headquarters management on many occasions. A summary reconciliation describing these changes and their effects on the baseline is presented in this plan (Appendix 6). The project plan



is a result of the Headquarters change control action in which a revised budget and schedule were submitted to the Energy Systems Acquisition Advisory Board (ESAAB) for approval on August 22, 1991.

The key estimating assumptions are identified in the Resources Plan section.

The baseline estimate presented to ESAAB in August 1991 was subjected to detailed review by the DOE Headquarters PR-22 independent cost estimating team, which prepared an independent estimate that (in total) was within 4 percent of the project estimate. Subsequently, in January 1992, the Acquisition Executive approved the baseline presented herein.

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## MISSION, OBJECTIVES, AND OVERVIEW OF PROJECT SCOPE

### MISSION

As part of the federal government's overall mission to restore the environment at various facilities, the U.S. Department of Energy (DOE) is authorized by Congress to conduct programs to remedy radiological conditions at a number of privately owned, institutionally owned, and DOE-owned sites to minimize and abate potential risks to the public, to workers, and to the environment. Most of the sites were used in the past to support nuclear activities conducted for DOE and its predecessor agencies, and some remain contaminated at levels in excess of current applicable radiological guidelines. The Formerly Utilized Sites Remedial Action Program (FUSRAP) is one of these programs and is directed to a specific category of sites.

FUSRAP, as described in this document, was authorized by:

- The Atomic Energy Act of 1954 (AEA), as amended, which requires DOE (and its predecessor agencies) to conduct research, development, and production activities in such a manner as to protect public health and safety
- The 1984 and 1985 Energy and Water Development Appropriations Acts (Public Laws 98-50 and 98-360, respectively) and subsequent reauthorizations that authorize DOE to conduct decontamination research and development projects for four specific sites

The Manhattan Engineer District (MED) and its immediate successor, the Atomic Energy Commission (AEC), conducted several programs during the 1940s and 1950s involving research; development, processing, and production of uranium and thorium; and storage of processing residues. Nearly all of this work involved some participation by private contractors and institutions. Generally, privately owned and institutionally owned sites that became contaminated during this early period of the nuclear program were decontaminated or stabilized in accordance with survey methods and guidelines then in existence, and were subsequently released for other uses. However, radiological guidelines have since become more stringent. As a result, FUSRAP was initiated in 1974 to identify these formerly utilized MED and AEC sites, reevaluate radiological conditions at the sites, take appropriate response action, establish controls consistent with existing legislative authority, and certify the sites for appropriate future use. Other sites used primarily for commercial ventures were added to FUSRAP by the appropriation acts described above.

## OBJECTIVES

The objectives of FUSRAP are (1) to identify sites used by MED or AEC that need response action and for which DOE has authority to perform such action; (2) to decontaminate or control these sites to ensure the protection of public health and safety and the environment; and (3) to perform response actions on sites as authorized by the Congress. Sites are assigned for response action under FUSRAP based on the need to protect public health and safety pursuant to current radiological guidelines and the presence of authority to proceed.

### Need for Action

As of December 1991, DOE has authority to proceed at 33 sites that require response action. The 33 FUSRAP sites identified are listed in Table 1; the general locations of the sites are shown in Figure 1. Sites may be added to the program based on the results of ongoing radiological surveys and health and safety evaluations, review of DOE authority to conduct response action, and legislative actions.

### Legislative Authority

DOE has authority under the AEA, as amended, to perform radiological surveys and other research. This work includes radiological monitoring at sites used to support the nuclear activities of DOE's predecessor agencies. DOE also has authority under the AEA to conduct response actions at 28 sites. Public Law 98-50, the 1984 Energy and Water Development Appropriations Act, authorized DOE to conduct a decontamination research and development project at four sites (Colonie, Wayne, Maywood, and Latty Avenue Properties). Public Law 98-360, the 1985 Energy and Water Development Appropriations Act, authorized DOE to acquire title to the St. Louis Airport Site (SLAPS), perform necessary response action, and develop the property as a disposal site for the waste currently onsite and for waste from response action activities conducted on vicinity properties and the Latty Avenue Properties. Continued authorization has been provided each year in the passage of subsequent Energy and Water Development Appropriations Acts. Response actions on most FUSRAP sites are conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended. DOE has the responsibility under CERCLA to implement these actions. DOE has entered into three Federal Facilities Agreements (FFAs) with the Environmental Protection Agency (EPA) for five of six FUSRAP sites on the National Priorities List (NPL), with Shpack being the exception.

# TABLE 1

## LISTING OF FUSRAP SITES

### APRIL 1992

WBS NO.	NAME OF SITE	LOCATION
<b>NEW YORK SITES</b>		
158	† Niagara Falls Storage Site	Lewiston
139	† Colonie	Colonie
103	Ashland 1	Tonawanda
132	Ashland 2	Tonawanda
129	Linde Air Products	Tonawanda
123	Seaway Industrial Park	Tonawanda
145	Baker and Williams Warehouses	New York
<b>NEW JERSEY SITES</b>		
138	*† Maywood	Maywood/Rochelle Park
137	*† Wayne	Wayne
118	† Middlesex Sampling Plant	Middlesex
144	† New Brunswick Site	New Brunswick
108	DuPont & Company	Deepwater
<b>MISSOURI SITES</b>		
140	*† Latty Avenue Properties	Hazelwood
153	* St. Louis Airport Site	St. Louis
134	* St. Louis Airport Site (Vicinity Properties)	Hazelwood
116	St. Louis Downtown Site	St. Louis
<b>OTHER SITES</b>		
126	Aliquippa Forge	Aliquippa, PA
141	General Motors	Adrian, MI
142	Seymour Specialty Wire	Seymour, CT
125	* Shpack Landfill	Norton, MA
127	Ventron	Beverly, MA
110	W. R. Grace & Company	Curtis Bay, MD
<b>COMPLETED SITES</b>		
101 (9/82)	Acid/Pueblo Canyon	Los Alamos, NM
102 (4/91)	Albany Research Center	Albany, OR
104 (9/82)	Bayo Canyon	Los Alamos, NM
105 (N/A)	Chupadera Mesa	White Sands
114 (12/80)	Kellex/Pierpont	Missile Range, NM
117 (7/86)	Middlesex Municipal Landfill	Jersey City, NJ
119 (4/89)	National Guard Armory	Middlesex, NJ
115 (3/87)	Niagara Falls Storage Site (Vicinity Properties)	Chicago, IL
130 (9/82)	University of California	Lewiston, NY
131 (9/88)	University of Chicago	Berkeley, CA
143 (2/92)	Elza Gate	Chicago, IL
		Oak Ridge, TN

† DOE-owned or-leased site

\* NPL site

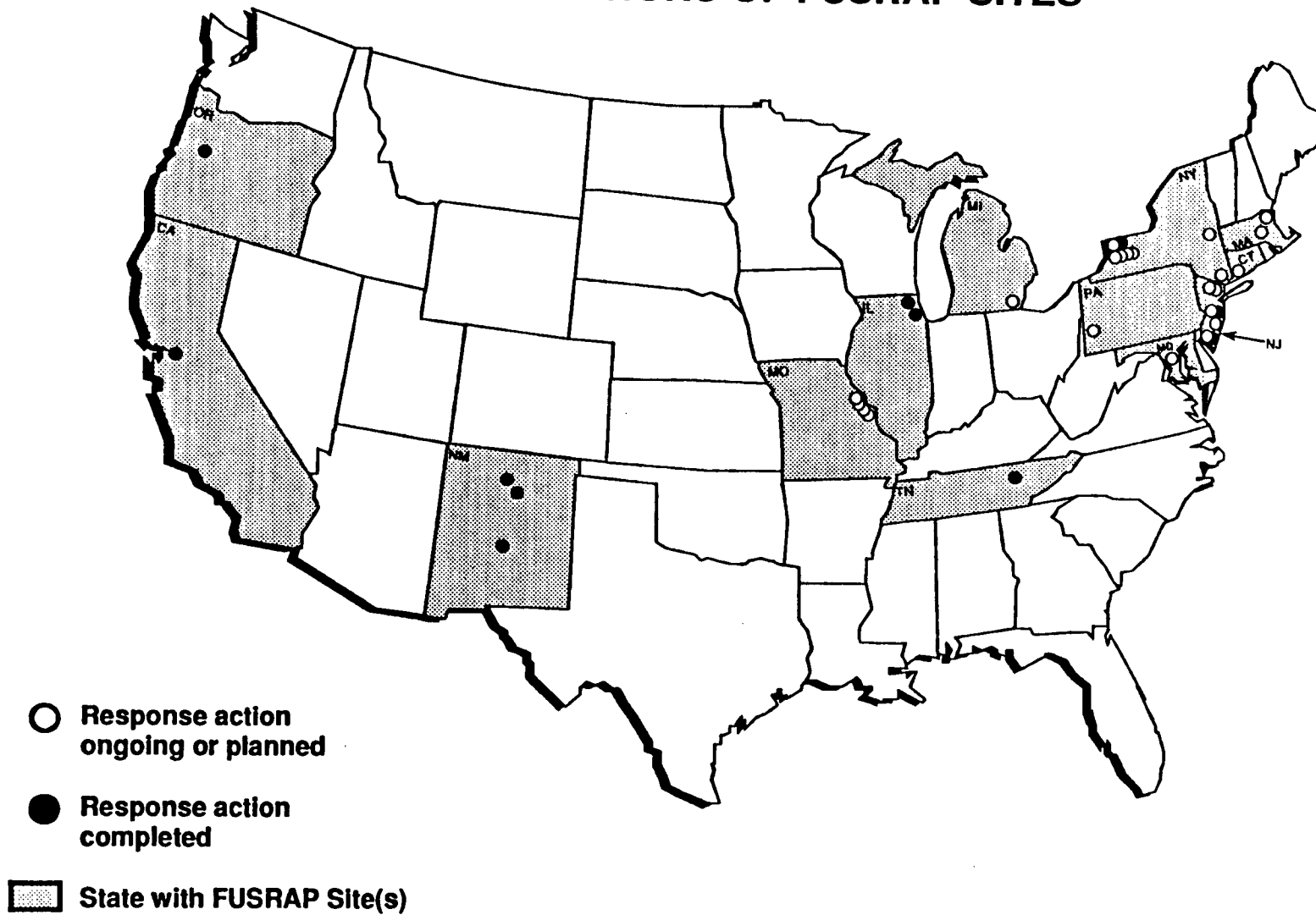
( ) Month and year completed

N/A - Not applicable —

No Response Action Required

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**FIGURE 1  
LOCATIONS OF FUSRAP SITES**



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## OVERVIEW OF PROJECT SCOPE

The scope of FUSRAP is to:

- Review records and perform site surveys to determine the need for response actions and to determine if the authority to perform such actions falls under the AEA
- Perform site investigations at DOE-owned or -leased properties or at privately owned sites to determine the nature and extent of radioactive or hazardous contamination for which DOE is responsible
- Bring sites that are authorized for response action into compliance with currently applicable guidelines by performing response actions to decontaminate and/or stabilize the sites and by applying the necessary controls
- Remove hazardous chemical wastes from privately owned FUSRAP sites when the wastes are commingled with radioactive contamination, or if the wastes are from MED/AEC operations
- Transport, store, or dispose of all wastes removed from sites in accordance with applicable laws, regulations, and guidelines

If additional sites are authorized for response action, the program scope will be altered and described in future revisions of the Energy Systems Acquisition Project Plan, referred to hereafter in this document as the Project Plan.

## SCHEDULE

A program baseline schedule has been prepared based on current assumptions, guidelines, site priorities, and response and waste disposal actions that are considered to be the most feasible and achievable at this time. This schedule is shown in Appendix 1 and reflects the current program completion goal of FY 2016.

## COST

The current total estimated cost (TEC) of the program, as well as the total project cost (TPC), is \$2.5 billion in year-of-expenditure dollars, as shown in Appendices 3, 4, and 5. The design and estimate bases on which the current TEC was developed are presented in Tables 2 and 3. Appendices 2, 3, 4, and 5 provide life cycle cost detail. Appendix 6 reconciles the cost and schedule baselines in the Project Plan, revision 2, with those in revision 3.



## TABLE 2

### WASTE DISPOSAL ASSUMPTIONS

WBS No.	Site	Est. Volume <sup>1</sup> (Cubic Yards)	Design-Basis <sup>3</sup> Disposal Site
<b>NEW YORK SITES</b>			
103	Ashland 1	84,000	New York
123	Seaway Industrial Park	117,000	In situ
129	Linde Air Products	26,800	New York
132	Ashland 2	19,400	New York
139	Colonie	14,200	Hanford
145	Baker & Williams Warehouses	27	Hanford
158	Niagara Falls Storage Site	205,000	Niagara Falls
<b>NEW JERSEY SITES</b>			
108	DuPont & Company	8,270	On-site
118	Middlesex Sampling Plant	57,190	New Jersey
137	Wayne	109,000	New Jersey
138	Maywood	395,000	New Jersey
144	New Brunswick Site	4,500	New Jersey
<b>MISSOURI SITES</b>			
153	St. Louis Airport Site	250,000	SLAPS
116	St. Louis Downtown Site	246,000	SLAPS
134	St. Louis Airport Site VPs	195,000	SLAPS
140	Latty Avenue Properties	211,000	SLAPS
<b>OTHER SITES</b>			
110	W. R. Grace & Company, MD	36,000	Maryland
125	Shpack Landfill, MA	2,000	Hanford
126	Aliquippa Forge, PA	38	Hanford
127	Ventron, MA	7,000	Hanford
141	General Motors, MI	200	Hanford
142	Seymour Specialty Wire, CT	25	Hanford
<b>COMPLETED SITES</b>			
101	Acid/Pueblo Canyon, NM	390 <sup>2</sup>	Los Alamos
102	Albany Research Center, OR	3,669 <sup>2</sup>	Hanford
104	Bayo Canyon, NM	1,520 <sup>2</sup>	In situ
105	Chupadera Mesa, NM	—	N/A
114	Kellex/Pierpont, NJ	273 <sup>2</sup>	Barnwell
115	Niagara Falls Storage Site VPs, NY	50,000 <sup>2</sup>	Niagara Falls
117	Middlesex Municipal Landfill, NJ	31,210 <sup>2</sup>	New Jersey
119	National Guard Armory, IL	20 <sup>2</sup>	Hanford
130	University of California, CA	30 <sup>2</sup>	Hanford
131	University of Chicago, IL	45 <sup>2</sup>	Idaho Falls
143	Elza Gate, TN	8,000 <sup>2</sup>	Oak Ridge
		2,082,807	

<sup>1</sup>Refer to Table 3 for estimate basis.

<sup>2</sup>Actual waste volume.

<sup>3</sup>Actual disposal site selection to be based on environmental analysis and review process.

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**TABLE 3**  
**ESTIMATE BASIS SUMMARY FOR WASTE VOLUMES**  
**AND TOTAL ESTIMATED COST**

WBS No.	Site	Characterization <sup>1</sup>	Design <sup>1</sup>	Remedial Action <sup>1</sup>	Type of Estimate <sup>2</sup>
155	New York Disposal Site	Partial	None	None	Budget
103	Ashland 1, NY	Substantial	None	None	Budget
123	Seaway Industrial Park, NY	Substantial	None	None	Budget
129	Linde Air Products, NY	Substantial	None	None	Budget
132	Ashland 2, NY	Substantial	None	None	Budget
139	Colonie, NY	Substantial	Partial	Partial	Budget
145	Baker & Williams Warehouses, NY	Substantial	Partial	Partial	Budget
158	Niagara Falls Storage Site, NY	Complete	Partial	Partial	Budget
115	Niagara Falls Storage Site VPs, NY	Complete	Complete	Complete	Actual
154	New Jersey Disposal Site	None	None	None	Budget
108	DuPont & Company, NJ	Substantial	None	None	Budget
117	Middlesex Municipal Landfill, NJ	Complete	Complete	Complete	Actual
118	Middlesex Sampling Plant, NJ	Substantial	Partial	Partial	Budget
137	Wayne, NJ	Substantial	Substantial	Substantial	Preliminary
138	Maywood, NJ	Substantial	Partial	Partial	Budget
144	New Brunswick Site, NJ	Partial	Minimal	Minimal	Preliminary
153	St. Louis Airport Site, MO	Complete	Minimal	Minimal	Preliminary
116	St. Louis Downtown Site, MO	Substantial	None	None	Budget
134	St. Louis Airport Site VPs, MO	Complete	Partial	None	Preliminary
140	Latty Avenue Properties, MO	Complete	Partial	Minimal	Preliminary
157	Maryland Disposal Site	None	None	None	Budget
110	W. R. Grace & Company, MD	Minimal	None	None	Budget
101	Acid/Pueblo Canyon, NM	Complete	Complete	Complete	Actual
102	Albany Research Center, OR	Complete	Complete	Complete	Actual
104	Bayo Canyon, NM	Complete	Complete	Complete	Actual
105	Chupadera Mesa, NM	Complete	Complete	Complete	Actual
114	Kellex/Pierpont, NJ	Complete	Complete	Complete	Actual
119	National Guard Armory, IL	Complete	Complete	Complete	Actual
125	Shpack Landfill, MA	Substantial	None	None	Budget
126	Aliquippa Forge, PA	Substantial	Partial	Partial	Design
127	Ventron, MA	Minimal	Partial	Minimal	Budget
130	University of California, CA	Complete	Complete	Complete	Actual
131	University of Chicago, IL	Complete	Complete	Complete	Actual
141	General Motors, MI	None	None	None	Budget
142	Seymour Specialty Wire, CT	None	None	None	Budget
143	Elza Gate, TN	Complete	Complete	Complete	Actual

<sup>1</sup> Definition of categories:

None - Not started; Minimal - Started but less than one quarter complete; Partial - More than one-quarter but less than one-half complete; Substantial - Greater than one half but not complete; Complete - All actions finished

<sup>2</sup> Definition of categories:

Budget - Conceptual scope, "rough" quantities, sketches; Preliminary - Preliminary scope, initial engineering quantities and drawings; Design - Design drawings, specifications, quantities; Actual - Actual volumes and costs at completion

## TECHNICAL PLAN

### STATUS

Screening of potential FUSRAP sites began in 1974, with response actions beginning in 1979 on a limited basis. Response action has been completed at 11 of the 33 currently authorized sites and has been initiated at 11 other sites. Planning is in progress for the remaining sites.

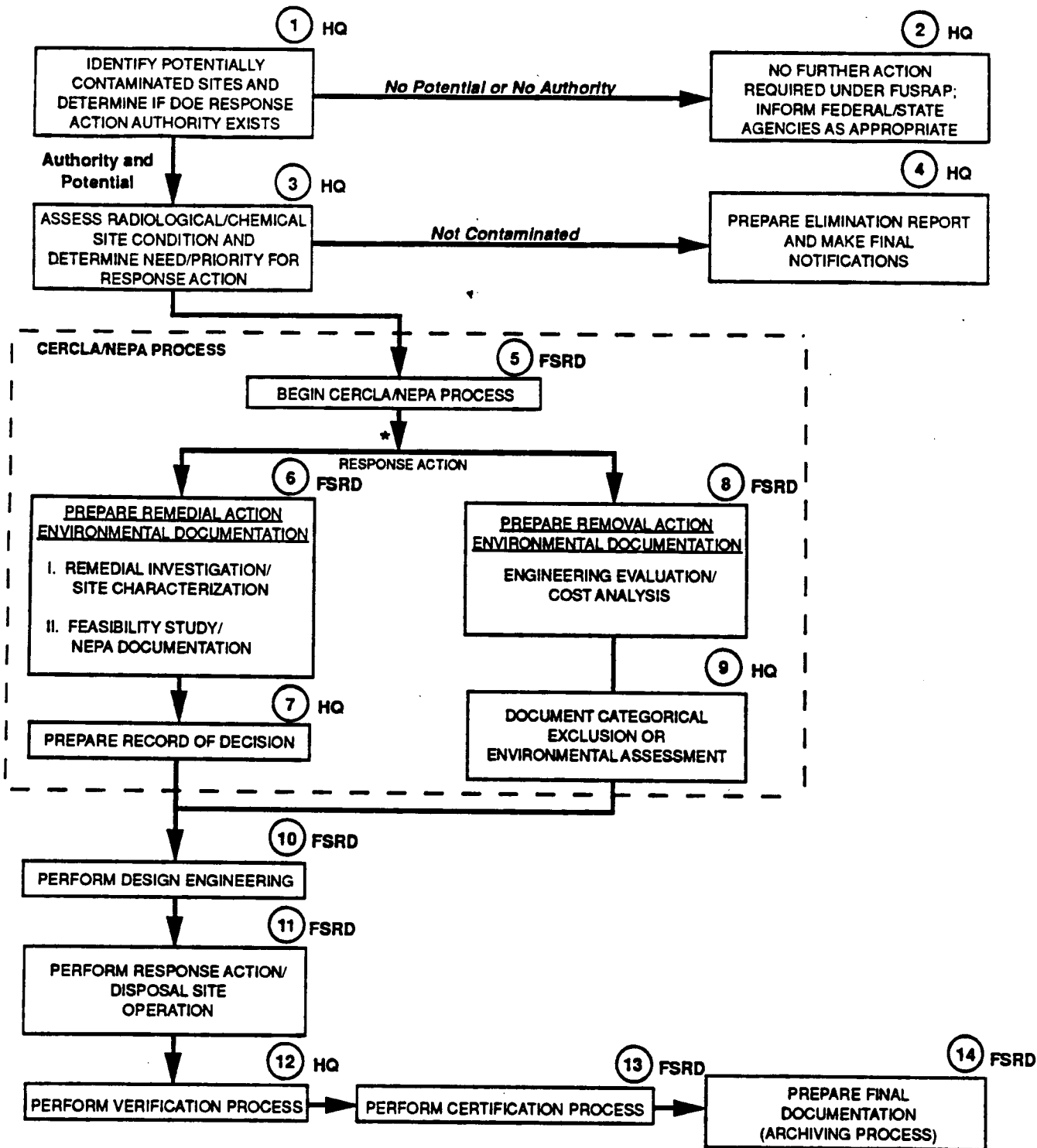
### APPROACH

#### Steps to Complete a Response Action

The general sequence of events to accomplish response action for a site and the responsibility for each event are presented in Figure 2 and described below. This sequence can be adapted to suit the particular characteristics of each site. The Office of Environmental Restoration and Waste Management at DOE Headquarters and the Former Sites Restoration Division (FSRD) at the DOE Oak Ridge Field Office (OR) manage the response action process.

- Step 1 Identify Site and Determine Authority for Response Action.** The objectives of Step 1 are to identify and locate potentially contaminated sites used during MED/AEC programs before 1974 and to determine, on a site-by-site basis, whether DOE has authority to proceed with response action. Sites are identified and located by researching records and reviewing information submitted by the public or industry. Records, such as contract files and title transfer documents, are reviewed to determine whether AEA authority exists for DOE to conduct response action on the site. Sites for which DOE has authority receive further review in Step 3 to determine whether there is a need to conduct such action to protect public health and safety. If no authority exists for the site, the process moves to Step 2, where the site is removed from further consideration under FUSRAP.
- Step 2 Determine That No Further Action Is Required Under FUSRAP; Inform Federal and State Agencies as Appropriate.** If authority does not exist, if there is no potential for radioactive contamination, or if the site is being addressed by another remedial action program or is under the regulatory authority of another agency, these findings are documented and the site will not be considered for inclusion in FUSRAP. When no DOE authority exists for a site that has been reviewed and at which there is an indication of radioactive contamination exceeding current guidelines, all pertinent DOE information about the site will be referred to EPA, the Nuclear Regulatory Commission, and other federal or state agencies as appropriate.
- Step 3 Assess Radiological and Chemical Condition and Determine Need and Priority for Response Action.** If the existing documentation or radiological and chemical data are

# FIGURE 2 BASIC STEPS IN THE DOE RESPONSE ACTION PROCESS



★ Decision for remedial action or removal action will be made on a case-by-case basis for each site.

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inadequate to determine the need for response actions at a site for which DOE has authority, a radiological and chemical survey of the site will be performed. The survey plan will take into account past and current activities at the site and types of contamination present. When the site survey is completed, a radiological and/or chemical survey report will be prepared that describes the condition of the site and compares this condition to current guidelines. The existing documentation and the survey report are evaluated by DOE to determine whether there is a need for response action to remove or reduce residual radioactive materials to levels that conform to applicable guidelines. Data on the current use and condition of the site and its surroundings are evaluated to assess the relative risk to public health and to establish the need and priority for response actions. If response actions are required, the site is designated as a FUSRAP site and the process moves to Step 5 for implementation of the environmental compliance process. If response actions are not required, the process moves to Step 4.

**Step 4 Prepare Elimination Report and Make Final Notifications.** When the assessment of site conditions in Step 3 indicates that no response action is required, a report is prepared that documents this finding. This report is forwarded to the site owner and appropriate state and federal agencies. The site is thereby excluded from further FUSRAP activities.

**Step 5 Begin CERCLA/NEPA Process.** Site scoping is the first step in integrating National Environmental Policy Act (NEPA) values with the procedural and documentation requirements of CERCLA, as amended by SARA of 1986. This is called the CERCLA/NEPA integration process. It includes implementing the NEPA values outlined in Council on Environmental Quality regulations, NEPA implementing procedures (10 CFR 1021), and DOE Order 5440.1D. CERCLA requirements are implemented through 40 CFR 300-399. NEPA determinations will be made as early as practical.

The site scoping phase consists of compiling and reviewing all relevant information about the site. Based on the review of information, a decision is made to conduct remedial action or removal action. Both types of action fall under the broad category of response actions. If remedial action is selected, Steps 6 and 7 are followed; if the removal action is selected, Steps 8 and 9 are followed.

**Step 6 Prepare Remedial Action Environmental Documentation.** This step is comprised of planning and implementing a remedial investigation (RI) (i.e., site characterization) and reporting the results. It also includes developing a feasibility study and appropriate NEPA documentation. The RI involves collecting and analyzing all data needed to identify the types of contaminants present, extent and boundaries of contamination, and effects of contamination on the environment. The FS-EIS involves developing and

analyzing remedial action alternatives ranging from no action to remedial action and offsite disposal. Cost estimates are developed for each alternative. Applicable or relevant and appropriate requirements (ARARs) are identified. Public participation is an integral part of the RI/FS-EIS process.

- Step 7 Prepare Record of Decision (ROD).** The ROD documents the formal selection of the remedial action alternative(s) by DOE Headquarters, in consultation with EPA and state authorities. For sites on the NPL, the remedy is selected by DOE with final concurrence from EPA. The selection is based on all factors described in the environmental documents including cost, health risks, environmental effects, and benefits. If the no action alternative is selected, the process will proceed directly to Step 13 to begin certification.
- Step 8 Prepare Removal Action Environmental Documentation.** This step satisfies the CERCLA requirements for removal actions. The rationale behind selecting the removal action is documented in an engineering evaluation/cost analysis (EE/CA). The EE/CA provides an analysis of site conditions, a review of possible removal actions, and an assessment of effects on the environment. The EE/CA concludes with a recommended removal action alternative for site cleanup.
- Step 9 Document Categorical Exclusion (CX) or Environmental Assessment (EA).** The determination that the response action will have no significant impact on the environment is documented. This step satisfies NEPA requirements for removal actions. This determination may usually be made by a CX. When appropriate, the EE/CA will contain sufficient analyses so that it can be adopted as an EA.
- Step 10 Perform Design Engineering.** Design engineering to implement the selected response action includes development of detailed cost estimates, work plans, drawings, specifications, and schedules for the response action. The design engineering will comply with all ARARs.
- Step 11 Perform Response Action/Disposal Site Operation.** Response action is performed in accordance with the engineering design (Step 10). During and upon completion of the response action, radiological and chemical measurements are performed and documented to guide and verify the effectiveness of the response action. Upon completion of the response action, a post-remedial action report is prepared documenting the entire response action and the final radiological condition of the site. The results presented in this report and those from the verification process are the primary basis for certification that the response action is complete. In some cases, a disposal site will be developed, operated, and closed for waste from a single site or multiple sites. Step 11 includes the surveillance and maintenance of such storage or disposal sites, if not provided for under other DOE programs.

**Step 12 Complete Verification Process.** An independent verification contractor (IVC) reviews the measurements taken during remediation at the site, the measurement procedures, and the associated quality assurance data. The IVC may also take separate sets of samples and measurements. The site is certified for release for use without radiological restrictions if measurements taken by the IVC verify that the levels of residual radioactive materials meet the established guidelines for release, and the DOE review of the certification data determines that the response action was successful. If such review determines that the response was not successful, either further response action measures will be taken, including further clean up or stabilization, or active or passive controls will be used as appropriate.

**Step 13 Complete Certification Process.** Certification includes publication of a certification docket containing all pertinent documentation that describes the response action process from initial review through verification. Issuance of these documents certifies the successful completion of the response action and stipulates continued limitations on use of the site (if any). Ownership of the site by the federal government is required to ensure control and enforcement of restrictions on FUSRAP disposal sites. Such controls may permit beneficial land use or possibly allow the use of the site for other regulated nuclear activities. Annual surveillance and maintenance efforts will be provided through completion of the program.

**Step 14 Prepare Final Documentation.** The completed record and files of activities are archived. This step closes the response action process for a given site.

## KEY ASSUMPTIONS

Key assumptions and potential alternatives used in developing the baseline are given below:

KEY ASSUMPTIONS MADE	POTENTIAL ALTERNATIVES
Excavation and disposal	Anticipate new technologies to separate and concentrate waste Minimal processing followed by low-cost, controlled disposal Maximize in situ stabilization; apply long-term controls
In-state, new DOE disposal sites	Commercial disposal site Single FUSRAP disposal site
Aggressive RI/FS schedules; driven by FFAs	Go slower Go faster
Full CERCLA, sequential process	Focused feasibility studies Use "observational approach"
Current cleanup and disposal standards	Tougher standards Relaxed standards

## WORK BREAKDOWN STRUCTURE

The planning, execution, and control of FUSRAP is based on a work breakdown structure (WBS). Figure 3 shows the FUSRAP WBS at the program level and Figure 4 shows the project summary WBS. The program WBS was developed in 1991 by the DOE-HQ Office of Environmental Restoration to correlate reporting of the entire DOE environmental restoration program. Costs tracked through project WBS elements are summarized to the states' level for reporting in the program WBS.

The project summary WBS (Figure 4) and the baseline schedule (Appendix 1) identify response action sites (including disposal sites) as separate elements at Level 2, in which costs for all site activities are collected. Thus, the output from each activity at Level 3 will be related to the project objective. Technology and system studies applicable to all sites are a separate element (WBS 190) at Level 2, as is general project support (WBS 191) and general program support (WBS 193). Capital equipment (WBS 192) is the final Level 2 element. This element includes primarily replacement vehicles, computers, and industrial hygiene equipment that can be used at many sites; therefore, it is not part of the site-specific WBS accounts. Each general purpose WBS account (190, 191, 192, and 193) is allocated to each response action and disposal activity on the basis of its portion of total site-specific WBS costs. Also, the disposal site costs, although accounted for separately, are allocated to each response action site on the basis of the portion of waste from that site that is disposed of at the disposal site. The total cost for each response action site thus includes the allocated WBS 190, 191, 192, 193, disposal site, risk and uncertainty assessment, and contingency costs (see Appendix 5).

## RESPONSE ACTION PLANS

The current status and plans for accomplishing the response action at each of the 33 sites are grouped by state and summarized below.

### **WBS 103: Ashland 1, Tonawanda, New York**

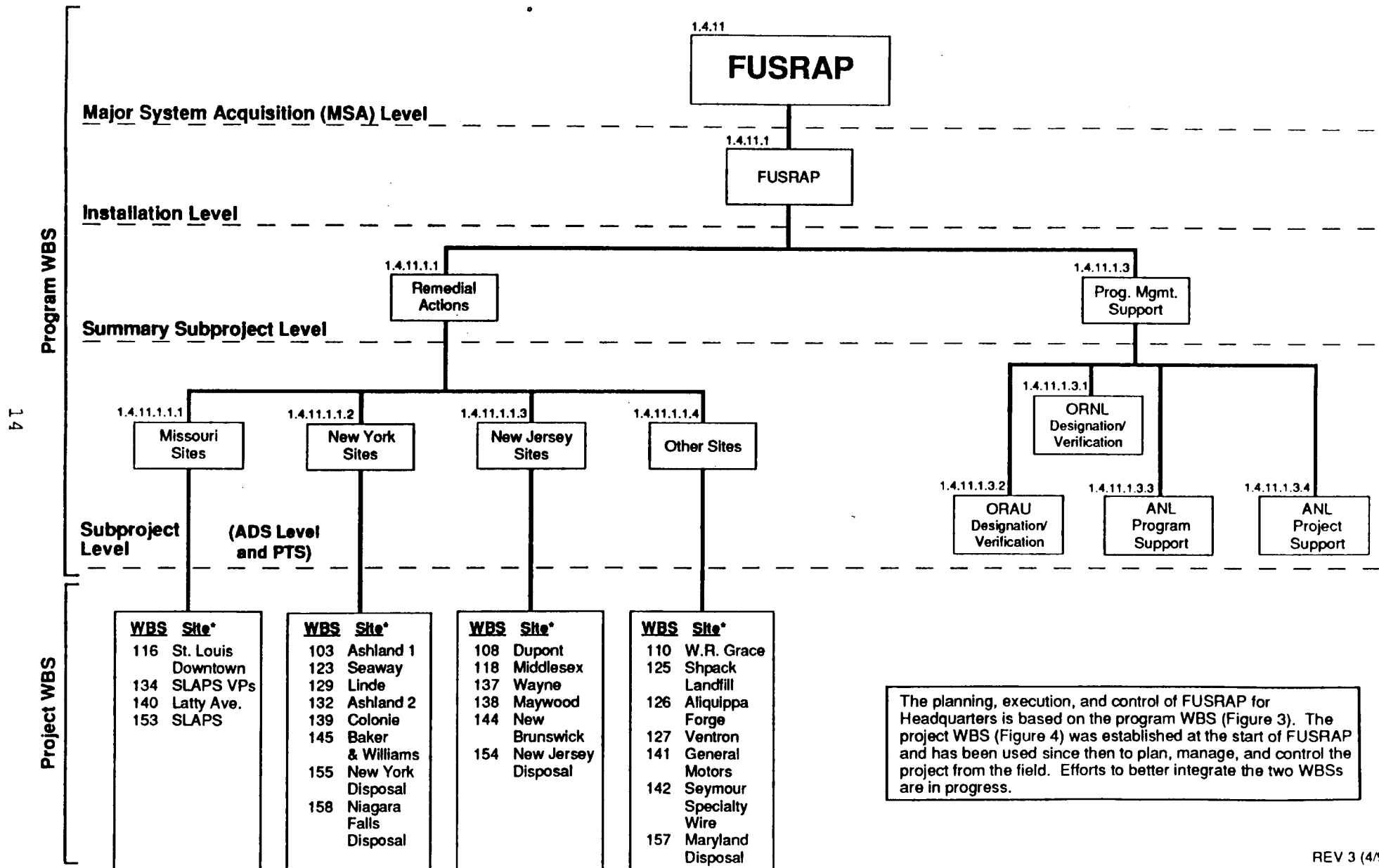
This site was added to FUSRAP in FY 1984. In FY 1985, a preliminary investigation was conducted for planning purposes. Characterization and remedial investigation activities began in FY 1987 and were completed in FY 1991. Approximately 84,000 yd<sup>3</sup> of contaminated material must be excavated. No mixed waste (hazardous chemical and radioactive) has been identified, and it is assumed that the waste will be disposed of at the New York FUSRAP disposal site.

### **WBS 123: Seaway Industrial Park, Tonawanda, New York**

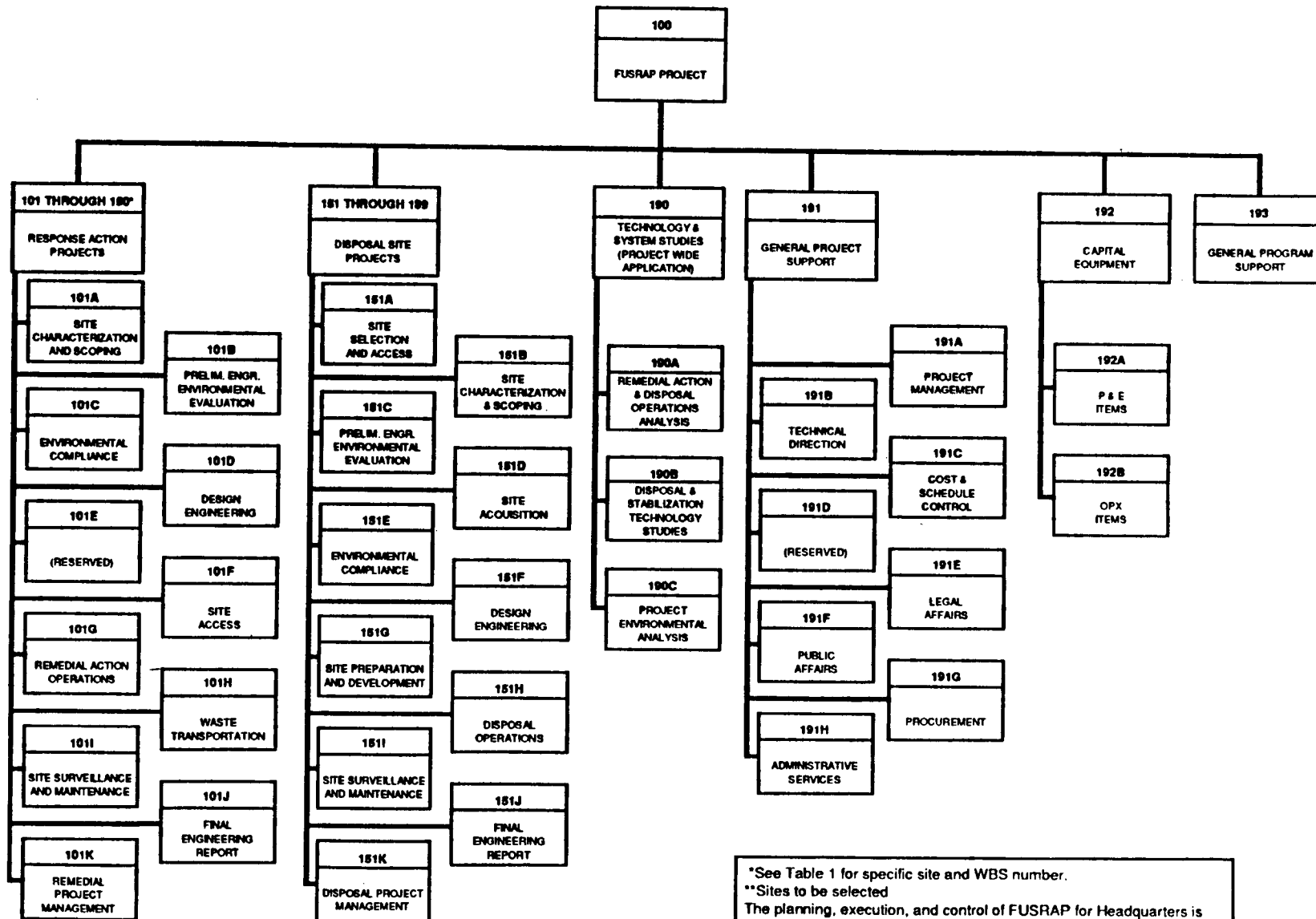
This site was added to FUSRAP in FY 1984. In FY 1988, a preliminary investigation of the site was made for planning purposes. A follow-up site characterization was completed in FY 1991, and a decision on remedial actions will be based on results of CERCLA/NEPA analyses and



# FIGURE 3 FUSRAP WORK BREAKDOWN STRUCTURE



# FIGURE 4 PROJECT SUMMARY WORK BREAKDOWN STRUCTURE FOR FUSRAP



\*See Table 1 for specific site and WBS number.

\*\*Sites to be selected

The planning, execution, and control of FUSRAP for Headquarters is based on the program WBS (Figure 3). The project WBS (Figure 4) was established at the start of FUSRAP and has been used since then to plan, manage, and control the project from the field. Efforts to better integrate the two WBSs are in progress.

documentation. For budgeting and scheduling purposes, this project plan assumes that of the projected 117,000 yd<sup>3</sup> of waste at the site, 80,000 yd<sup>3</sup> must be excavated and transported to the New York FUSRAP disposal site and 37,000 yd<sup>3</sup> will remain in situ.

**WBS 129: Linde Air Products, Tonawanda, New York**

Remedial investigation and site characterization began in FY 1988 and was completed in FY 1991. Approximately 26,800 yd<sup>3</sup> of contaminated material, including that resulting from building decontamination, must be excavated. No mixed waste (hazardous chemical and radioactive) has been identified, and it is assumed for budgeting and scheduling purposes that disposal will be at the New York FUSRAP disposal site.

**WBS 132: Ashland 2, Tonawanda, New York**

This site was added to FUSRAP in FY 1984. A preliminary investigation was made of the site in FY 1985 for planning purposes. Characterization activities began in FY 1988 and was completed in FY 1991. Approximately 19,400 yd<sup>3</sup> of contaminated waste must be excavated. No mixed waste (hazardous chemical and radioactive) has been identified, and it is assumed for budgeting and scheduling purposes that the waste will be disposed of at the New York FUSRAP disposal site.

**WBS 139: Colonie, Colonie, New York**

Title to the National Lead Industries uranium milling and machining plant, land surrounding the plant, and two adjoining parcels of land owned by Niagara Mohawk Power Corporation was transferred to DOE in FY 1984. Contaminated waste from remediation of 53 vicinity properties is being stored inside the plant. Remedial investigation was completed in FY 1989.

Approximately 14,200 yd<sup>3</sup> of contaminated material, including that from building decontamination, must be excavated. Disposal of contaminated residue at Hanford is assumed for budgeting and scheduling purposes. Until remedial action is implemented, the site and buildings will be maintained and routine environmental monitoring will continue.

**WBS 145: Baker and Williams Warehouses, New York, New York**

This site was added to FUSRAP in FY 1990. Results of a designation survey performed in FY 1990, and information obtained from recent expedited action, indicate the presence of approximately 27 yd<sup>3</sup> of contaminated building material for which DOE has authority. The DOE expedited removal process was used at this site during FY 1991 to remediate two of three designated warehouses. The disposal location is assumed to be the Hanford Site.

**WBS 115: Niagara Falls Storage Site Vicinity Properties, Lewiston, New York**

Remedial action was performed during FY 1983 through FY 1985. DOE issued the final environmental impact statement and ROD in FY 1986. All but three of the remediated properties have been released for use with no radiological restrictions.

**WBS 158: Niagara Falls Storage Site, Lewiston, New York**

This site was transferred to FUSRAP for funding in FY 1992. To date, wastes have been consolidated and several buildings have been demolished. K-65 residues will remain onsite within the diked containment area. The waste at the storage site is currently covered by a temporary cap, and performance of the cap is being monitored annually. Surveillance of the storage site continues. Surplus site property will be transferred to the General Services Administration, and new fencing and roads will be installed in FY 1992. In FY 1994 work will begin on a permanent disposal cap for the storage site. The cap will be completed in FY 1996.

**WBS 108: DuPont and Company, Deepwater, New Jersey**

The radiological characterization report, published in FY 1985, indicated that approximately 8,270 yd<sup>3</sup> of soil and one large building are contaminated. Radioactive contaminants are commingled with various chemical contaminants. Measures currently enforced by DuPont are adequate to protect personnel from the areas of subsurface low-level radioactive contamination. Planning for the removal action will include environmental compliance activities and will be conducted in cooperation with DuPont. Onsite disposal is assumed for budgeting and scheduling purposes; however, no final decision has been made.

**WBS 117: Middlesex Municipal Landfill, Middlesex, New Jersey**

Removal action was initiated at the landfill in FY 1984 and was completed in FY 1986. A total of 31,210 yd<sup>3</sup> of contaminated material was excavated and transported to the Middlesex Sampling Plant (WBS 118) for interim storage until a permanent disposal site is selected. Documentation to release the site was published in FY 1989. Environmental monitoring of the landfill by DOE ended one year after removal action was completed.

**WBS 118: Middlesex Sampling Plant, Middlesex, New Jersey**

This DOE-owned site is being used for temporary storage of vicinity property wastes. A radiological survey of the site indicated that contamination extends throughout the site. Approximately 88,400 yd<sup>3</sup> of contaminated waste resulting from FUSRAP activities at the Middlesex Municipal Landfill and the Middlesex Sampling Plant must be disposed. Removal action will be deferred until a disposal site is identified and operational. The certification docket

for the vicinity properties has been published. Environmental monitoring, maintenance, and surveillance will continue until all removal action activities have been completed.

**WBS 137: Wayne, Wayne, New Jersey**

This site was added to the NPL in FY 1984. The former W. R. Grace and Company property was acquired by DOE in FY 1984 for use as an interim storage site for contaminated wastes from nearby properties. Site preparation began in FY 1984 and was completed in FY 1985. Removal actions on offsite properties were initiated in FY 1984 and were completed in FY 1987.

Excavation and transportation of contaminated onsite material (109,000 yd<sup>3</sup>) to a disposal site is assumed.

**WBS 138: Maywood, Maywood/Rochelle Park, New Jersey**

This site was added to the NPL in FY 1983. Stepan Company transferred title of a small portion of its Maywood property to DOE in September 1985. The property was then prepared by DOE for interim storage of contaminated material from nearby residential properties. Offsite removal actions were conducted in FY 1984, FY 1985, and FY 1986. Characterization of remaining residential and commercial properties was completed in FY 1991. Environmental monitoring, maintenance, and surveillance will continue until remedial action is complete. Excavation and transportation of approximately 375,000 yd<sup>3</sup> of contaminated material to a disposal site is assumed. An additional 20,000 yd<sup>3</sup> of contaminated material is assumed to remain in situ.

**WBS 144: New Brunswick Site, New Brunswick, New Jersey**

The New Brunswick site was transferred to FUSRAP in FY 1990. Previous removal actions performed include decontamination and demolition of the buildings. Contaminated soil and sewers remain to be cleaned up. Excavation and transportation of contaminated material (4,500 yd<sup>3</sup>) to a disposal site is assumed.

**WBS 116: St. Louis Downtown Site, St. Louis, Missouri**

This site was added to FUSRAP in FY 1984. Planned remedial investigation activities have been completed and the remedial investigation report will be issued in FY 1992. This project plan assumes 246,000 yd<sup>3</sup> of waste will be transported to SLAPS (WBS 153) for disposal.

**WBS 134: St. Louis Airport Site (Vicinity Properties), Hazelwood, Missouri**

Radiological characterization of the vicinity properties began in FY 1986 and was completed in FY 1990. The remedial investigation report will be completed in FY 1992. Excavation and transportation of 195,000 yd<sup>3</sup> of contaminated waste to SLAPS (WBS 153) for disposal are assumed for budgeting and scheduling purposes. Until the final disposal site is established,

contaminated waste excavated during local development will be stored at the Hazelwood Interim Storage Site (HISS).

**WBS 140: Latty Avenue Properties, Hazelwood, Missouri**

Cleanup of properties along Latty Avenue began in FY 1984. Monitoring wells have been installed at HISS as part of an environmental monitoring program. Characterization of the site and vicinity properties was completed and reports prepared in FY 1988 and FY 1990. A total of 211,000 yd<sup>3</sup> of contaminated waste must be excavated. Support will be given during local development along the haul roads, and any waste generated by these activities will be stored at HISS. Excavation and transportation of contaminated material to SLAPS (WBS 153) for final disposal are assumed for budgeting and scheduling purposes.

**WBS 153: St. Louis Airport Site (SLAPS), St. Louis, Missouri**

In FY 1985, DOE was authorized to reacquire this site from the City of St. Louis, conduct in-place stabilization actions, and develop the property as a disposal site for the contaminated wastes from the cleanup of the nearby Latty Avenue Properties (WBS 140) and the SLAPS vicinity properties (WBS 134).

Additional characterization of Latty Avenue Properties, SLAPS vicinity properties, and SLAPS itself indicated greater volumes of contaminated material than originally projected for disposal at SLAPS. This project plan assumes that SLAPS will be expanded to accommodate 1,040,000 yd<sup>3</sup> of wastes by using SLAPS proper and adjacent vacant property. It is assumed that the waste is not mixed (hazardous chemical and radioactive waste). SLAPS itself is estimated to contain 250,000 yd<sup>3</sup> of contaminated material.

Site maintenance, and radiological, chemical, and geological characterization of the site began in FY 1986. The characterization was completed in FY 1988. Surveillance and maintenance are currently being performed at the site. This site was added to the NPL in FY 1989.

**WBS 110: W. R. Grace and Company, Curtis Bay, Maryland**

This site was added to FUSRAP in FY 1984. Site visits for planning purposes were completed in FY 1986. Environmental compliance activities and subsequent remedial actions will be deferred until a disposal site is operational. Approximately 36,000 yd<sup>3</sup> of contaminated material must be excavated.

**WBS 101: Acid/Pueblo Canyon, Los Alamos, New Mexico**

Removal action was completed during FY 1982. Final reports were issued during FY 1984, and the site has been certified for use with no radiological restrictions.

**WBS 102: Albany Research Center, Albany, Oregon**

The radiological characterization report and the engineering evaluation of selected removal action alternatives were published in FY 1985. The volume of waste that exceeds DOE guidelines is 3,669 yd<sup>3</sup>. Initial removal action and additional characterization were performed in FY 1987 and FY 1988. Phase II design engineering and removal action based on the FY 1989 characterization report was completed in FY 1991. The waste was shipped to Hanford for disposal.

**WBS 104: Bayo Canyon, Los Alamos, New Mexico**

Removal action was performed during FY 1982, and the final report has been completed.

**WBS 105: Chupadera Mesa, White Sands Missile Range, New Mexico**

Based on a radiological survey report published in FY 1984, it has been determined that this site does not require response action under FUSRAP. No further activities are planned for this site. It will continue to be carried on the site list to account for past costs for radiological survey work and the final report. Although no response action was required, the site will be listed as "response action completed."

**WBS 114: Kellex/Pierpont, Jersey City, New Jersey**

A radiological survey was conducted by Oak Ridge National Laboratory (ORNL) during FY 1977. Remedial action was performed during FY 1979 and FY 1980. In FY 1983, a final certification docket was prepared, and the site has been released for use with no radiological restrictions.

**WBS 119: National Guard Armory, Chicago, Illinois**

Removal action at this site was completed in FY 1989, and 20 yd<sup>3</sup> of waste was shipped to Hanford. Final reports were issued in FY 1989.

**WBS 125: Shpack Landfill, Norton, Massachusetts**

This site is contaminated with radioactive waste and with nonradioactive hazardous materials unrelated to DOE-sponsored work or work by DOE predecessor agencies. This site is on the NPL. Radiological characterization was completed in FY 1984, and additional chemical characterization will be performed in FY 1992. Assuming a uranium cleanup guideline of 40 pCi/g, approximately 2,000 yd<sup>3</sup> of radioactively contaminated material exists on the site. Removal action is planned for FY 1993, FY 1994, and FY 1995, with waste assumed to be shipped to Hanford.

**WBS 126: Aliquippa Forge, Aliquippa, Pennsylvania**

This site was added to FUSRAP in FY 1983. A team visited the site in February 1986 to conduct a preliminary investigation. The designation survey, performed in FY 1978, indicated the presence of approximately 30 yd<sup>3</sup> of radioactively contaminated material for which DOE has authority. This volume was later revised to approximately 38 yd<sup>3</sup>. At the request of the current owner, a waste consolidation and decontamination effort was initiated in late 1988. Approximately 10 yd<sup>3</sup> of waste resulting from Phase I removal action was shipped to Hanford.

**WBS 127: Ventron, Beverly, Massachusetts**

This site, an active laboratory and chemical plant, was added to FUSRAP in FY 1986. Radiological surveys conducted in FY 1980 and FY 1982 indicated the presence of approximately 7,000 yd<sup>3</sup> of contaminated material for which DOE has response action authority. During FY 1987 and FY 1988, radiological assistance was provided to the owners during modification of buildings. Site characterization will be performed during FY 1992. For budgeting and scheduling purposes, it is assumed that the waste will be shipped to Hanford. Survey of vicinity properties for possible designation has not yet been completed.

**WBS 130: University of California, Berkeley, California**

Removal action was performed during FY 1982 and FY 1983. Certification occurred during FY 1985, and the final report was issued.

**WBS 131: University of Chicago, Chicago, Illinois**

Removal action at this site was performed in FY 1984 and FY 1988. Final reports were issued in FY 1989 and FY 1990.

**WBS 141: General Motors, Adrian, Michigan**

This site was added to FUSRAP in FY 1986. Results of a survey performed in FY 1977 indicated the presence of approximately 200 yd<sup>3</sup> of contaminated material for which DOE has authority. In FY 1986, General Motors uncovered a uranium-contaminated drain line and requested disposal assistance. The material was shipped to Idaho Falls for disposal. Detailed characterization, preliminary and design engineering, and removal action will be completed in FY 1996. For planning purposes, the disposal location is assumed to be the Hanford Site.



**WBS 142: Seymour Specialty Wire, Seymour, Connecticut**

This site was added to FUSRAP in FY 1986. A survey conducted in FY 1980 indicated the presence of approximately 25 yd<sup>3</sup> of contaminated material for which DOE has authority. Cleanup under the expedited removal process will be conducted in FY 1992. For planning purposes, the disposal location is assumed to be the Hanford Site.

**WBS 143: Elza Gate, Oak Ridge, Tennessee**

This site was added to FUSRAP in FY 1989. Activities in FY 1989 included removal of surface contamination on a concrete slab. Characterization and excavation of the slab was completed in FY 1991. The EE/CA was completed in FY 1991, and the removal action was completed in FY 1992. Approximately 8,000 yd<sup>3</sup> of waste was transported to the Oak Ridge Reservation for disposal.

**WASTE DISPOSAL**

Waste disposal assumptions are summarized in Table 2. To complete the program as estimated in this project plan, four disposal sites [in addition to Niagara Falls Storage Site (NFSS)] would be identified and developed (one each in the states of New York, New Jersey, Missouri, and Maryland). To date, sites in Missouri and New York are under consideration; however, final sites would be selected following completion of appropriate environmental documentation. In New Jersey, signing of the ROD would be followed by a large-area screening study and site investigations and characterizations of three to five candidate disposal sites.

One interim disposal site (NFSS) currently exists in New York. NFSS, which was transferred to FUSRAP from SFMP in FY 1992, contains contaminated material from onsite and offsite areas in a waste containment structure (WCS). In FY 1986, the cap over the 10-acre WCS was closed and geotechnical instruments were installed. In FY 1988, onsite remedial action was completed on several isolated areas of residual radioactivity. All radiological cleanup has now been completed and all wastes are now incorporated into the WCS. Remaining work includes independent verification of onsite buildings, excessing of approximately 135 acres, and site surveillance and maintenance. Installation of the permanent WCS cap is pending.

In addition to those wastes stored in disposal sites constructed under FUSRAP, wastes may be disposed of in situ; at DOE facilities in Hanford, Washington; at commercial facilities; or at Oak Ridge, Tennessee, for the Elza Gate site. Selection of ultimate waste disposal options will be driven by the ROD or its equivalent. Results from ongoing environmental analyses will help identify waste disposal alternatives, including the use of commercial facilities. For the purpose of this estimate, siting of disposal facilities in the four states previously mentioned was assumed.

## **KEY REQUIREMENTS: GUIDELINES, DESIGN CRITERIA, AND ASSUMPTIONS**

### **Radiological and Chemical Cleanup and Waste Control Guidelines**

Radiological cleanup and waste control guidelines (for storage and disposal) for this project are stated in DOE Order 5400.5. For radionuclides not covered by DOE Order 5400.5, site-specific guidelines will be developed and approved by DOE. Chemical cleanup and control guidelines will be developed from federal and state ARARs on a site-specific basis.

### **CERCLA and NEPA Compliance**

FUSRAP follows a process for integrating CERCLA requirements with NEPA values in a manner that is consistent with DOE operating orders. All work conducted at FUSRAP sites is done in compliance with DOE orders, CERCLA, NEPA, and federal and state ARARs.

### **Facility Design Criteria**

DOE Order 6430.1A, "General Design Criteria," is being used in the planning and design of FUSRAP facilities. Additionally, federal and state ARARs addressing the design of waste storage facilities will also be considered.

### **Site Operations**

All work will be accomplished in accordance with (1) appropriate landowner agreements; (2) local and state environmental and land-use requirements, to the extent permitted by federal law; and (3) applicable regulations, standards, policies, and procedures, including DOE orders.

## RISK AND UNCERTAINTY ASSESSMENT

### AREAS OF UNCERTAINTY

FUSRAP does not require technological breakthroughs or advancements in state-of-the-art methods that are often sought for "major" programs and "major system acquisition" projects. Because well-proven concepts and commercially available equipment are used in FUSRAP tasks, the potential impact from technological breakthroughs are minimal. In addition, no imminent environmental or public health and safety risks are known to be involved at any of the identified sites; however, these sites have potential long-term radiological risks, and DOE's ability to apply institutional controls over the exposure to or spread of contamination is limited. Overall, the project will reduce environmental releases and improve safety, and it is expected that the requisite work can be accomplished in an environmentally acceptable manner.

Some areas of considerable uncertainty exist in regard to cost and schedule. Because conceptual design efforts have not yet been completed for all sites, a definitive baseline cost estimate cannot be established. The greatest areas of uncertainty in cost and schedule are:

1. Response action options (decontamination, demolition, stabilization). Options must be addressed on a site-specific basis with careful attention to such concerns as disruption to property owners/occupants and community life, worker exposure, adverse effects on local land-use plans, waste relocations, and unbalanced cost/benefit actions.
2. Development process and availability of suitable disposal sites. These factors are most important for sites from which wastes are to be removed and relocated. Use of in situ stabilization, existing DOE waste disposal sites, and waste consolidation (within each state) at new FUSRAP sites will be explored. Selection of the final disposal sites will be based on the environmental analyses of reasonable options that evaluate all relevant factors, including health effects and cost.
3. Presence of hazardous chemical contaminants. This factor must also be addressed on a site-specific basis. Complete chemical characterization and cleanup are required for sites owned by DOE. For other sites, DOE's authority extends only to cleanup of those hazardous chemicals that are commingled with radioactive waste or that represent a component of waste for which DOE has authority. Chemical characterization is required to determine response actions and treatment or disposal requirements.
4. Designation of additional sites based on the continuing survey program.

Other factors that may affect cost estimates include:

- Results of future characterization surveys
- Assumptions about waste volumes, transportation methods, and disposal or stabilization options that can be expected to vary substantially over the coming years
- Determinations that stabilization may not be feasible for some sites for which it is now assumed possible

## COST RISK AND UNCERTAINTY ASSESSMENT

This assessment was prepared using the following steps:

1. Screening major areas of risk. Major risk and uncertainty areas are regulatory and institutional.
2. Applying probabilities of occurrence to elements within each major risk area. The probability of a risk element occurring was evaluated and characterized as low (25 percent probability), moderate (50 percent probability), or high (75 percent probability). These determinations were based on technical factors, trends, and project experience.
3. Multiplying the estimated total cost for each risk element by the probability of its occurrence.

Although it is unreasonable to expect all of these potential risks to occur, it is reasonable to assume that some will occur. The probability assessment accounts for this so that the total cost risk and uncertainty estimate for FUSRAP is judged to be reasonable.

The table below summarizes the cost risk and uncertainty assessment into major categories:

<u>Item</u>	<u>Cost</u> <u>(\$ in millions)</u>
Additional Sites	94
Change in Standards	45
Program Delay	94
Volume Increase	59
Disposal Alternatives	(20)
Total	272

### MANAGEMENT APPROACH

The DOE Under Secretary is the Acquisition Executive for FUSRAP, which was designated in December 1980 as Major System Acquisition Project No. 142. Thus, the management approach described in this plan conforms with the requirements of DOE Order 4700.1, "Project Management System."

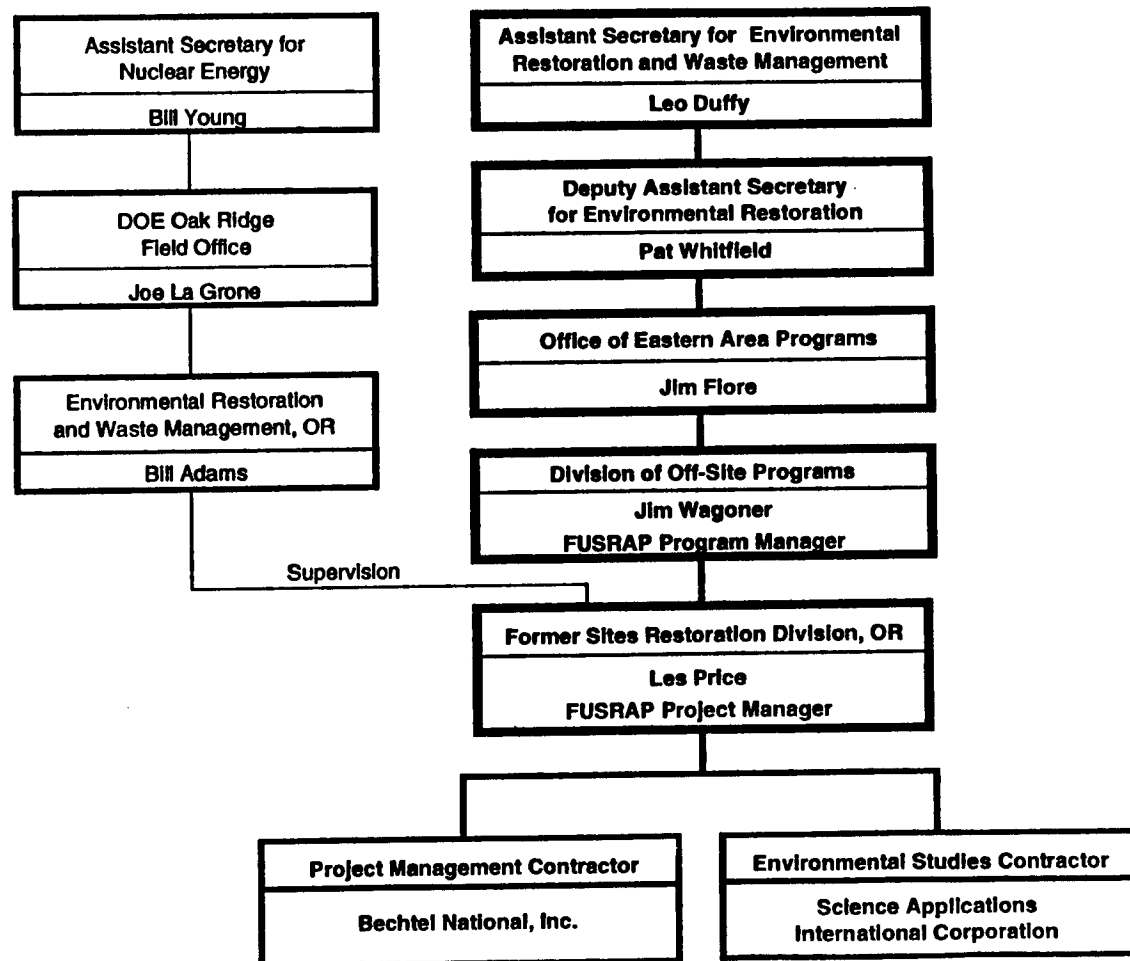
Responsibility for achieving the approved goals and objectives of FUSRAP has been delegated by the Under Secretary to the Assistant Secretary for Environmental Restoration and Waste Management. This responsibility is executed through the Director, Office of Eastern Area Programs (DOEAP), who has designated a program manager in the Division of Off-Site Programs. Field execution of FUSRAP is conducted by OR. The OR Manager, through the Assistant Manager for Environmental Restoration and Waste Management, has designated the Director, FSRD, as project manager for FUSRAP. Figures 5 and 6 illustrate this program management structure.

The FUSRAP project manager has primary responsibility, accountability, and authority to direct and manage FUSRAP in accordance with the project charter, revised December 14, 1988, and the Project Plan. The DOEAP and the program manager establish overall program direction, including policies, broad goals, major requirements, program milestones, and program budget; approve remedial actions; review and concur with OR project management and implementation plans; justify budgets to DOE management and the Office of Management and Budget, and Headquarters offices; and participate with the Office of General Counsel (with appropriate input from OR) in the preparation of legislative proposals.

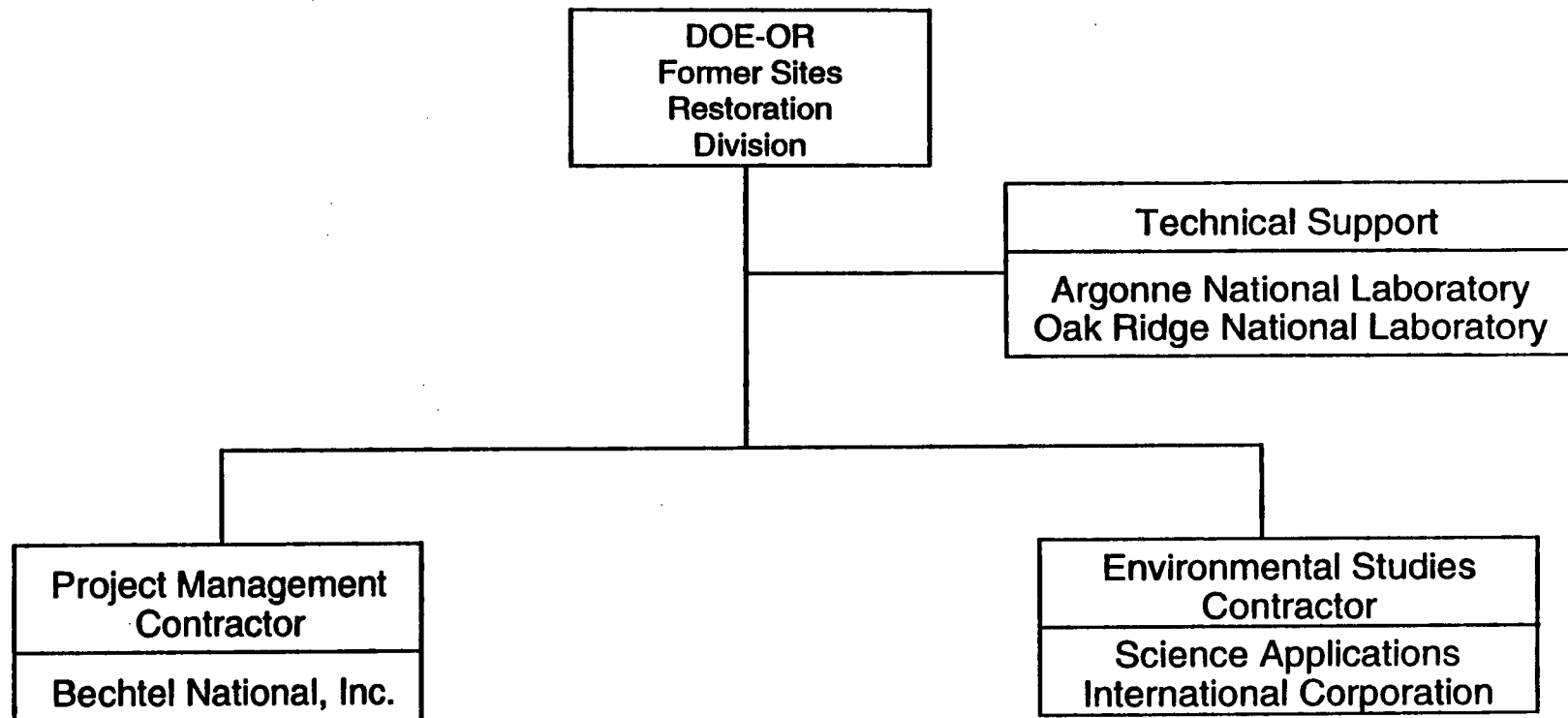
The project management contractor (PMC) for FUSRAP, Bechtel National, Inc. (BNI), is responsible for project integration and the planning, management, and execution of response action activities. BNI administers subcontracts, coordinates the sequence of operations and the relationships among subcontractors, and ensures completion of the program in accordance with DOE goals. On approval from FSRD, BNI executes response actions as required. BNI subcontracts response action work at FUSRAP sites to the extent that is cost-effective and programmatically expedient. BNI is responsible for monitoring and controlling all day-to-day activities at remedial action sites. In addition, BNI is responsible for defining and implementing quality assurance procedures, environmental compliance activities, and safety programs to meet DOE requirements for all sites.

The environmental studies contractor (ESC) for FUSRAP, Science Applications International Corporation (SAIC), is responsible under direction from FSRD for planning, managing, and executing the CERCLA process, integrating NEPA values, and meeting RCRA requirements. SAIC interfaces closely with the PMC.

# **FIGURE 5** **PROGRAM MANAGEMENT STRUCTURE FOR FUSRAP**



# FIGURE 6 PROJECT ORGANIZATION FOR FUSRAP



- Overall project management and integration
- RI field work
- Implement ROD
- Remedial design and construction
- Site surveillance and maintenance
- Environmental permits and compliance
- Disposal site operation

- Field investigation planning/design
- Analysis/documentation of field data
- Site risk assessment
- Remedial alternatives analysis
- Regulatory analysis
- NEPA/CERCLA/RCRA documents

Argonne National Laboratory (ANL) provides technical support to FSRD through technical review of analyses and documents and through assistance to the FUSRAP self-assessment program. ORNL also provides technical support to FSRD by conducting environmental audits of activities at FUSRAP sites.

The FUSRAP project management approach is designed to ensure that cost, schedule, and technical goals are attained. A WBS, which consists of systematic subdivision of all work necessary to achieve FUSRAP objectives and goals, has been developed to establish the formal work organization and the planning and scheduling structure. The WBS identifies critical relationships and interdependencies and is the framework for integrating budget requirements with program schedule and technical performance. It establishes a management analysis and reporting structure that enables summations of data for different levels of management. The WBS for FUSRAP is shown in Figures 3 and 4. Cost and schedule control systems criteria (CSCSC) have been adopted by FUSRAP as a basis for assessing the quality of cost and schedule controls used by program participants. Use of CSCSC facilitates effective planning, management, and control of contracted work and provides valid and timely information on cost, schedule, and technical performance. The project management control system was validated as meeting DOE criteria.



### ACQUISITION STRATEGY

The acquisition arrangement for FUSRAP is one whereby, under guidance and direction of DOE:

- (1) The PMC performs project integration, site management, environmental compliance, engineering, and inspection functions and manages response action activities, including sample collection, decontamination, restoration, transportation, and waste disposal.
- (2) The ESC performs CERCLA activities, integrates NEPA values, and handles RCRA requirements.
- (3) Specialized resources from DOE laboratories are employed in technical support roles. ANL and ORNL provide this support.

The PMC is required to subcontract as much response action work as possible to use available industry capabilities rather than build up project-specific manpower, contract with firms that are local to the remedial action sites, and make maximum use of minority and disadvantaged contractors. All subcontractors employed by the PMC are selected competitively, using fixed-price contracts whenever feasible. Material, equipment, and supplies are procured competitively in the same manner. Any force-account work must be justified by the PMC and approved by OR before beginning such work.

Because of the complexity and nature of CERCLA/NEPA/RCRA activities, the ESC is required to perform most of these activities in-house with project-specific manpower; however, the use of subcontractors is acceptable when feasible and appropriate.

It is not feasible to use a single procurement approach for the remedial work managed by the PMC because of the large number of FUSRAP sites at widely separated locations and the numerous tasks and procurement activities associated with each site. Instead, acquisition strategy has been established on a case-by-case basis by OR through the PMC. Subcontracting procedures have been established by the PMC and approved by the DOE contracting officer whereby each subcontract over \$200,000 awarded by the PMC is reviewed by the OR Contract/Subcontract Review Board for compliance with the requirements of DOE DEAR 971.2 and ORPL3. Most of the subcontracts awarded by the PMC require submission to the OR Contract/Subcontract Review Board for approval. In any case, the PMC is required to give the DOE Contracting Officer and the FUSRAP project manager advance notice of any subcontract awards to be made.

## **PROJECT SCHEDULE**

### **REVISED BASELINE SCHEDULE**

Significant changes in the scope of the program have been made since the approval of the September 1987 Project Plan (revision 2). Because of these changes, the project baseline schedule has been revised. Revision 3 to the baseline schedule is presented in Appendix 1.

The revised baseline schedule is predicated on the following assumptions: (1) since revision 2, three response action sites have been added and one site (NFSS) was transferred from SFMP; (2) no mandated schedule for project completion exists, but the previously established target date of September 2002 has been extended to September 2016; (3) onsite disposal is feasible at SLAPS and DuPont, while in situ stabilization for a portion of the material is feasible at the Seaway site; (4) offsite disposal will be used for the remaining uncompleted sites requiring response action; (5) four new disposal sites must be acquired and developed (one at SLAPS in Missouri, and one each in the states of New Jersey, New York, and Maryland); (6) Palos Park was transferred from FUSRAP in FY 1991; and (7) chemical characterization and CERCLA requirements have been added to the project scope. Any changes in these key assumptions will require further revision to the baseline schedule.

### **PRIORITIES AND MILESTONES**

Priorities for response action are primarily based on health risk but may include other factors, including legislative mandates, funding availability, and disposal and/or storage site availability. Increased priority is being given to the SLAPS, New York, and New Jersey disposal sites because completion of substantial response action at many sites depends upon their operation.

The principal milestones for the project are reflected in the revised baseline schedule; other, more detailed milestones will be developed for each fiscal year by agreement between EM-421 and OR-FSRD. These milestones will be documented in FUSRAP monthly progress reports. Changes to annual milestones will be made through the Change Control Board and will be sent to EM-421 for approval and concurrence.

Selected milestones are listed below:

#### New York Sites

#### Milestone

- Publish ROD for Colonie and Tonawanda FY 1993
- Complete cleanup at Colonie FY 1998
- Begin operation of New York disposal site FY 1996
- Complete cleanup at Tonawanda sites FY 1999
- Close New York permanent disposal site FY 2000
- Complete cleanup at Baker and Williams Warehouses FY 1993

#### New Jersey Sites

- Issue EPA Draft ROD for Maywood FY 1993
- Issue EPA Draft ROD for Wayne FY 1994
- Begin operation of New Jersey disposal site FY 2001
- Complete cleanup at New Jersey sites FY 2011
- Close New Jersey permanent disposal site FY 2012

#### Missouri Sites

- Issue EPA Draft ROD for Missouri sites FY 1994
- Begin operation of Missouri disposal site at SLAPS FY 1997
- Complete cleanup of Missouri sites FY 2009
- Close Missouri permanent disposal site FY 2010

#### Maryland Sites

- Begin operation of Maryland disposal site FY 2014
- Complete cleanup of W. R. Grace FY 2015
- Close Maryland permanent disposal site FY 2016

#### Other Sites

- Complete cleanup at Aliquippa Forge, Pennsylvania FY 1992
- Complete cleanup at Seymour Specialty Wire, Connecticut FY 1992
- Complete cleanup at Shpack Landfill, Massachusetts FY 1995
- Complete cleanup at General Motors, Michigan FY 1996
- Complete cleanup at Ventron, Massachusetts FY 1998

Note: Milestones at the Acquisition Executive's level include initiation and termination of a project. Decisions requiring approval by the Acquisition Executive will go through Change Control.

## RESOURCES PLAN

### **COSTS**

The revised baseline resources plan (Appendices 2, 3, 4, and 5) has been developed commensurate with the revised baseline schedule (Appendix 1). The proposed baseline estimate is based on funding guidance developed by DOE-HQ. HQ directed funding levels from FY 1996 through FY 2016 to be held constant at \$111 million per year. TEC is \$1.615 billion in FY 1992 dollars and \$2.5 billion in year-of-expenditure dollars. Appendix 6 explains the changes made to the revision 2 baseline.

In developing the revised baseline resources plan, four types of estimates were used; these are defined in Table 3. Escalation and contingency rates consistent with DOE guidelines have been included. The annual escalation rate used was 4.5 percent, compared to 3.8 percent used in revision 2. Contingency for the out years beyond the five-year plan time frame is approximately 10 percent.

Reviews have indicated there are apparently no serious alternatives to technology currently available for use on FUSRAP sites.

### Cost Estimating Assumptions

Major cost estimating assumptions were made in conjunction with those made for scheduling purposes. In addition to the key assumptions described in the Technical Plan, the following specific assumptions were used for pricing the development of disposal sites:

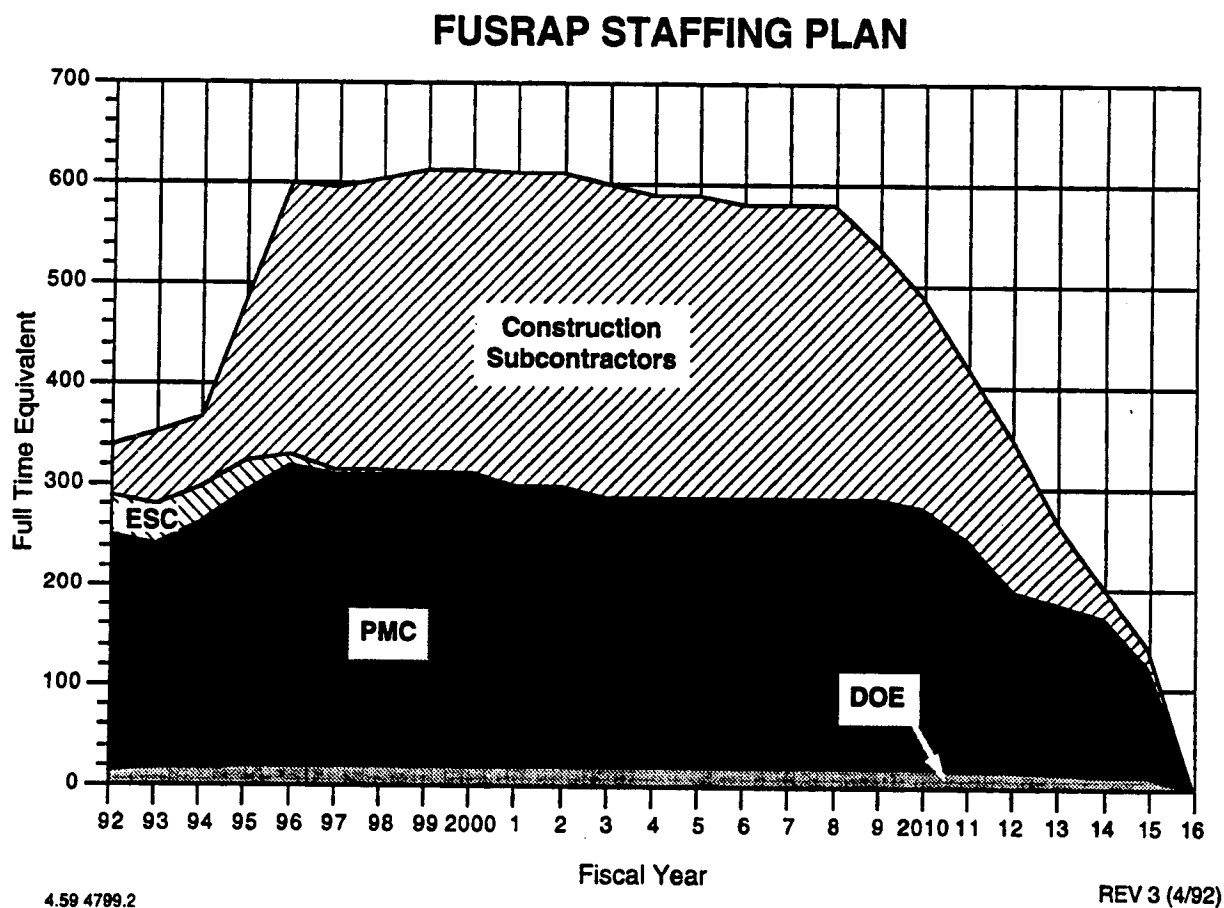
1. Missouri waste will be placed in final storage at SLAPS.
2. Waste from New Jersey sites will be placed in final storage in a New Jersey disposal site within 100 miles of the sites.
3. Some of the Seaway waste will remain in situ and a permanent disposal site will be constructed at Seaway for waste from the New York sites (except for waste from Colonie, which will go to Hanford).
4. Maryland waste will be placed in a permanent disposal site within 200 miles of the W. R. Grace site.

5. Surveillance and maintenance of storage sites will continue through program completion.
6. Program costs will end with completion of response actions.

### FUSRAP STAFFING PLAN

OR has allocated 14 full-time equivalent positions in FY 1992 for direct administration of FUSRAP. These manpower numbers exclude support by other OR staff. DOE FUSRAP staff will also be supported by approximately 234 equivalent PMC and designated subcontractor personnel and 40 ESC and technical support contractor personnel.

The FUSRAP staffing plan is shown below:



### CONTROLLED ITEMS

Technical controls are established for FUSRAP remedial action activities through identification of site-specific cleanup standards. These standards are established by Headquarters in accordance with requirements contained in regulations and DOE orders and guidelines. Headquarters ensures attainment of these standards by using independent contractors to verify that remedial action objectives are achieved.

Additional controls are established for the program through the implementation of change control procedures, which encompass program scope, cost, and schedule. Scope, cost, and schedule variance thresholds by management level are provided below:

#### **THRESHOLD CHANGE CONTROL FOR ACQUISITION EXECUTIVE**

- Change in program completion date greater than 6 months
- Change with impact of \$50 million or greater\*
- Major change in scope or criteria

#### **THRESHOLD CHANGE CONTROL FOR HEADQUARTERS-EM**

- Change in program completion date or Level 1-controlled milestone greater than 3 months - EM-40
- Change in scope involving new sites, vicinity properties, cleanup requirements, or types of waste - EM-421
- Change to Activity Data Sheet allocation of funds exceeding 5 percent of annual budget - EM-421
- Changes in annual Headquarters milestone greater than 2 months - EM-421

#### **THRESHOLD CHANGE CONTROL FOR OR-PROJECT MANAGER, FSRD**

- Change in TEC or contractor funding allocation by site
- Change in annual OR milestone greater than 1 month
- Change to contractor work plan

\* Cost changes:

(1) Any change of \$50 million or greater that does not change the scope of work or TEC/TPC will go to the Director, Office of Procurement, Assistance, and Program Management (PR-1) for disposition. PR-1 may or may not call for an ESAAB, depending on the situation.

(2) Any change of \$50 million or greater that changes the program scope will be presented to the ESAAB.

**SCHEDULED DECISION POINTS**

Key decision and approval points for the project are listed below, together with the level of approval required. Annual reviews will be performed by ESAAB.

<b><u>Authority</u></b>	<b><u>Description</u></b>	<b><u>Schedule</u></b>
Acquisition Executive	Approve Project Plan (Rev. 3)	As Appropriate
Director, Office of Eastern Area Programs	Approve selection of preferred option for remedial action and disposal site for each remedial action site; certify sites after remedial action	As appropriate
Assistant Secretary for Environment, Safety and Health	Determine level of NEPA documentation when site not covered by Section D of DOE NEPA implementing procedures (10 CFR 1021) or when requested by the Assistant Secretary for Environmental Restoration and Waste Management	As appropriate
Assistant Secretary for Environment, Safety, and Health	Concur on environmental assessments and approve environmental impact statements; approve (for environmental content only) NEPA RODs; concur on CERCLA RODs	As appropriate
Deputy Assistant Secretary for Environmental Restoration	Designate additional sites for remedial action	As appropriate
Assistant Secretary for Environmental Restoration and Waste Management	Approve selection of all remedial actions and sign records of decision for NPL sites	As required by project schedule
Acquisition Executive	Approve termination of project	September 2016

**ACRONYMS**

AEA	Atomic Energy Act
AEC	Atomic Energy Commission
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
BNI	Bechtel National, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSCSC	cost and schedule control system criteria
DOEAP	Director, Office of Eastern Area Programs
DOE	Department of Energy
EA	environmental assessment
EE/CA	engineering evaluation/cost analysis
EPA	Environmental Protection Agency
ESAAB	Energy Systems Acquisition Advisory Board
ESC	environmental studies contractor
FFA	federal facilities agreement
FS-EIS	feasibility study-environmental impact statement
FSRD	Former Sites Restoration Division
FTE	full-time equivalent
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
HISS	Hazelwood Interim Storage Site
HQ	DOE Headquarters
IVC	independent verification contractor
MED	Manhattan Engineer District



**ACRONYMS**

(continued)

NEPA	National Environmental Policy Act
NFSS	Niagara Falls Storage Site
NPL	National Priorities List
OR	DOE Oak Ridge Field Office
ORNL	Oak Ridge National Laboratory
PMC	project management contractor
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	record of decision
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SFMP	Surplus Facilities Management Program
SLAPS	St. Louis Airport Site
SLDS	St. Louis Downtown Site
TEC	total estimated cost
TPC	total project cost
WBS	work breakdown structure
WCS	waste containment structure

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**PROJECT PLAN**

**APPENDICES**

# FUSRAP BASELINE SCHEDULE REVISION 3 - APRIL 1992

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WBS ACTIVITY	FISCAL YEAR																									YR-OF-EXP \$1 = \$1,000
	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	
<b>NEW YORK SITES</b>																										
155 NEW YORK DISPOSAL SITE																										67,293
103 ASHLAND 1																										13,588
123 SEAWAY INDUSTRIAL PARK																										14,993
129 LINDE AIR PRODUCTS																										25,447
132 ASHLAND 2																										10,754
139 COLONIE																										79,343
145 BAKER & WILLIAMS WAREHOUSES																										2,954
115 NFSS VICINITY PROPERTIES																										22,880
158 NIAGARA FALLS STORAGE SITE																										35,542
<b>NEW JERSEY SITES</b>																										
154 NEW JERSEY DISPOSAL SITE																										168,865
117 MIDDLESEX MUNICIPAL LANDFILL																										5,347
118 MIDDLESEX SAMPLING PLANT																										42,865
137 WAYNE																										79,674
138 MAYWOOD																										219,101
144 NEW BRUNSWICK																										18,451
108 DUPONT & COMPANY																										31,189
<b>MISSOURI SITES</b>																										
153 ST. LOUIS AIRPORT SITE																										265,926
116 ST. LOUIS DOWNTOWN SITE																										169,774
134 ST. LOUIS AIRPORT SITE VPs																										72,993
140 LATTY AVENUE PROPERTIES																										56,253
<b>OTHER SITES</b>																										
157 MARYLAND DISPOSAL SITE																										105,374
110 W. R. GRACE & COMPANY																										35,788
<div> <div></div> PLANNING, ENVIRONMENTAL COMPLIANCE, AND DESIGN <div></div> DEVELOPMENT, OPERATION, AND CLOSURE <div></div> REMEDIAL ACTION (EXCLUDES POST-REMEDIAL ACTION REPORT &amp; CERTIFICATION DOCKET) <div></div> SURVEILLANCE </div>																										


APPENDIX 1


# FUSRAP BASELINE SCHEDULE (Cont.)


## REVISION 3 - APRIL 1992


PAGE 2 OF 2

WBS ACTIVITY	FISCAL YEAR																								YR-OF-EXP \$1 = \$1,000	
	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15		16
OTHER SITES (CONT)																										
101 ACID/PUEBLO CANYON, NM	COMPLETED																									1,039
102 ALBANY RESEARCH CENTER, OR	COMPLETED																									9,489
104 BAYO CANYON, NM	COMPLETED																									503
105 CHUPADERA MESA, NM	COMPLETED																									45
114 KELLEX / PIERPONT, NJ	COMPLETED																									426
119 NATIONAL GUARD ARMORY, IL	COMPLETED																									1,520
121 PALOS PARK, IL	TRANSFERRED																									925
125 SHPACK LANDFILL, MA																										30,363
126 ALIQUIPPA FORGE, PA																										3,631
127 VENTRON, MA																										37,307
130 UNIVERSITY OF CALIFORNIA, CA	COMPLETED																									68
131 UNIVERSITY OF CHICAGO, IL	COMPLETED																									1,139
141 GENERAL MOTORS, MI																										5,007
142 SEYMOUR SPECIALTY WIRE, CT																										2,618
143 ELZA GATE, TN	COMPLETED																									5,639
190 TECHNOLOGY & SYSTEMS STUDIES																										11,101
191 GENERAL PROJECT SUPPORT																										250,926
192 CAPITAL EQUIPMENT																										6,261
193 GENERAL PROGRAM SUPPORT																										141,263
CONTINGENCY																										174,324
RISK AND UNCERTAINTY																										272,012
																										2,500,000

 PLANNING, ENVIRONMENTAL COMPLIANCE AND DESIGN

 DEVELOPMENT, OPERATION, AND CLOSURE

 REMEDIAL ACTION (EXCLUDES POST-REMEDIAL ACTION REPORT & CERTIFICATION DOCKET)

 SURVEILLANCE

 PLANNING, ENVIRONMENTAL COMPLIANCE AND DESIGN

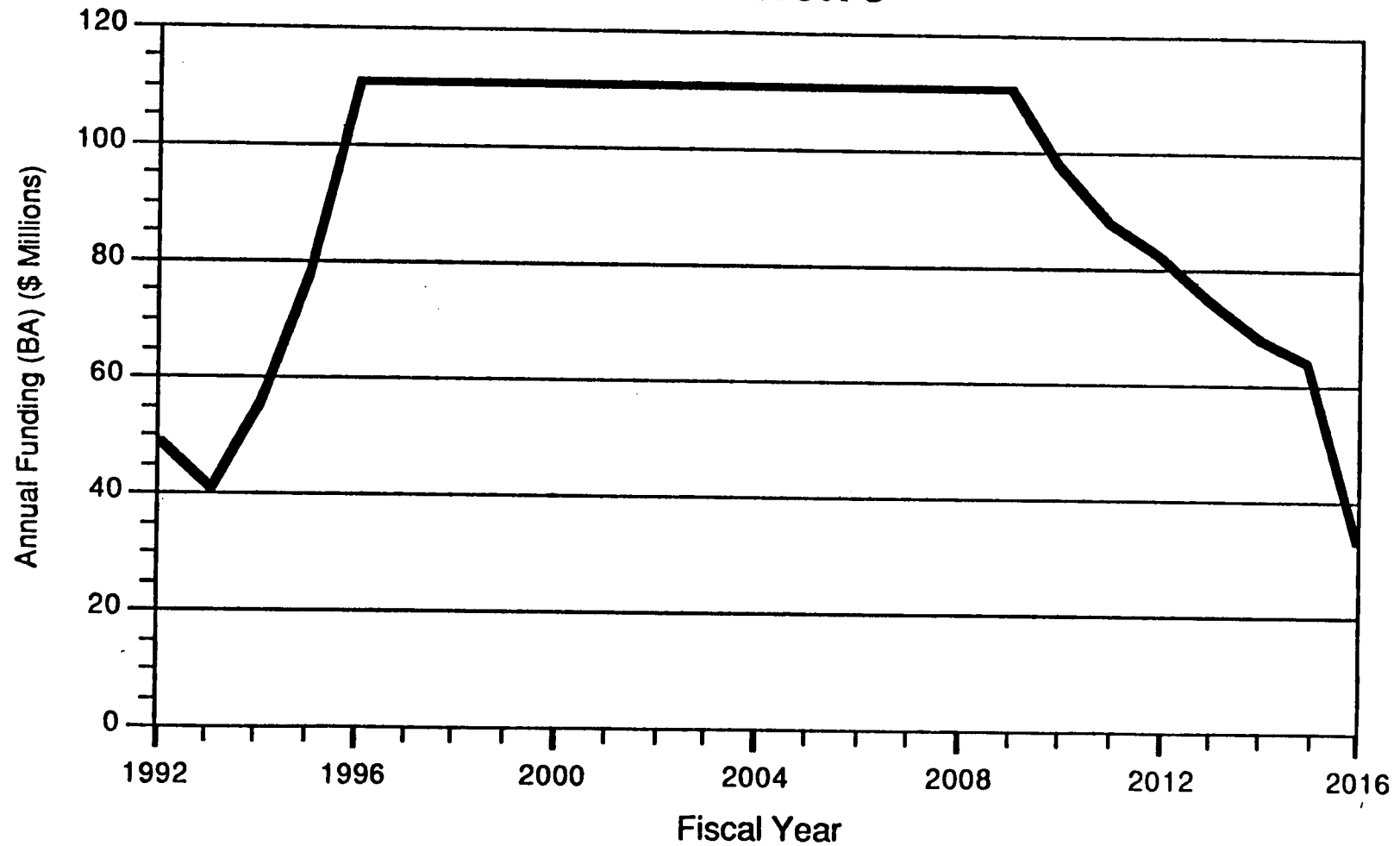
 DEVELOPMENT, OPERATION, AND CLOSURE

 REMEDIAL ACTION (EXCLUDES POST-REMEDIAL ACTION REPORT & CERTIFICATION DOCKET)

 SURVEILLANCE

# BASELINE RESOURCES PLAN

## REVISION 3



2-1

**BASELINE RESOURCES PLAN - DETAIL OF OBLIGATIONS (BA) FOR ALL WBS LEVEL 2 ELEMENTS  
(YEAR OF OBLIGATION DOLLARS IN THOUSANDS)**

REV 3 (3/92)

WBS	DESCRIPTION	PRIOR YEARS	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	TOTAL
Site 155	- New York Disposal Site	2,873	262	48	3,227	9,617	8,784	9,179	9,592	10,756	2,823	446	466	487	509	532	556	581	607	634	663	692	724	756	790	826	863	67,293
Site 103	- Ashland 1	2,045	411	83	0	452	10,351	100	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13,588
Site 123	- Seaway Industrial Park	1,003	391	83	0	452	6,385	6,423	104	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,993
Site 129	- Linde Air Products	3,597	712	1,199	1,166	1,969	5,515	7,114	3,907	109	159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,447
Site 132	- Ashland 2	1,594	399	83	0	0	0	307	4,057	4,034	114	166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,754
Site 139	- Colonie	12,517	8,733	9,667	14,525	12,419	10,265	6,605	4,037	776	159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79,343
Site 145	- Baker/Williams Warehouses	473	280	1,986	87	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79,343
Site 115	- NFSS (Vic Prop)	22,880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,954
Site 158	- Niagara Falls Storage Site	0	1,792	1,287	4,046	5,953	3,659	599	626	655	684	715	747	781	816	852	891	931	973	1,017	1,062	1,110	1,160	1,212	1,267	1,324	1,383	35,542
Site 154	- New Jersey Disposal Site	274	0	0	705	3,669	4,834	5,108	3,654	5,758	12,112	11,259	11,765	12,295	12,846	13,426	14,030	14,662	11,277	12,921	6,592	5,308	3,135	756	790	826	863	168,865
Site 117	- Middlesex Landfill	5,347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,347
Site 118	- Middlesex Sampling Plant	13,833	1,773	512	535	1,092	584	611	638	667	917	5,170	5,921	9,464	950	198	0	0	0	0	0	0	0	0	0	0	0	42,865
Site 137	- Wayne	12,986	3,430	2,103	1,164	473	495	517	540	565	590	847	4,223	4,161	704	735	769	1,628	14,432	14,193	8,834	4,616	1,387	282	0	0	0	79,674
Site 138	- Maywood	20,160	2,174	2,662	811	536	560	586	612	640	1,311	13,159	16,368	27,717	13,716	19,186	23,677	24,743	17,148	18,031	8,834	4,616	1,572	282	0	0	0	219,101
Site 144	- New Brunswick	240	1,488	136	142	639	618	162	189	177	185	193	202	857	6,534	6,344	148	217	0	0	0	0	0	0	0	0	0	18,451
Site 108	- DuPont & Company	362	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	1,205	610	16,206	12,196	202	295	0	0	31,189
Site 153	- St. Louis Airport Site	6,197	1,042	516	456	1,108	11,928	13,403	12,965	18,992	23,118	21,632	22,760	20,539	24,962	23,081	13,966	21,193	10,243	7,211	5,963	692	724	756	790	826	863	265,926
Site 116	- St. Louis Downtown Site	6,040	2,219	1,565	1,031	854	873	9,493	15,588	12,055	12,597	13,164	13,756	519	14,886	10,382	17,701	15,937	10,112	10,567	177	258	0	0	0	0	0	169,774
Site 134	- SLAPS (Vic Prop)	5,237	1,777	1,717	2,367	1,737	6,313	8,148	2,743	2,866	2,995	3,130	3,271	6,774	6,984	7,298	9,254	155	227	0	0	0	0	0	0	0	0	72,993
Site 140	- Latty Avenue Properties	8,063	1,674	1,661	1,652	1,675	1,732	299	6,302	13,981	13,359	5,192	481	182	0	0	0	0	0	0	0	0	0	0	0	0	0	56,253
Site 157	- Maryland Disposal Site	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,289	6,502	4,975	12,807	6,476	10,204	20,406	17,372	19,634	5,709	105,374
Site 110	- W. R. Grace & Company	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,023	217	642	1,260	15,536	14,468	552	35,788
Site 101	- Acid/Pueblo Canyon	1,039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,039
Site 102	- Albany Research Center	9,000	489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,489
Site 104	- Bayo Canyon	503	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503
Site 105	- Chupadera Mesa	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
Site 114	- Kellex/Pierpont	426	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	426
Site 119	- National Guard Armory	1,520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,520
Site 121	- Palos Park	925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	925
Site 125	- Shpack Landfill	1,190	1,135	401	7,672	14,230	5,595	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30,363
Site 126	- Alliquippa Forge	302	2,090	1,117	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,631
Site 127	- Ventron	1,546	1,351	484	454	598	7,075	15,509	10,022	109	159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37,307
Site 130	- University of California	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68
Site 131	- University of Chicago	1,139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,139
Site 141	- General Motors	107	59	0	1,959	444	2,192	100	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,007
Site 142	- Seymour Specialty Wire	96	816	1,584	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,618
Site 143	- Elza Gate	2,537	2,872	230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,639
WB 190	- Technology & Systems	11,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,101
WB 191	- General Project Support	33,146	9,055	9,501	10,982	10,793	10,232	9,571	8,816	6,124	6,399	6,687	6,988	7,303	7,631	7,975	8,334	8,709	9,101	9,510	9,938	10,385	10,853	11,341	8,889	6,192	6,471	250,926
WB 192	- Capital Equipment	2,309	100	100	100	114	119	125	130	136	142	149	155	162	170	177	185	194	202	211	221	231	241	252	198	138	0	6,261
WB 193	- General Program Support	21,584	2,767	2,175	2,175	1,959	1,902	1,863	1,830	4,321	4,515	4,718	4,931	5,153	5,384	5,627	5,880	6,145	6,421	6,710	7,012	7,327	7,657	8,002	8,271	4,370	4,564	141,263
SUBTOTAL		214,394	49,000	40,900	55,500	70,911	100,011	95,962	86,624	82,873	82,338	86,627	92,034	96,394	96,092	95,813	95,391	96,384	87,289	87,185	65,736	58,134	50,495	45,507	52,198	48,604	21,268	2,053,664
Contingency		0	0	0	0	5,588	7,489	11,038	9,375	8,126	8,662	9,372	8,968	9,606	9,907	10,186	10,609	9,615	8,711	8,814	7,264	4,865	6,505	4,492	5,802	5,395	3,937	174,324
Risk & Uncertainty		0	0	0	0	1,501	3,500	4,000	15,001	20,001	20,000	15,001	10,000	5,000	5,001	5,001	5,000	5,001	15,000	15,001	25,000	25,001	25,000	25,001	10,000	10,001	8,001	272,012
GRAND TOTAL		214,394	49,000	40,900	55,500	78,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	98,000	88,000	82,000	75,000	68,000	64,000	33,206	2,500,000

**BASELINE RESOURCES PLAN - DETAIL OF OBLIGATIONS (BA)**  
**WITH GENERAL PROJECT COSTS, CONTINGENCY, AND RISK & UNCERTAINTY ALLOCATED TO THE REMEDIAL ACTION AND DISPOSAL SITES\***  
**(YEAR OF OBLIGATION DOLLARS IN THOUSANDS)**

REV 3 (3/92)

WBS	DESCRIPTION	PRIOR YEARS	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	TOTAL
Site 155	- New York Disposal Site	4,251	346	67	4,240	12,923	11,110	12,071	14,037	16,515	4,396	659	647	645	681	720	762	793	941	995	1,338	1,515	1,870	2,188	1,458	1,395	2,800	99,363
Site 103	- Ashland 1	3,026	543	117	0	607	13,092	132	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,731
Site 123	- Seaway Industrial Park	1,484	517	117	0	607	8,076	8,447	152	233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,633
Site 129	- Linde Air Products	5,322	941	1,684	1,532	2,646	6,976	9,356	5,718	167	247	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,589
Site 132	- Ashland 2	2,358	527	117	0	0	0	404	5,937	6,194	177	245	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,959
Site 139	- Colonie	18,519	11,066	13,576	19,083	16,888	12,984	8,686	5,908	1,192	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107,950
Site 145	- Baker/Williams Warehouses	700	370	2,789	114	172	0	0	0	0	0	0	0	172	0	0	0	0	0	0	0	0	0	0	0	0	0	4,145
Site 115	- NFSS (Vic Prop)	33,850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33,850
Site 158	- Niagara Falls Storage Site	0	2,368	1,807	5,316	8,000	4,628	788	916	1,006	1,065	1,057	1,037	1,035	1,093	1,153	1,221	1,271	1,509	1,595	2,143	2,430	2,996	3,508	2,339	2,236	4,488	57,005
Site 154	- New Jersey Disposal Site	405	0	0	926	4,930	6,114	6,718	5,347	8,841	18,861	16,647	16,332	16,290	17,199	18,167	19,228	20,009	17,491	20,271	13,302	11,622	8,098	2,188	1,458	1,395	2,800	254,639
Site 117	- Middlesex Landfill	7,911	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,911
Site 118	- Middlesex Sampling Plant	20,466	2,343	719	703	1,467	739	804	934	1,024	1,428	7,644	8,219	12,539	1,272	268	0	0	0	0	0	0	0	0	0	0	0	60,569
Site 137	- Wayne	19,213	4,534	2,953	1,529	636	626	680	790	868	919	1,252	5,862	5,513	943	995	1,054	2,222	22,386	22,266	17,826	10,107	3,583	816	0	0	0	127,573
Site 138	- Maywood	29,827	2,873	3,738	1,066	720	708	771	896	983	2,041	19,457	22,722	36,725	18,364	25,960	32,449	33,767	26,597	28,287	17,826	10,107	4,061	816	0	0	0	320,761
Site 144	- New Brunswick	355	1,966	191	187	859	782	213	247	272	288	285	280	1,135	8,748	8,584	203	296	0	0	0	0	0	0	0	0	0	24,891
Site 108	- DuPont & Company	536	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	1,890	1,231	35,485	31,505	585	545	0	0	71,936
Site 153	- St. Louis Airport Site	9,168	1,377	725	599	1,489	15,086	17,626	18,974	29,160	36,000	31,985	31,596	27,214	33,419	31,230	19,141	28,922	15,887	11,313	12,033	1,515	1,870	2,188	1,458	1,395	2,800	384,170
Site 116	- St. Louis Downtown Site	8,936	2,933	2,198	1,355	1,148	1,104	12,484	22,812	18,510	19,616	19,464	19,096	688	19,930	14,048	24,259	21,749	15,684	16,578	357	565	0	0	0	0	0	243,514
Site 134	- SLAPS (Vic Prop)	7,748	2,348	2,411	3,110	2,334	7,985	10,716	4,014	4,401	4,664	4,628	4,541	8,975	9,351	9,875	12,683	212	352	0	0	0	0	0	0	0	0	100,348
Site 140	- Latty Avenue Properties	11,929	2,212	2,333	2,170	2,251	2,191	393	9,223	21,467	20,802	7,677	668	241	0	0	0	0	0	0	0	0	0	0	0	0	0	83,557
Site 157	- Maryland Disposal Site	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,759	10,085	7,805	25,844	14,179	26,359	59,064	32,065	33,151	18,527	228,838
Site 110	- W. R. Grace & Company	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,100	475	1,658	3,647	28,677	24,428	1,791	68,909
Site 101	- Acid/Pueblo Canyon	1,039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,039
Site 102	- Albany Research Center	13,315	646	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13,961
Site 104	- Bayo Canyon	503	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503
Site 105	- Chupadera Mesa	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
Site 114	- Kellex/Pierpont	426	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	426
Site 119	- National Guard Armory	2,249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,249
Site 121	- Palos Park	925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	925
Site 125	- Shiprock Landfill	1,761	1,500	562	10,080	19,122	7,077	184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,286
Site 126	- Aliquippa Forge	447	2,783	1,569	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,939
Site 127	- Ventron	2,287	1,785	680	596	804	8,949	20,395	14,667	167	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50,578
Site 130	- University of California	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68
Site 131	- University of Chicago	1,139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,139
Site 141	- General Motors	158	78	0	2,574	597	2,773	132	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,526
Site 142	- Seymour Specialty Wire	142	1,078	2,224	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,604
Site 143	- Elza Gate	3,753	3,795	323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,871
<b>PRORATED TOTAL</b>		<b>214,394</b>	<b>49,000</b>	<b>40,900</b>	<b>55,500</b>	<b>78,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>111,000</b>	<b>98,000</b>	<b>88,000</b>	<b>82,000</b>	<b>75,000</b>	<b>68,000</b>	<b>64,000</b>	<b>33,206</b>	<b>2,500,000</b>

\* GENERAL PROJECT COSTS INCLUDE WBS 190, 191, 192, 193, CONTINGENCY, & RISK & UNCERTAINTY

**BASELINE RESOURCES PLAN - DETAIL OF OBLIGATIONS (BA)**  
**WITH GENERAL PROJECT, CONTINGENCY, RISK & UNCERTAINTY, AND DISPOSAL SITE COSTS ALLOCATED TO THE REMEDIAL ACTION SITES\***  
**(YEAR OF OBLIGATION DOLLARS IN THOUSANDS)**

WBS	DESCRIPTION	PRIOR YEARS	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	TOTAL
Site 103	- Ashland 1	5,768	767	160	2,735	8,945	20,260	7,920	9,270	10,655	2,836	425	417	418	440	464	492	512	607	642	863	978	1,207	1,412	941	900	1,807	81,839
Site 123	- Seaway Industrial Park	1,484	517	117	0	607	8,076	8,447	152	233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,633
Site 129	- Linde Air Products	6,197	1,012	1,698	2,405	5,306	9,263	11,841	8,607	3,567	1,152	136	133	133	140	148	157	163	194	205	275	312	385	450	300	287	576	55,042
Site 132	- Ashland 2	2,992	579	127	632	1,926	1,655	2,202	8,029	8,655	832	344	96	96	102	107	114	118	140	148	199	226	279	326	217	208	417	30,766
Site 139	- Colonie	18,519	11,067	13,575	19,082	16,688	12,984	8,686	5,908	1,192	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107,949
Site 145	- Baker/Williams Warehouses	700	370	2,789	114	172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,145
Site 115	- NFSS (Vic Prop)	33,851	2,368	1,807	5,316	8,000	4,628	788	916	1,008	1,065	1,057	1,037	1,035	1,093	1,153	1,221	1,271	1,509	1,595	2,143	2,430	2,996	3,508	2,339	2,236	4,488	90,856
Site 117	- Middlesex Landfill	7,933	0	0	50	267	331	363	289	478	1,020	901	884	881	930	983	1,040	1,082	946	1,097	720	629	438	118	79	75	151	21,685
Site 118	- Middlesex Sampling Plant	20,506	2,343	719	795	1,956	1,345	1,469	1,464	1,901	3,298	9,294	9,839	14,154	2,977	2,069	1,906	1,984	1,734	2,009	1,319	1,152	803	217	145	138	278	85,814
Site 137	- Wayne	19,289	4,533	2,953	1,704	1,567	1,781	1,949	1,801	2,538	4,482	4,398	8,948	8,591	4,192	4,427	4,687	6,002	25,689	26,096	20,340	12,302	5,113	1,230	276	264	529	175,681
Site 138	- Maywood	30,089	2,873	3,738	1,668	3,925	4,683	5,137	4,372	6,730	14,301	30,278	33,339	47,313	29,543	37,769	44,948	46,774	37,968	41,465	26,473	17,662	9,325	2,239	948	907	1,820	486,287
Site 144	- New Brunswick	358	1,966	191	194	897	829	265	289	341	435	415	408	1,283	8,882	8,726	353	452	136	158	104	91	63	17	11	11	22	26,877
Site 108	- DuPont & Company	536	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	1,890	1,231	35,482	31,504	585	545	0	0	0	71,932
Site 153	- St. Louis Airport Site	2431	365	192	159	395	4000	4673	5030	7731	9544	8479	8376	7215	8860	8280	5074	7668	4212	2999	3190	402	496	580	387	370	742	101,850
Site 116	- St. Louis Downtown Site	11736	3353	2419	1538	1802	5712	17868	28606	27415	30611	29232	28745	8999	30137	23586	30105	30582	20536	20033	4032	1028	571	668	445	426	855	360,840
Site 134	- SLAPS (Vic Prop)	9634	2632	2560	3233	2640	11089	14342	7918	10400	12070	11208	11041	14574	16226	18300	16620	6162	3621	2327	2475	312	385	450	300	287	576	179,382
Site 140	- Latty Avenue Properties	13981	2520	2495	2305	2584	5566	4337	13468	27991	28858	14833	7737	6330	7478	6988	4283	6471	3555	2531	2692	339	418	490	326	312	627	169,515
Site 110	- W. R. Grace & Company	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1759	10085	7805	31944	14655	28017	62710	60741	57579	20318	295,746
Site 101	- Acid/Pueblo Canyon	1039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,039
Site 102	- Albany Research Center	13315	646	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13,961
Site 104	- Bayo Canyon	503	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503
Site 105	- Chupadera Mesa	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
Site 114	- Kellex/Pierpont	426	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	426
Site 119	- National Guard Armory	2249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,249
Site 121	- Palos Park	925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	925
Site 125	- Shpack Landfill	1761	1500	563	10080	19122	7077	184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,287
Site 126	- Alliquippa Forge	447	2762	1569	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,938
Site 127	- Ventron	2287	1785	680	596	804	8949	20397	14667	167	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50,580
Site 130	- University of California	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68
Site 131	- University of Chicago	1139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,139
Site 141	- General Motors	158	78	0	2574	597	2773	132	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,526
Site 142	- Seymour Specialty Wire	142	1078	2224	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,604
Site 143	- Elza Gate	3753	3795	323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,871
PRORATED TOTAL		214,394	49,000	40,899	55,500	78,000	111,001	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	111,000	98,000	88,000	82,000	75,000	68,000	64,000	33,206	2,500,000

\* GENERAL PROJECT COSTS INCLUDE WBS 190, 191, 192, 193, CONTINGENCY, RISK & UNCERTAINTY, & DISPOSAL SITES 153, 154, 155, 157, & 158



# **BASELINE COST COMPARISON** (Millions of Dollars)

	<u>FY 1992 Dollars</u>		<u>YOE Dollars</u>	
	<u>Revision 2</u>	<u>Revision 3</u>	<u>Revision 2</u>	<u>Revision 3</u>
<b>WBS Direct Accounts</b>				
New York Sites	158	228	151	273
New Jersey Sites	267	333	281	565
Missouri Sites	175	378	187	565
Other Sites	<u>86</u>	<u>162</u>	<u>93</u>	<u>241</u>
Subtotal	686	1,101	712	1,644
Management Support	157	273	153	410
Contingency	<u>84</u>	<u>95</u>	<u>95</u>	<u>174</u>
Subtotal	927	1,469	960	2,228
Risk and Uncertainty Assessment	<u>405<sup>*</sup></u>	<u>146</u>	<u>420<sup>*</sup></u>	<u>272</u>
	1,332	1,615	1,380	2,500

\* Risk and uncertainty assessment was proposed to be added to the baseline in December 1988.

REV 3 (4/92)