

FUDS Overview and Perspective on DoD Research & Development Needs for Environmental Restoration

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US Army Corps of Engineers
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14. ABSTRACT The Formerly Used Defense Site (FUDS) program is a unique program that consolidates eligible, formerly used, DoD sites from any of the 3 services under a single program for environmental restoration purposes. FUDS properties are no longer owned by DoD. Ownership of FUDS properties has been transferred to either private entities; or other federal, state, or local government entities. The scale of the program is indicated by the total cost to complete estimate from FY 2011 (\$2.8B). The goal for FUDS IRP is to achieve RC at 90% of the projects by the end of FY 2018. Response complete has been achieved on approximately 59% of all projects. Projects within the FUDS program generally have similar environmental restoration needs and challenges as that of the IRP projects from the 3 DoD services. Persistent chloroethenes plumes are prevalent. Ex-situ groundwater treatment systems are in operation on some of the sites, but progress towards achieving RC appears be very slow on many of the sites with operational groundwater treatment systems. Renewed emphasis on LTMO, and optimization of remedies already in place (with emphasis on green and sustainable methods) are among the important R&D needs that have been identified.					
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FUDS OVERVIEW AND PERSPECTIVE ON DoD RESEARCH AND DEVELOPMENT NEEDS FOR ENVIRONMENTAL RESTORATION

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The Formerly Used Defense Site (FUDS) program is a unique program that consolidates eligible, formerly used, DoD sites from any of the 3 services under a single program for environmental restoration purposes. FUDS properties are no longer owned by DoD. Ownership of FUDS properties has been transferred to either private entities; or other federal, state, or local government entities. The scale of the program is indicated by the total cost to complete estimate from FY 2011 (\$2.8B). The goal for FUDS IRP is to achieve RC at 90% of the projects by the end of FY 2018. Response complete has been achieved on approximately 59% of all projects.

Projects within the FUDS program generally have similar environmental restoration needs and challenges as that of the IRP projects from the 3 DoD services. Persistent chloroethenes plumes are prevalent. Ex-situ groundwater treatment systems are in operation on some of the sites, but progress towards achieving RC appears be very slow on many of the sites with operational groundwater treatment systems. Renewed emphasis on LTMO, and optimization of remedies already in place (with emphasis on green and sustainable methods) are among the important R&D needs that have been identified.

FUDS Overview & Perspective

- Purpose:
 - ▶ Overview of FUDS Program & Goals
 - ▶ Offer FUDS Perspective on Environmental Restoration (ER) R&D Needs
- Objective:
 - ▶ To ensure that FUDS ER R&D needs are taken into consideration



FUDS is a Different Animal

- The FUDS Program is separate from the Army IRP Program
- The Department of Defense does not own the property that FUDS is cleaning up
- The FUDS Program cleans up only DoD generated pollution which occurred before transfer of property to private owners, or federal, state or local government owners
- We do not certify that the property is clean
- We rarely have a project office on site
- We work hand in hand with current property owners and regulators on cleanup efforts



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FUDS Property Eligibility

- For a Property to be FUDS eligible:
 - ▶ Under the jurisdiction of the Secretary, AND
 - ▶ One of the following:
 - Owned by;
 - Leased to; or
 - Otherwise possessed by.
- Transferred from DoD prior to 17 October 1986
- Meeting eligibility criteria makes the property eligible for DERA funding



FUDS Properties

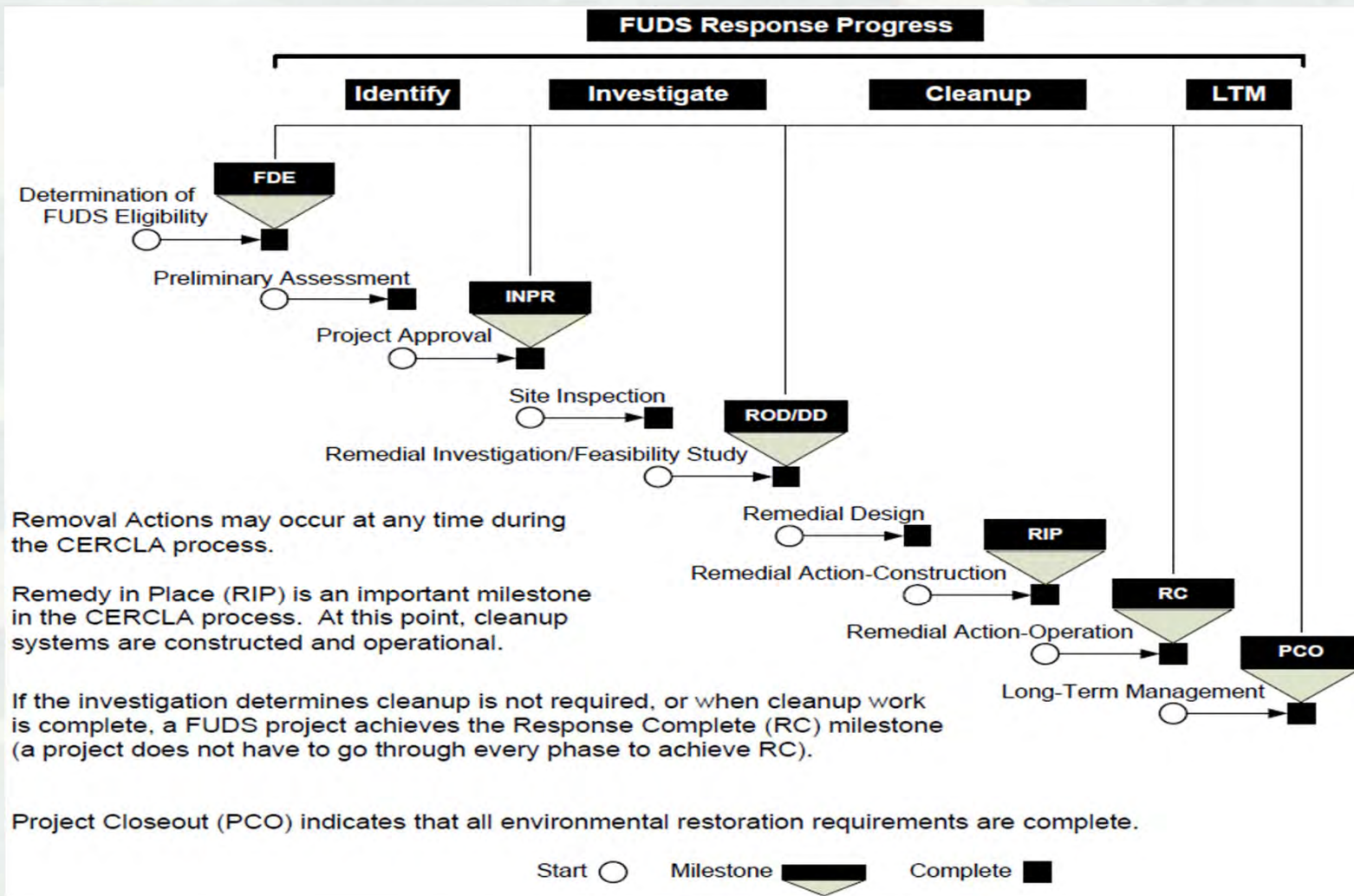
Prevalent Property Categories

- Former Nike Missile Sites ~ 270
- Former Army Airfields ~ 240
- Former AFBs ~ 100
- Former Atlas Missile sites (D, E & F) ~ 100
- Former Titan Missile sites ~ 29
- Others
 - ▶ Former Ammunition Depots, Ordnance Plants, Radar Stations, etc





FUDS HTRW and MMRP Projects Follow CERCLA



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FUDS Perspective for Meeting New DERP Goals

- New DERP Goals on Response Complete
 - ▶ 90% of IRP* sites achieving RC by end of FY 2018, and
 - ▶ 95% of IRP* sites achieving RC by end of FY2021

*FUDS HTRW and CON/HTRW sites are referred to as IRP although they are no longer owned by DoD & do not function as installations.



FUDS Perspective for Meeting New DERP Goals

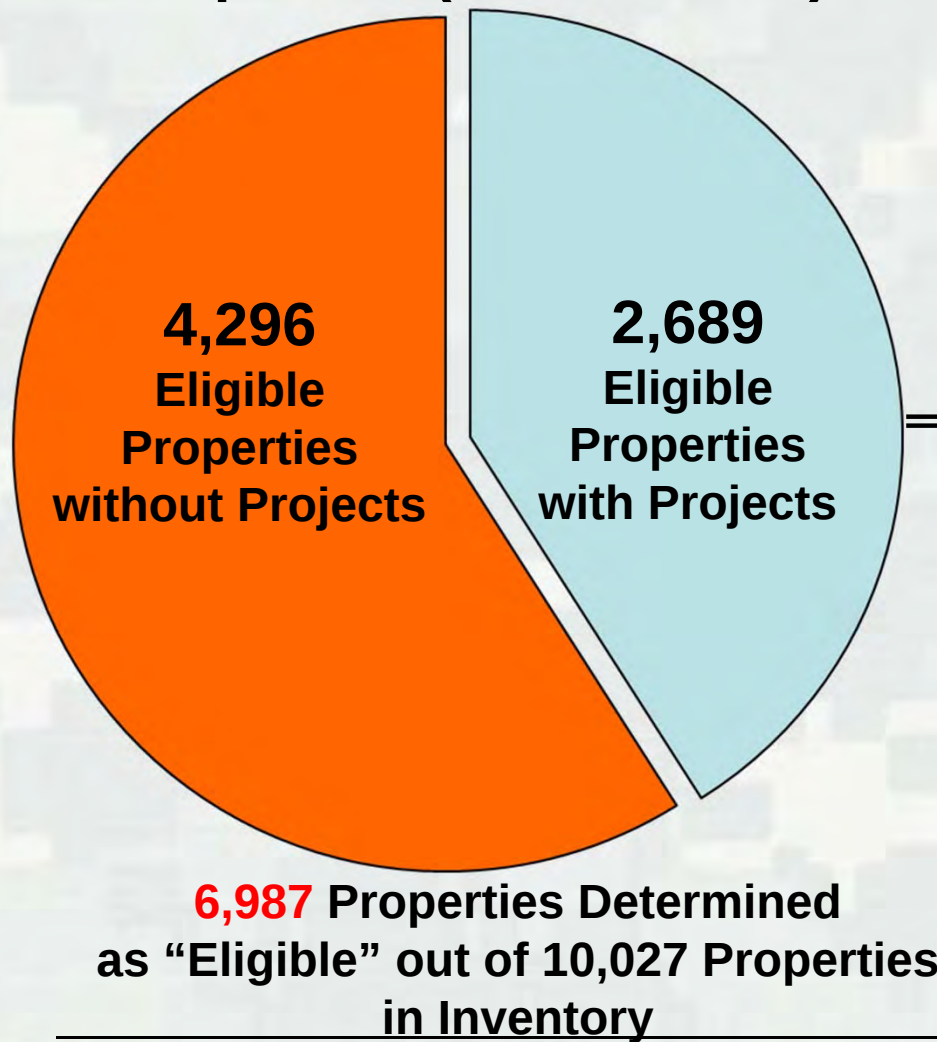
- FUDS Program Perspective Projection Based on FY12-16 POM, CTC12, and MMRP Annual Cap at \$82M
 - If no reduction in future Program Objective Memorandums for FY13-21 and no increase in IRP cost requirements, we may be able to achieve:
 - ▶ 91.7% of IRP site RCs by end of FY 2018, and
 - ▶ 96.5% of IRP site RCs by end of FY2021



Scope of FUDS Program

(Data Source: 2010 Report To Congress)

Properties (Installations)



Projects (Sites)



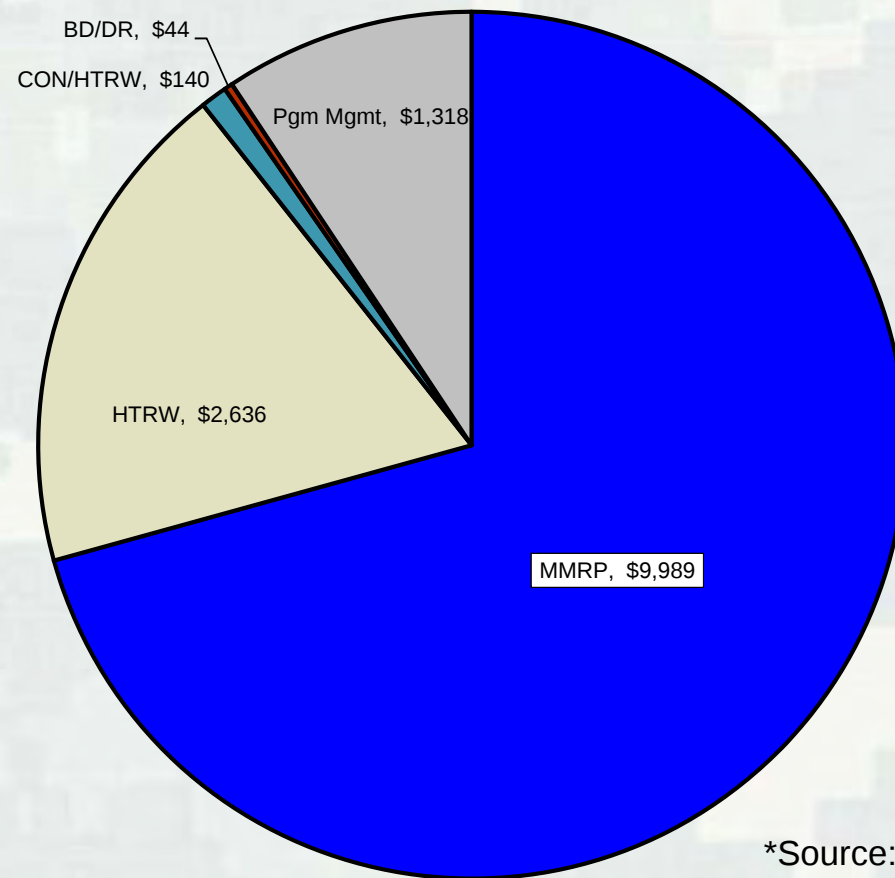
4,624 Eligible Projects at 2,689 Eligible Properties



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FUDS Cost-to-Complete (\$M) Profile

(Total CTC, FY11 and Beyond = \$14.1B)

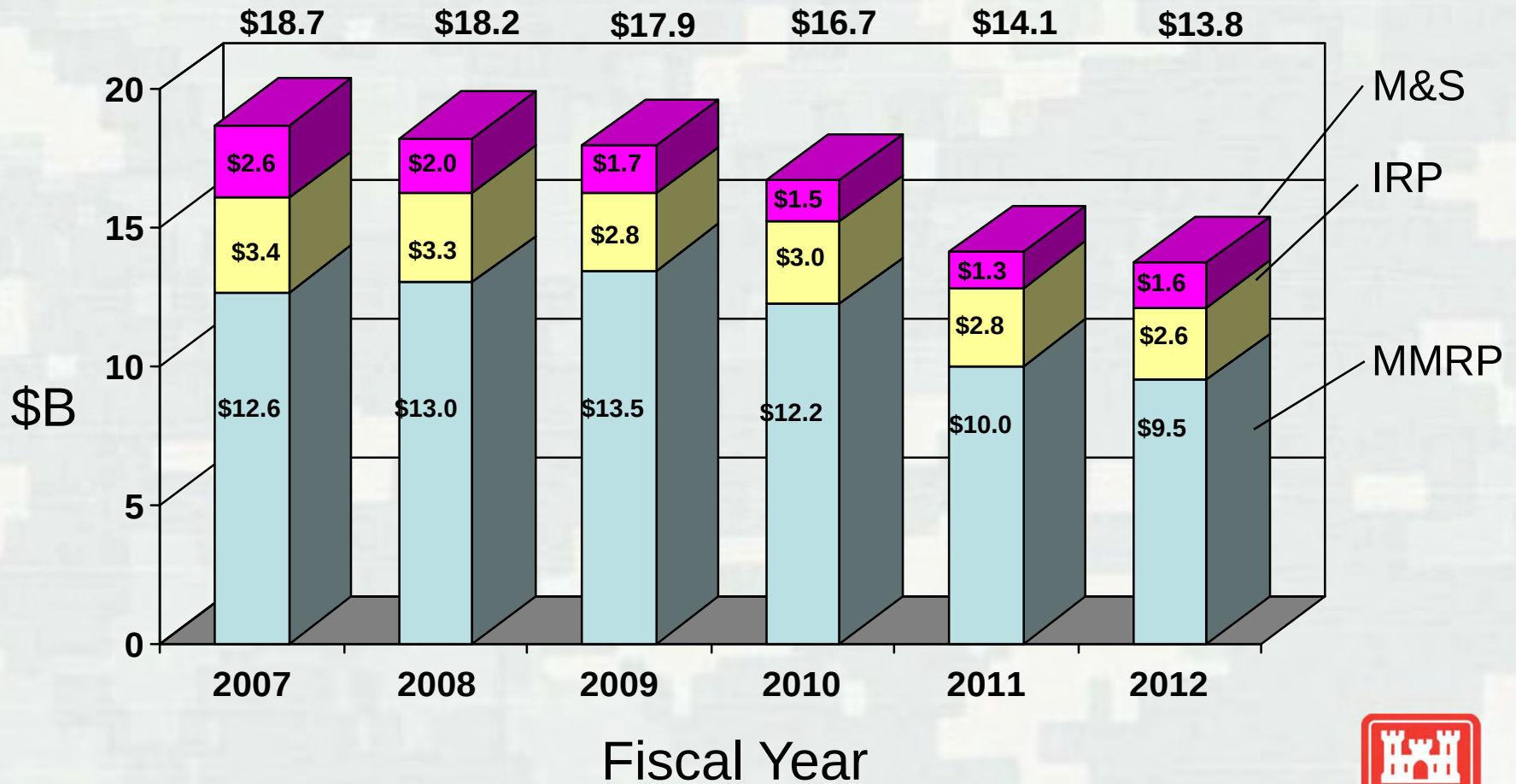


*Source: draft 2010 ARC



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CTC Downward Trend (FY* and Beyond)



*Dollars shown reflect ARC reported amounts
(not adjusted for inflation)

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PBC Goals

- FUDS funding goal for PBC
 - ▶ 25% of FY Program
 - ▶ exceeded by > 2x for FY 2011
- Use of innovative technologies within PBCs continues to be encouraged, but can pose challenges
 - ▶ Consider FUDS as host sites for SERDP / ESTCP demonstrations.



FUDS ER Issues / Challenges

- MMRP
- IRP



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Overall Data Set Metadata

- Site Types: Formerly Used Defense Sites in the Military Munitions Response Site Program
- FUDS - Properties used by the Military Prior to October 1986 to Train and Support Soldiers, Airmen, Sailors, and Marines, as well as to Test New Weapons and Warfare Capabilities
- Number of sites: 467

- Soil and sediment samples: 5514
- Surface water and groundwater samples: 501
- Totals above do not include quality control samples
- Samples were collected between April 2006 and May 2009

- Screening Levels used throughout are the "Regional Screening Levels for Chemical Contaminants at Superfund Sites", which reflect risk to human receptors specifically
- The version used was updated 19 May 2009, http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

Other Data Considerations

- Most Conceptual Site Models at this phase are based only on historical documentation and surface observations; they are not refined by geophysical methods to identify Munitions of Explosive Concern (MEC) or Munitions Debris (MD)
- Data have not been collected from any intrusive locations at any conventional SI Munitions Response Sites (MRSs)
- Surface soil sampling has not been exhaustive
- Based on stakeholder agreement, collection of environmental media other than surface soil has been omitted at some MRSs
- Groundwater has been collected primarily from available sources and hasn't been optimized for MRS hydrogeology
- MRS path forward (based on land use) and Munitions Response Site Prioritization Protocol (MRSP) must consider human and ecological receptors, which this comparison didn't

Summary - Pyrotechnics

AQUEOUS

Analyte Name	Maximum Conc. (ug/L)	# of Detections	# of Non-Detections	Total # of Analyses	# of Residential Tapwater Screening Level Exceedances	Residential Tapwater Screening Level (ug/L)	# of MCL Exceedances	MCL ug/L
Hexachloroethane	N/A	0	1	1	0	N/A	N/A	N/A
Perchlorate	3.4	179	188	365	0	26	0	15
White Phosphorus	N/A	0	1	1	0	0.73	N/A	N/A

SOILS

Analyte Name	Maximum Conc. (mg/kg)	# of Detections	# of Non-Detections	Total # of Analyses	# of Residential Exceedances	Residential Soil Screening Level (mg/kg)	# of Industrial Exceedances	Industrial Soil Screening Level (mg/kg)
Hexachloroethane	N/A	0	13	13	0	35	0	120
Perchlorate	0.070	25	87	92	0	55	0	720
White Phosphorus	N/A	0	102	102	0	1.6	0	20

Summary – Energetics (Soil)

Analyte Name	Maximum Conc. (mg/kg)	# of Detections	# of Non-Detections	Total # of Analyses	# of Residential Exceedances	Residential Soil Screening Level (mg/kg)	# of Industrial Exceedances	Industrial Soil Screening Level (mg/kg)
1,3,5-Trinitrobenzene	6.9	6	5065	5071	0	2200	0	27000
1,3-Dinitrobenzene	0.24	5	5077	5082	0	6.1	0	62
2,4,6-Trinitrotoluene (TNT)	2000	57	5052	5109	4 (1 property)	19	4 (1 property)	79
2,4-Dinitrotoluene	5.5	28	5244	5273	6 (1 property)	0.71	2 (1 property)	2.5
2,6-Dinitrotoluene	16	25	5248	5273	4 (1 property)	0.71	4 (1 property)	2.5
2-Amino-4,6-Dinitrotoluene	43	23	5229	5252	0	150	0	3000
3-Nitrotoluene	2.4	16	5182	5198	0	2.9	0	13
3-Nitrotoluene	0.26	6	5192	5198	0	1200	0	12000
4-Amino-2,6-Dinitrotoluene	38	37	5200	5237	0	150	0	1900
4-Nitrotoluene	3.2	17	5196	5213	0	30	0	110
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX)	2.1	11	5037	5048	0	5.5	0	34
Methyl-2,4,6-Trinitrophenylamine (Tetryl)	160	5	5100	5105	0	240	0	2900
Nitrobenzene	0.55	228	4821	5049	0	4.4	0	22
Nitroglycerine	1200	58	5093	5152	11 (6 properties)	6.1	1 (1 property)	62
Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazine (HMX)	0.63	21	5008	5029	0	3800	0	49000
Pentaerythritol Tetranitrate	55	11	4816	4827	0	N/A	0	N/A
Picric Acid	0	0	104	104	0	120	0	1200

Summary – Energetics (Aqueous)

Analyte Name	Maximum Conc. (ug/L)	# of Detections	# of Non-Detections	Total # of Analyses	# of Residential Tapwater Screening Level Exceedances	Residential Tapwater Screening Level (ug/L)
1,3,5-Trinitrobenzene	0	0	540	540	0	1100
1,3-Dinitrobenzene	0.038	2	537	539	0	3.7
2,4,6-Trinitrotoluene (TNT)	0.077	5	541	546	0	2.2
2,4-Dinitrotoluene	0.51	4	570	574	2 (1 property)	0.099
2,6-Dinitrotoluene	0.68	4	570	574	4 (2 properties)	0.099
2-Amino-4,6-Dinitrotoluene	1.7	6	551	557	0	73
3-Nitrotoluene	0.46	16	542	558	1 (1 property)	0.31
3-Nitrotoluene	0.25	10	548	558	0	730
4-Amino-2,6-Dinitrotoluene	6.3	8	549	557	0	73
4-Nitrotoluene	1.8	12	546	558	0	4.2
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX)	9.3	3	543	546	1 (1 property)	0.61
Methyl-2,4,6-Trinitrophenylamine (Tetryl)	0.20	1	662	663	0	160
Nitrobenzene	0.24	11	528	539	7 (4 properties)	0.12
Nitroglycerine	0.10	2	536	538	0	3.7
Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazine (HMX)	2.7	9	526	535	0	1800
Pentaerythritol Tetranitrate	0.037	2	503	505	N/A	N/A
Picric Acid	0	0	9	9	0	73

Summary – Metals (Soil)

Analyte Name	Maximum Conc. (mg/kg)	Total # of Analyses	# of Residential Exceedances	Residential Soil Screening Level (mg/kg)	# of Industrial Exceedances	Industrial Soil Screening Level (mg/kg)
Aluminum	160000	3933	18 (6 properties)	77000	0	990000
Antimony	14800	4604	2 (6 properties)	31	1 (1 property)	410
Arsenic	163	2014	189 (12 properties)	0.39	131 (11 properties)	1.6
Barium	11000	3434	0	15000	0	190000
Beryllium	19.6	2331	0	160	0	2000
Cadmium	1600	2580	1 (1 property)	70	1 (1 property)	800
Chromium	2400	2780	21 (6 properties)	280	1 (1 property)	1400
Cobalt	110	2342	102 (24 properties)	23	0	300
Copper	95700	4547	5 (1 property)	3100	2 (2 properties)	41000
Iron	357000	4805	110 (29 properties)	95000	0	120000
Lead	122000	5924	132 (27 properties)	400	55 (37 properties)	800
Manganese	5500	3103	72 (25 properties)	1800	0	23000
Mercury	53	2520	5 (5 properties)	4.3	2 (2 properties)	24
Molybdenum	149	2249	0	390	0	5100
Nickel	2500	2976	3 (1 property)	1500	0	20000
Selenium	58.9	2378	0	390	0	5100
Silver	200	2267	0	390	0	5100
Strontium	8800	2302	0	47000	0	610000
Thallium	6.5	2321	3 (2 properties)	5.1	0	66
Titanium	7400	1859	N/A	N/A	N/A	N/A
Vanadium	890	2321	1 (1 property)	550	0	7500
Zinc	10000	4515	0	20000	0	310000
Zirconium	106	785	N/A	N/A	N/A	N/A

Typically, metals are compared to background prior to comparison with risk screening values. This dataset has not been screened against background. Further, it should be noted that very few conventional numbers contain arsenic.

Summary – Metals (Aqueous)

Analyte Name	Maximum Conc. (ug/L)	Total # of Analyses	# of Residential Tapwater Screening Level Exceedances	Residential Tapwater Screening Level (ug/L)	# of MCL Exceedances	MCL ug/L
Aluminum	100000	419	6 (3 properties)	37000	N/A	N/A
Antimony	13	526	0	15	3 (2 properties)	6
Arsenic	100	253	161 (42 properties)	0.045	13 (8 properties)	10
Barium	1200	346	0	7300	0	2000
Beryllium	3.2	236	0	73	0	4
Cadmium	5.2	268	0	18	1 (1 property)	5
Chromium	120	309	N/A	N/A	4 (2 property)	100
Cobalt	53	309	3 (3 properties)	11	N/A	N/A
Copper	264	244	0	1500	0	1300
Iron	130000	563	6 (6 properties)	26000	N/A	N/A
Lead	87	425	N/A	N/A	18 (12 properties)	15
Manganese	14000	598	21 (13 properties)	880	N/A	N/A
Mercury	2.5	354	0	0.57	2 (1 property)	2
Molybdenum	250	305	2 (1 property)	180	N/A	N/A
Nickel	1600	207	1 (1 property)	730	N/A	N/A
Selenium	110	294	0	180	2 (1 property)	50
Silver	0.73	241	0	180	N/A	N/A
Strontium	21000	241	0	22000	N/A	N/A
Thallium	0.88	224	0	2.4	0	2
Vanadium	74	236	0	260	N/A	N/A
Zinc	2800	236	0	11000	N/A	N/A

Summary – Metals (Soil)

Analyte Name	Maximum Conc. (mg/kg)	Total # of Analyses	# of Residential Exceedances	Residential Soil Screening Levels (mg/kg)	# of Industrial Exceedances	Industrial Soil Screening Levels (mg/kg)
Aluminum	160000	3933	18 (6 properties)	77000	0	990000
Antimony	14800	4804	7 (6 properties)	31	1 (1 property)	410
Arsenic	163	2014	1867 (124 properties)	0.39	1371 (114 properties)	1.6
Barium	11000	3434	0	15000	0	190000
Beryllium	19.6	2331	0	160	0	2000
Cadmium	1600	2580	1 (1 property)	70	1 (1 property)	800
Chromium	2400	2780	21 (6 properties)	280	1 (1 property)	1400
Cobalt	110	2342	102 (24 properties)	23	0	300
Copper	95700	4947	5 (4 properties)	3100	2 (2 properties)	41000
Iron	357000	4005	110 (39 properties)	55000	0	720000
Lead	122000	5924	132 (57 properties)	400	66 (37 properties)	800
Manganese	5500	3103	72 (25 properties)	1800	0	23000
Mercury	53	2820	5 (5 properties)	4.3	2 (2 properties)	24
Molybdenum	149	2249	0	390	0	5100
Nickel	2500	2976	3 (1 property)	1500	0	20000
Selenium	58.9	2378	0	390	0	5100
Silver	200	2367	0	390	0	5100
Strontium	8800	2302	0	47000	0	610000
Thallium	6.5	2321	3 (2 properties)	5.1	0	66
Titanium	7490	1889	N/A	N/A	N/A	N/A
Vanadium	680	2321	1 (1 property)	550	0	7200
Zinc	10000	4515	0	23000	0	310000
Zirconium	106	785	N/A	N/A	N/A	N/A

Typically, metals are compared to background prior to comparison with risk screening values. This dataset has not been screened against background. Further, it should be noted that very few conventional munitions contain arsenic.



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MMRP Characterization Data Summary



- So far, Pb appears to be the most prevalent MC that has been identified in soils from FUDS MMRP properties
- At least 42 former Small Arms Ranges (SARs) have been identified on FUDS MMRP project sites,
- A large number of the Pb exceedances in soils are believed to be associated with SARs
- Sidenote: There is significant uncertainty regarding the timing of when former SARs on FUDS MMRP properties will move into RI/FS stage – will probably depend on scoring from Munitions Response Site Priority Protocol (MRSPPP)



Common IRP Issues

- Persistent chloroethene plumes are prevalent on FUDS projects
- Some sites appear to have high-concentrations of chloroethenes that are “hung-up” in the vadose zone, & functioning as continuing sources
- Secondary sources also appear to be common (i.e., back-diffusion from low permeability zones)
- RIP has been achieved on many sites by installing ex-situ groundwater treatment systems; but progress toward RC appears to be slow (i.e., some sites appear to be “stuck” in RA-O)



Maturity of the Program

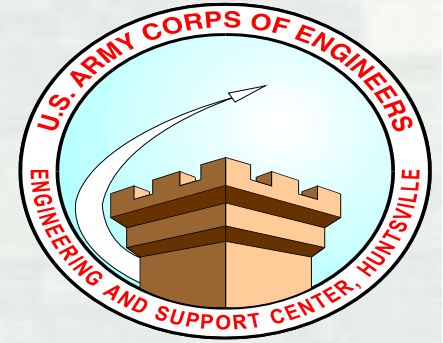
- RC achieved on approx. 59% of projects (neglecting MMRP re-alignment)
- Current cost to complete estimate for FUDS IRP projects (HTRW & CON/HTRW) : \$2.6 B. FY12 funding profile for FUDS IRP projects: \$152.6M
- Approx 130 FUDS IRP projects scheduled to enter RI stage after FY2011
- The list of FUDS-eligible properties may still increase, but the number of new properties coming into the program is decreasing (average of ~20/yr, over the last 3 years)



Preliminary List of R&D Needs

- Development of better sensors / field instruments & methods to reduce long term monitoring (LTM) costs
- Renewed emphasis on LTMO & Optimization of Remedies already In Place, with Green & Sustainable Remediation attributes
- Research to reduce uncertainty in Risk Assessment
- Continue to fund a modest level of remediation technology development, including fractured rock applications
- Extension of Incremental Sampling & Analysis methods to metals & other organics
- Improvements in technologies for cleanup of MC (e.g., metals) from small arms ranges on MMRP sites





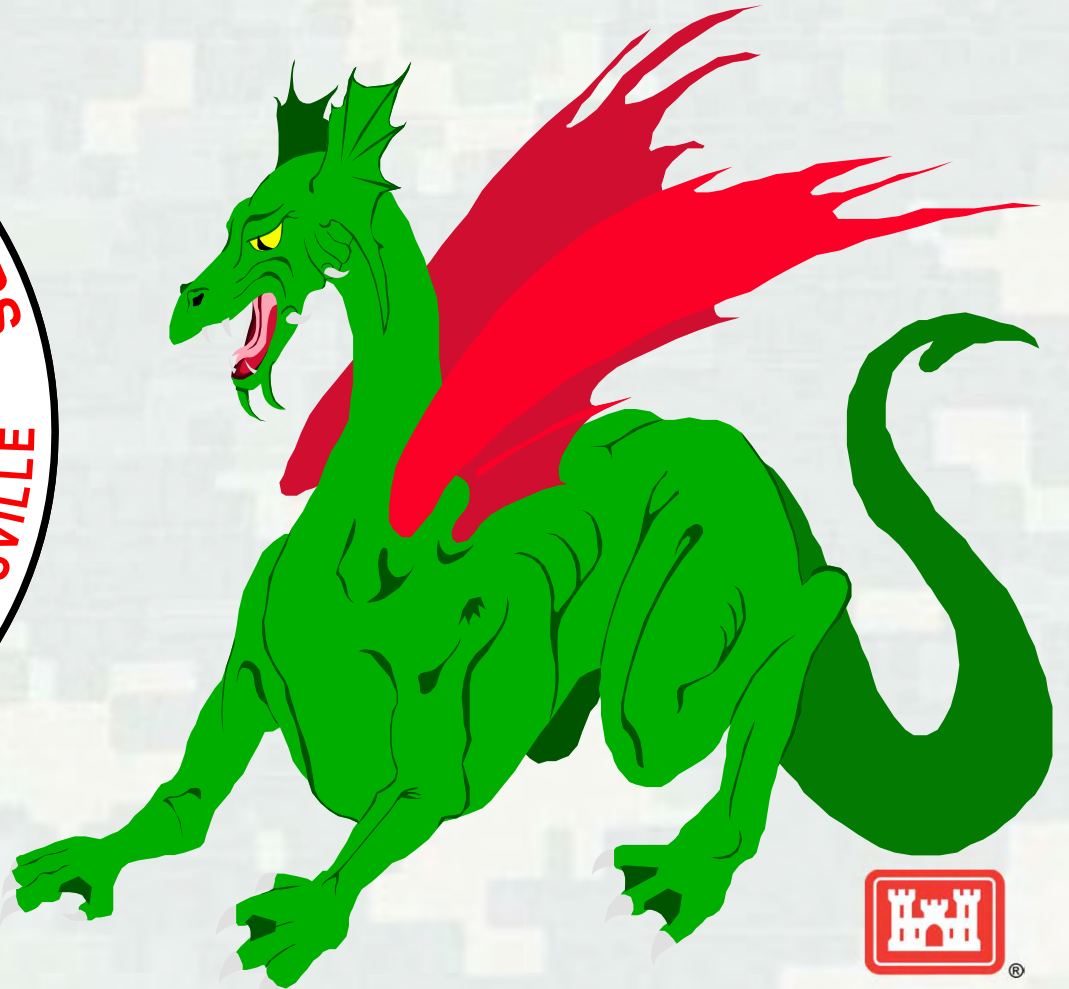
Huntsville Engineering & Support Center Environmental & Munitions CX (EM CX)

- **EM CX Environmental Capabilities**
 - ▶ **Technical Assistance on FUDS, Army IRP, Army BRAC, & Superfund Projects**
 - ▶ **Five-Year Review / Remedial Optimization**
 - ▶ **Remedial System Evaluations**
 - ▶ **Value Engineering Studies**
 - ▶ **Independent Technical Reviews**
 - ▶ **Long Term Monitoring Optimization**



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Questions ???



Definitions

Attachment 1: Response Complete (RC) Definition and RC Message

RC Definition:

The RC milestone signifies that the Department of Defense (DoD) has met the remedial action objectives for a site, documented the determination, and sought regulatory agreement. RC signifies that DoD has 1) determined at the end of the Preliminary Assessment/Site Inspection, or Remedial Investigation that no additional response action is required, 2) achieved Remedy-in-Place (RIP) and the required Remedial Action Operation (RA-O) has achieved the remedial action objectives, or 3) where there is no RA-O phase, then the Remedial Action Construction (RA-C) has achieved the remedial action objectives. Long-term management may occur after RC is achieved.



Definitions

RC Message:

DoD achieves RC when no contaminants pose a threat to human health and the environment for the current land use. DoD may establish land use restrictions and conduct long-term periodic reviews, monitoring, and maintenance at a site once it has achieved RC. These activities may last either for a specified period or indefinitely to ensure protection of human health and the environment.



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OFFICE OF THE UNDER SECRETARY OF DEFENSE

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JUL 18 2011

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,
ENERGY, AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (ENERGY,
INSTALLATIONS, AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT, AND LOGISTICS)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: New Goals for the Defense Environmental Restoration Program (DERP)

The Office of the Secretary of Defense (OSD) is establishing Response Complete (RC) goals for Installation Restoration Program (IRP) (which include the newly eligible sites) and Military Munitions Response Program (MMRP) sites at active installations, and for IRP sites at Formerly Used Defense Site (FUDS) properties. The timing for establishing these new goals is important because a large portion of the DERP is advancing into the final phases of the cleanup process. These RC goals will enable the Department of Defense (DoD) Components to advance sites through the final cleanup phases to site closeout. The goals will also augment OSD's oversight of program progress.

The RC goals are:

- 90% of IRP and MMRP sites at active installations, and IRP sites at FUDS properties will achieve RC by the end of Fiscal Year (FY) 2018, and
- 95% of IRP and MMRP sites at active installations, and IRP sites at FUDS properties will achieve RC by the end of FY2021.

FY10 Actual Expenditures

	IRP	MMRP	IRP & MMRP
FUDS	\$164.5	\$168.8	\$333.3
Navy	\$247.7	\$38.0	\$285.7
Army	\$327.8	\$108.5	\$436.3
AF	\$393.7	\$100.6	\$494.3

All figures are in millions of dollars

Source: Appendix D from FY 2010 Annual Report to Congress



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FY11 Achievements

	FY11 Planned	FY11 Actual
PBA Obligations (Goal = 25% of FY Program)	\$114.1M	\$271.1M (238%)
IRP RIP/RC (No. of Projects)	46	55 (120%)
MMRP RC (No. of Projects)	19	52 (274%)
Phase Completions (No. of Phases)	419	463 (111%)
Program Obligation	\$456.5 M	\$456.5M (100%)
MMRP SI	690 (90% of 765)	754 (99% of 765)



MMRP SI completion:

FY2010 was the original DOD goal, but, in practice, USACE is awarding the last of the SI's under the Nationwide SI Program in FY11; with a 18-month tail, they won't be completed until FY13.

CONSTRUCT FROM STRATEGIC PLAN – RIP/RC Phase Completions MAJOR GOALS

FUDS Goals and Objectives:

DoD Goals for DERP:

Reduce risk to human health and the environment:

Relative Risk Site Evaluations (RRSE) used to prioritize HTRW Projects.

Achieve Remedy in Place (RIP) or Response Complete (RC) Milestones:

50% and 100% of high relative risk projects by end of FY 2002 and 2007, respectively;

100% of medium relative risk projects by FY2011;

100% of low relative risk projects by FY2020.

No cleanup goals established for BD/DR;



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FUDS Outlook

DERP Goals

- Reduce relative risk at 100% of high relative risk sites by end of FY 2007
- Reduce relative risk at 100% of medium relative risk sites by end of FY 2011
- Reduce relative risk at 100% of low relative risk sites by end of FY 2014 (FY 2020 for FUDS sites)



FUDS Outlook

2020 Goal

- DoD's goal is to achieve response complete (RC) or remedy in place (RIP) for formerly used defense sites (FUDS) by 2020.
- 52% of high relative risk FUDS sites had achieved final remedy in place or response complete status by 2002.



Definitions

- MMRP:

- ▶ *Munitions and Explosives of Concern (MEC):*

- UXO;
 - Discarded Military Munitions;
 - Munitions Constituents (in concentrations to be explosive).

- ▶ *Munitions Constituents (MC) ...*

- Originating from MEC

- ▶ Recovered Chemical Warfare Materials (RCWM).



FUDS Program

- Formerly Used Defense Site Program

- ▶ History

- SARA Amendments to CERCLA
 - Defense Environmental Restoration Program (DERP) Statute
 - Three authorized responses [10 USC 2701]:
 - ▷ CERCLA hazardous substances, pollutants, or contaminants
 - ▷ Other environmental damage creating an imminent and substantial endangerment
 - ▷ Building Demolition/Debris Removal (BD/DR)



Scope of FUDS Program

(based on 2006 Report to Congress)

- Properties:
 - ▶ Total in Inventory 9,908
 - ▶ Requiring Response Actions 3,044
- FY07 Cost to Complete (CTC) - \$18.7B
 - ▶ MMRP \$12,647M (1,364 projects)
 - ▶ HTRW \$ 3,144M (837 projects)
 - ▶ OTHER \$ 37M
 - ▶ CON/HTRW \$ 247M (900 proj)
 - ▶ BD/DR \$ 50M (91 proj)
 - ▶ PGM MGT \$ 2,628M
- FY07 Approved Workplan - \$253.7M



Definitions

- FUDS – not FUDS sites
- POM - possession of MJ

