FIVE YEAR OPERATING PLAN
FOR THE REMEDIAL ACTION COST ENGINEERING
& REQUIREMENTS (RACER) APPLICATION

(REVISED 08/01/2014)

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Prepared For:

RACER Steering Committee (RSC)

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Contents

List of Appendices

Appendix A RACER Technology History Tables

List of Acronyms

Acronym	Definition
ACF	Area Cost Factor
AOC	Area of Concern
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CoN	Certificate of Networthiness
CONUS	Continental United States
COT	Cost-Over-Time
CSI	Construction Specifications Institute
CTD	Certification Termination Date
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
ECP	Engineering Change Proposal
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
FUDS	Formerly Used Defense Site
FY	Fiscal Year (October 1 – September 30)
GUI	Graphic User Interface
ISCO	In Situ Chemical Oxidation
ISCR	In Situ Chemical Reduction
MEC	Munitions & Explosives of Concern
MNA	Monitored Natural Attenuation
.NET	Microsoft .NET Framework
OCONUS	Outside the Continental United States
OU	Operable Unit
PACES	Parametric Cost Engineering System
QA	Quality Assurance

Acronym	Definition
QC	Quality Control
RACER	Remedial Action Cost Engineering & Requirements
ROM	Rough Order of Magnitude
RSC	RACER Steering Committee
TRG	Technical Review Group
USACE	United States Army Corps of Engineers
USFS	U.S. Forest Service
V&V	Verification and Validation
VB6	Visual Basic Version 6
VB.NET	Visual Basic .NET
VV&A	Verification, Validation and Accreditation
WP	Work Plan
XML	Extensible Markup Language

1.0   Background

This document is a work product of the RACER Technical Review Group (TRG). It has been prepared for the RACER Steering Committee (RSC) to review and approve changes to and funding for the RACER application for Fiscal Years (FY) 2015 through 2019.

1.1   Introduction

The Remedial Action Cost Engineering and Requirements (RACER) is a parametric, integrated cost estimating application that is to provide an automated, consistent, and repeatable method to estimate and document the program cost for the environmental cleanup of contaminated sites and to provide a reasonable estimate for program funding purposes consistent with the information available at the time of the estimate preparation. RACER provides the detail of an engineers' estimate, but it also can be used at early order-of-magnitude stages of cost estimating. RACER is used by over 3,000 users including the Department of Defense (DOD), the Department of Energy (DOE), the Department of the Interior (DOI), the Environmental Protection Agency (EPA), engineering consultants, contractors, state regulatory agencies, and the private sector.

1.2   Purpose of this Plan

The purpose of this Five-year Operating Plan is to establish an actionable and prioritized path forward by which RACER maintains functionality and usability while creating auditable cost estimates representative of current practices in Federal Government environmental remediation programs.

1.3   Scope of this Plan

The scope of this plan encompasses the following components of the RACER application:

- Graphic user interface (GUI)
- Database
- Cost models (including associated documentation)
- Utilities
- Reports and other output files (e.g., export files)
- Help topics

This plan also addresses routine maintenance and user support business functions related to RACER including order fulfillment (processing of user registration forms, and issuance of registration numbers and serial numbers), and help line support to users. This plan does not address training of users; responsibility for user training lies at the agency level.

1.4 Plan Review & Updates

This plan requires annual reviews and updates to address feedback from users, technological advances in the environmental remediation industry, new and evolving requirements for Government agency reporting of environmental liabilities, changes in Government computer operating systems and architecture, and other external drivers. This plan will be revised annually by the RACER Technical Review Group (TRG) and submitted to the RACER Steering Committee (RSC) in accordance with the RACER Management Plan.

1.5 Supporting Documents and References

RACER Management Plan, September 2011.

Final Verification and Validation (V&V) Report for RACER Services and Verification and Validation, Booz Allen Hamilton, 23 September 2009.

Final Validation Report for RACER Services and Verification and Validation (V&V), Booz Allen Hamilton, 23 September 2009.

RACER 2008 Final Technology History Report, AECOM, 24 July 2008.

DoD Modeling and Simulation Verification, Validation and Accreditation (VV&A), DOD Instruction 5000.61, April 1996.

Minutes from RACER Government Steering Committee August 27, 2013 Meeting, AECOM, September 3, 2013.

Minutes from Technical Review Group (TRG) April 30, 2013 Meeting, AECOM, May 14, 2013.

2.0   Five Year Plan

This five-year operating plan for RACER covers fiscal years 2014 through 2018. The subsections that follow present a summary of the key accomplishments that were made during FY12 and FY13, along with the annual tasks necessary over the five year planning period to ensure RACER meets the functional and technical requirements of user agencies. In addition, this plan identifies engineering change proposals (ECPs) and the estimated rough-order-of-magnitude (ROM) cost for implementing each ECP. The ECPs presented herein will be considered and processed in accordance with the RACER Management Plan.

2.1   FY13 and FY14 Accomplishments

RACER 11.1 was released in October 2012. The cost elements in the RACER 11.1 database that were updated include:

- Unit Prices for Material, Labor, Equipment & Sub Bid (MLES), which are the basis for the prices calculated and displayed for each of the assemblies in a RACER estimate. RACER 11.1 uses the 2010 Cost Book, as it was the latest available version at the time of development of the application.

- Area Cost Factors (ACF), for the Continental United States (CONUS) and locations Outside the Continental United States (OCONUS) were updated for RACER 11.1. The ACFs are the basis for the location modifiers in RACER.

- Escalation Index Values were updated to be reflective of current factors. Escalation factors are used for escalating (inflating) out-year costs, in RACER reports, from current (2013) prices to future-year prices using the Secretary of the Air Force Escalation Factor (SAF EF) calculator.

- Per Diem Rates are used as the basis for assembly number 33010202. Per Diem rates for CONUS and OCONUS locations were updated based on current rates published by the U.S. Government.

A task order was awarded in August 2012 to implement approved FY12 RACER Enhancements. The enhancements include adding technologies and reengineering several existing technologies to accommodate mine reclamation site estimates, reengineering the Munitions and Explosives of Concern (MEC) technologies, and reengineering the Asbestos technology. These enhancements also incorporate related alterations to the cost database, reports, and analytical templates within RACER.

A new base contract was awarded in September 2013. The previous base contract ended in August 2012. Due to the delay in contract award no task orders were awarded in FY13 and RACER support was discontinued at the end of September 2013. A new task order was awarded in March 2014 for continuation of support to RACER 11.1 through October 2014. Another new task order was awarded in May

2014 for the Maintenance and Support of RACER 11.2. This version is anticipated to be released early FY15.

The annual TRG meeting was held May 28-29 2014. The meeting centered around discussion on current schedule for completion of enhancements, RACER management plans, RACER bugs and potential enhancements, and lessons learned.

2.2   Annual Tasks

Annual maintenance of the RACER application will continue throughout the FY15 – FY19 planning horizon covered by this Plan. Annual tasks include the following:

- **Assembly Unit Prices** - This task involves updating the assembly prices for labor, materials, equipment, and subcontracted services (SubBid). In addition, relationships between assemblies in RACER and CSI Tasks in the Government Cost Book also are updated to address changes in the cost book. Assembly prices typically are updated biennially when the Cost Book is released.

- **Area Cost Factors** - This task involves updating the RACER database with new Area Cost Factors (ACFs) by location. The RACER database is updated annually to incorporate current ACFs. The ACFs for both CONUS and OCONUS are taken annually from the PAX Newsletter.

- **Per Diem Rates** - This task involves updating the RACER database with new per diem rates by location. The Government Services Administration (GSA) annually develops and issues per diem rates for locations in the Continental United States (CONUS) and Outside the Continental United States (OCONUS). The RACER database is updated annually to incorporate current per diem rates.

- **Escalation Factors** - This task involves updating the RACER database with new escalation index factors by year and month. The escalation index factors are obtained from Government sources. The RACER database is updated annually to incorporate current escalation index factors.

- **Quality Control Reviews** - This task involves conducting quality control (QC) reviews of the database updates and other changes to RACER by the maintenance & support contractor. QC reviews are conducted in stages corresponding to the development cycle (i.e., alpha, beta, final acceptance, and final). This task includes preparation of Verification Testing documentation in support of ongoing V&V activities. QC reviews involve testing RACER according to written test plans to ensure that all functional and technical requirements have been met or achieved.

- **Quality Assurance Reviews** - This task involves conducting quality assurance (QA) reviews by the Technical Review Group (TRG) to ensure that the QC reviews conducted by the maintenance & support contractor fulfill contract requirements. QA reviews are conducted in stages corresponding to the development cycle (i.e., alpha, beta, final acceptance, and final). QA reviews involve reviews of documentation from QC testing, and verifying that all functional and technical requirements have been met or achieved.

- **Release** - This task involves releasing the updated RACER application to users within Federal Government agencies. This task also involves tracking user registration data so RACER usage within the Federal Government can be tracked, and agencies can ensure RACER users are adequately trained in the use of the application.

- **Provide Technical Support to Users** - This task involves providing technical support to approved RACER users within Federal Government agencies. Technical support is provided via telephone hotline and e-mail. This task also includes notifying users of problems and workarounds, as well as mid-year service releases when issued.

- **TRG Meetings** - This task involves planning, conducting and documenting meetings of the RACER TRG. Specific activities include preparing agendas, preparing meeting materials, conducting the meetings, and preparing minutes documenting the proceedings and discussions. A key activity of the TRG meetings is to review, evaluate, debate, decide, and prioritize which enhancement requests are to be elevated to Engineering Change Proposals (ECPs).

- **Plan Updates** – This task involves reviewing and updating the five-year operating plan for RACER for presentation and discussion at the annual meeting of the RACER Steering Committee.

- **RSC Meetings** - This task involves planning, conducting and documenting meetings of the RSC. Specific activities include preparing agendas, preparing meeting materials, conducting the meetings, and preparing minutes documenting the proceedings and discussions.

2.3   Periodic Tasks

Certain activities and tasks are conducted periodically or on an as-needed basis. These periodic and as-needed tasks include the following:

- **Verification, Validation & Accreditation (VV&A)** - This task involves determining whether the RACER application needs to be revalidated and/or reaccredited in accordance with DOD Instruction 5000.61. If revalidation and/or reaccreditation are required, this task includes planning, performing, and documenting the VV&A steps and evaluations.

2.4   Engineering Change Proposals (ECPs)

Engineering Change Proposals (ECPs) are identified, evaluated and approved according to the procedures described in the Change Management section of the RACER Management Plan. The TRG evaluated the potential ECPs with respect to the priority categories described in Section 3.5 of the RACER Management Plan. In preparing this update to the five-year operating plan, the TRG determined that the ECPs for the FY15 – FY19 planning horizon should focus primarily on addressing known V&V deficiencies. In addition, the TRG conducted a review of the cost models available within the RACER application. The TRG's model review was a primary source of ECPs presented in Section 3.0 below. Details about how the TRG reviewed RACER models are provided in the section that follows.

2.4.1 Cost Model Review

RACER has a library of 114 cost models that can be used in any combination to reflect the presumptive remedy or scope of work for a contaminated site. Some of the cost models were developed in the early 1990s (as part of the PACES cost estimating application), while others were added to RACER over the years. A summary of the RACER cost models and their development history is provided in Appendix A.

The TRG identified and evaluated numerous potential changes to the RACER cost models. Change requests from users, results from the 2009 V&V report, changes in remediation technology, and changing needs within the environmental restoration program and industry were considered in the TRG's evaluation.

To prioritize cost models for updating/re-engineering, the TRG developed and applied a numeric rating system. The factors included in the numeric ratings were:

- Agency priority
- Multi-agency usage
- Frequency of usage in cost estimates
- Number of enhancements/change requests received from users
- Age of cost model

The cost model ratings are provided in Appendix A. Note that agency priority was a significant factor in the TRG's deliberations about which cost models to select for ECPs.

2.4.2 TRG Evaluation of Potential ECPs

In evaluating the potential ECPs, the TRG considered potential ramifications of the change to other components of the RACER application. It is common for a change to a cost model to trigger changes to other cost models, help topics, the database, agency post-processors, export-import functionality, and reports. Therefore, the full

scale of the change and the potential hidden costs were considered. The TRG also evaluated whether potential ECPs should be "bundled" to ensure consistent functionality across the RACER applications

The TRG's technical evaluation of the implementability of potential ECPs also considered the following items:

- **High-level Architecture** - RACER is configured as a single user, stand-alone desktop PC application. All program files are installed on the client machine, and the default location for the RACER database file is under the user's profile. The user's validation key is stored in the Current User section of the registry. Potential ECPs were evaluated in terms of whether they would trigger any changes to the RACER architecture/configuration.

- **Network Security** - RACER *11.x* has been evaluated for network security, and a Certificate of Networthiness (CoN) has been issued. Potential ECPs were evaluated to determine whether they would trigger any changes in network security documentation, testing or configuration of the RACER application.

- **Operating Systems & Office Suites** - RACER *11.x* is supported on Microsoft *XP,* Vista and Windows 7 operating systems. RACER also is supported on Office 2003, Office 2007, and Office 2010 suites. Potential ECPs were evaluated in terms of whether they would prevent or limit the usability of RACER on the supported operating systems and office suites.

- **Graphic User Interface** - The conversion of RACER to .NET included a major redesign of the GUI to improve usability and add several new functional elements. The conversion also produced a GUI with a more professional appearance with easier navigation through the multi-level estimating hierarchy. Potential ECPs were evaluated in terms of their consistency with the current GUI design for RACER.

- **Database** - The conversion of RACER to .NET included a major redesign of the data storage model within the RACER database. Potential ECPs were evaluated in terms of their consistency with the current data storage model

- **Utilities** - The conversion of RACER to .NET included the utilities provided within the application and the agency post-processors. Potential ECPs were evaluated to determine whether they would trigger any changes to the FUDS Post Processor and/or the Army Interface Utility.

- **Reports** - The conversion of RACER to .NET included redesign and reprogramming of the reports generated by the application at all levels of the estimating hierarchy, as well as the preferences reports. Technology-level reports were eliminated from the cost models and moved to the main reports menu. Potential ECPs were evaluated in terms of whether they would trigger any changes to the design or content of the existing reports and/or the functionality of the reports menu and reports display window.

- **Export-Import Functionality** - The RACER export files were converted from Microsoft database (mdb) format to Extensible Markup Language (xml) format. Potential ECPs were evaluated in terms of whether they would trigger any changes to the schema or file format of the export files

- **Help Topics** - The conversion of RACER to .NET included the help system provided within the application. Potential ECPs were evaluated in terms of the changes that would be required in the functionality, organization, or content of the RACER help system.

3.0 Engineering Change Proposals for FY14 - FY18

The TRG reviewed the change requests identified by RACER users and the V&V deficiencies identified in the 2009 validation report. Change requests were evaluated in terms of the legitimacy and scope of the need, implementability, timeframe for implementation, and for level of effort. The ECPs described in this section were prioritized by the TRG according to (1) agency need; (2) frequency of use; (3) consistency with current technology/standard of practice; and (4) date of last update/revision. For each ECP, the following information is provided:

ECPXX-YY: Engineering Change Proposal Title

> Note: XX = FY in which the ECP was proposed, and YY = sequential number assigned to the ECP

- **Description:** a general description of the item to be changed and the nature of the change
- **Need:** the business reason why the change is needed (e.g., cost model out of date with current practice; costs are not estimated accurately; new remediation technology has become widely accepted/applied at Government sites, etc.) Identify V&V status or deficiency standing.
- **Implementability:** the TRG's evaluation of the implementability of the ECP and whether it has any repercussions on other aspects of RACER
- **Timeframe for Implementation:** XXX months

3.1 Approved Engineering Change Proposals

There were 6 ECPs approved for FY12. The 6 ECP's approved for FY12 are as follows:

> ECP11-01: Revise Area Cost Factors (New source for ACFs was incorporated into RACER 11.0 and subsequent versions)
>
> ECP11-02: Reengineer MEC Removal Action Technology
>
> ECP11-03: Reengineer MEC Site Characterization and Removal Assessment Technology
>
> ECP11-04: Reengineer MEC Sifting Technology
>
> ECP11-05: Enhancements for Mining Sites
>
> ECP11-13: Reengineer Asbestos Removal Technology

The TRG awarded a contract action for the reengineering of the above items in FY13. The ECPs 11-01, 11-05, and 11-13 will be completed in time for inclusion into the 11.2 version release of RACER. ECPs 11-02, 11-03, and 11-04 will be included into 11.3 as these models are still under review.

There were 5 ECPs approved for FY14. The 5 ECP's approved for FY14 are as follows:

ECP11-05: Mining Enhancements: Fencing, Access Roads, O&M SubTechs, and Monitoring

ECP11-15 Include Ability to Estimate Removal of Above Ground Storage Tanks

ECP13-01: Changes to RACER Reports

ECP13-05: In Situ Chemical Oxidation Technology

ECP13-07: Changes to Site-Level Setup Templates

3.2   Engineering Change Proposals for RSC Consideration

Based on the TRG evaluation, the ECPs described below are recommended for implementation within the FY15 – FY19 planning horizon.

3.2.1 ECP11-06: Reengineer Five Year Review Technology (revised August 2014)

- **Description:** The Five Year Review (SFY) cost model should be re-engineered to address government installations with multiple sites, operable units (OUs), and areas of concern (AOCs). The model does not include costs for community engagement meetings and associated travel that may be required as part of the five year review. The model also needs to ensure it is following the most recent guidance.

- **Need**: The SFY model is widely used by Government agencies to estimate costs for planning, conducting, and reporting the results of five year reviews as required by CERCLA. It appears, based on user feedback, that the model over-estimates costs when it is applied on a site-by-site basis at installations with multiple sites, OUs and AOCs, and it under-estimates costs when it is applied on an installation-wide basis. The model does not address use of USACE Remediation System Evaluation Checklists as described in USEPA guidance for five year reviews. The model also does not address the number and complexity of engineered controls (e.g., containment systems, treatment systems, etc.) in estimating the level of effort for the site inspection task. Subsequent to development of the SFY cost model, five year reviews have been conducted at numerous Government restoration sites and guidance has been updated; as a result, the scope of work and level of effort for five year reviews are better understood today.

- **Implementability:** TBD

- **Timeframe for Implementation:** 12 – 18 months

3.2.2 ECP11-07: Reengineer Natural Attenuation Technology

- **Description:** The Natural Attenuation (NAT) technology does not function in the same way as other technologies that include sampling and analysis tasks. The QA/QC, Data Management, and documentation tasks do not provide the user with the same choices and inputs as the Monitoring model or the Remedial Investigation model, both of which are based on the RACER "sampling mini-model." The net result is that the costs calculated by the NAT model are incorrect. To generate reasonable costs for Monitored Natural Attenuation (MNA), users must make significant edits to assembly quantities and prices.

- **Need:** Monitored Natural Attenuation (MNA) is frequently applied as an interim and/or final remedy at many Government sites. The NAT technology does not estimate costs for MNA correctly, especially when it comes to QA/QC samples and data management. The NAT technology does not enable users to specify the frequency of sampling less than annually. The NAT technology should be renamed "Monitored Natural Attenuation" as that is the terminology currently used by agencies, environmental regulators, and environmental professionals as an acceptable remedy. The analytical templates used by the NAT technology need to be reviewed to ensure consistency with current practice and regulatory requirements.

- **Implementability:** The NAT technology can be re-engineered to include the methodologies, engineering logic, assembly quantity algorithms, and assemblies for QA/QC, Data Management, and documentation as currently included in the Monitoring (MON) technology. The ability to identify incremental sampling durations has been requested by many RACER users. Note that NAT uses different analytical templates than MON, and it is applicable to different remedial lifecycle phase than MON. For this reason, NAT should be kept separate from the MON cost model. New assemblies will be required, and some new CSI Tasks may be needed to support the new assemblies. The help topics for the NAT cost model will require edits to reflect the changes to the model. Depending on the changes to the analytical templates, some changes may be required to the Army Post Processor to include new Army Environmental Database tech codes.

- **Timeframe for Implementation:** 12 – 18 months

3.2.3 ECP11-08r: Revisions to Monitoring Technology / Sampling & Analysis mini-model (revised June 2013)

- **Description:** Description: the Monitoring (MON) model should be reengineered to include:
  - additional choices for sample frequency (e.g., every X years rather than every year)
  - additional media (e.g., residential tap water, vegetation, fish tissue, building materials)

o revisions to calculations for purge water

- **Need:** Not all monitoring programs include sampling every year; users currently must implement a complicated workaround to capture monitoring costs on a less-than-annual frequency. Sampling efforts related to tap water, vegetation, fish tissue, and building materials would also enhance RACER's utility in estimating studies of media other than what currently exists in the MON model. Currently RACER calculates purge water from ground surface to the sampling depth; the calculation is incorrect and should take into account depth to groundwater.

- **Implementability:** RACER currently contains engineering logic and algorithms for calculating cost-over-time on a biennial (or less frequent) basis; this logic and algorithms are in the Operation & Maintenance (OPM) and Administrative Land Use Controls cost models. This proposal would leverage the existing logic and algorithms into the MON model. Note that changes made to MON should be concurrently made to the Natural Attenuation (NAT) cost model as well as other models, such as Site Inspection, Feasibility Study, and Remedial Investigation, which also employ the Sampling & Analysis mini-model. New assemblies and CSI tasks would be required for sampling additional media only. Minor edits to the help topics for the MON model would be required.

- **Timeframe for Implementation:** < 12 months

3.2.4 ECP11-09r: Reengineer In Situ Biodegradation Technology (revised June 2013)

- **Description:** The In-situ Biodegradation (ISZ) cost model should be expanded to include a wider range of treatment reagents and the ability to add a variety of supplementary amendments. Expanding the range of treatment reagents will increase the applicability of the model for remedies that involve in situ biodegradation.

- **Need:** Major technological advances have occurred over the past several years in remediating soil and groundwater contamination using in situ technologies. In situ biodegradation is a commonly applied technology on Government restoration sites. RACER has a limited range of treatment reagents for in situ biodegradation. Other treatment reagents should be added to the ISZ cost model to address current state of practice in the remediation field. Secondary parameter defaults also need to be looked at to coincide with current practice.

- **Implementability:** A significant number of case studies and technology research for in situ biodegradation is currently available in the open literature. New assemblies will be required, and some new CSI Tasks may be needed to support the new assemblies. The help topics for the ISZ cost model will require edits to reflect the changes to the ISZ model.

- **Timeframe for Implementation:** 12 – 18 months

3.2.5 ECP11-10: Include Remaining Drilling Models in Well Abandonment Technology

- **Description:** The Well Abandonment (GWA) cost model should be expanded to include all RACER cost models that include drilling of wells.

- **Need:** The GWA model currently does not enable users to estimate costs for abandoning or closing wells drilled in conjunction with In Situ Biodegradation (ISZ), the horizontal and slant well options in the Special Well Drilling (SWD) model, or the Petroleum UST Site Assessment (SUS) model. As a result, users must manually define well groups in the GWA model to estimate costs for abandoning wells from the ISZ, SWD, and SUS technologies.

- **Implementability:** The ISZ, SWD, and SUS models will need to be changed to calculate and capture the number of wells and the construction details (casing diameter, depth, etc.) in the same way that the other drilling models function. The work flow, engineering logic and assemblies for GWA will remain unchanged. It is unlikely that any new assemblies or CSI tasks will be required. The help topics for the GWA cost model as well as the models that pass information into the GWA cost model will require minor edits to reflect the changes.

- **Timeframe for Implementation:** < 12 months

3.2.6 ECP11-11r: Add Cost-Over-Time to Residual Waste Management Technology (revised June 2013)

- **Description:** The Residual Waste Management (WMS) cost model should be converted to a cost-over-time (COT) model. When WMS is used with COT cost models such as Natural Attenuation (NAT), and Monitoring (MON), all costs for residual waste loading, transportation and disposal are captured in the first year of the phase of work. The cost calculated by the WMS model should be spread over the life of the phase.

- **Need:** This model estimates costs for loading, transporting, and treating/disposing of wastes generated during site investigations, remedial actions, and monitoring programs. The WMS technology is one of the most frequently used cost models in RACER. It is used by all Government agencies in their annual CTC estimates. Due to the way RACER costs are entered into the Air Force's database, EESOH-MIS, (by year rather than by phase), the AF must manually spread WMS costs in RACER so they are accounted for in the year they occur. This process involves significant assembly-level adjustments and associated documentation.

- **Implementability:** Residual waste quantities are calculated by the technologies that generate the waste, not by the WMS cost model. Thus, the cost over time technologies that generate residual waste (NAT, and MON) need to be revised to calculate quantities on an annual (or first year basis). The WMS cost model will need to be revised to load and display the annual quantities, and the cost-over-time reports would need to be revised to include

the WMS model. It is unlikely that any new assemblies or CSI Tasks will be required. The help topics for the WMS cost model will require edits to reflect the changes to the model.

- **Timeframe for Implementation:** < 12 months

3.2.7 ECP11-12: New Cost Model for Remediation System Decommissioning

- **Description:** A new model should be developed for estimating costs of decommissioning remediation systems once remediation goals have been achieved or at the end of their useful lives.

- **Need:** RACER enables users to estimate costs for designing, constructing, operating and maintaining a remediation system, but it currently does not include any models for estimating costs of decommissioning or removing treatment systems at the end of their useful lives. As a result, users desiring to estimate costs for end-of-life system decommissioning must adapt existing cost models (Demolition, Buildings; D&D, Specialty Process Equipment). Some of the existing Demolition cost models can be used for select tasks or elements of system decommissioning (e.g., the Demolition, Buildings model can be used for estimating costs to demolish the building in which a treatment plant is located; the Demolition, Fencing model can be used for removal and disposal of fencing around a treatment system). However, RACER currently does not have any models for removal of process residuals, unused treatment chemicals, draining and decontamination of piping and treatment vessels, physical disassembly of salvageable equipment, etc.

- **Implementability:** The new System Decommissioning cost model could function similar to the Operations & Maintenance model by importing sub-technologies and associated parameters from the Remedial Action, Interim Action, and/or Operations & Maintenance phases. Some of the engineering logic and algorithms in the radiological D&D cost model may be adaptable for non-radioactive situations. In particular, the D&D, Specialty Process Equipment (DEE) and the D&D, Conduit, Piping & Ductwork (DED) cost models may be adaptable for non-radioactive process equipment and treatment systems. New assemblies will be required, and some new CSI Tasks may be needed to support the new assemblies.

- **Timeframe for Implementation:** 14 – 20 months

3.2.8 ECP11-14r: New Lead Abatement Technology (revised June 2013)

- **Description:** TRG agency members explained that one issue at their sites is lead based paint on structures and associated lead contaminated soil from lead based paint.

- **Need:** Currently RACER does not contain a technology that deals strictly with lead based paint abatement from structures and soils; however, the Excavation technology is adequate for removing contaminated soils and the Demotion, Buildings technology could be revised to account for handling of

structures containing lead-based paint. Other demolition and structure-related technologies would be assessed for potential changes as well. Such revisions would improve each agency's ability to accurately report liabilities.

- **Implementability:** Revisions to technology(ies) would be made in accordance with the Parametric Tri-Service specification and the RACER Configuration Management Plan and would be developed to fit the current RACER architecture and graphic user interface. New assemblies will be required, and some new CSI Tasks may be needed to support the new assemblies.

- **Timeframe for Implementation:** 14 – 20 months

3.2.9 ECP 13-02: Folder Level Cost Display

- **Description:** Several TRG agency members expressed an interest in adding a folder level total cost to the main RACER screen.

- **Need:** This was a feature in RACER 10.4 that was not included in the .NET version. Direct and marked up cost totals for the entire folder would be helpful for users. This would give the user insight on the overall cost of the group of estimates within the folder.

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

3.2.10 ECP 13-03: Emerging Contaminants

- **Description:** RACER should be enhanced to include analytical costs for emerging contaminants by modify existing RACER technologies to ensure they can effectively address sites with these "new" Contaminates of Concern (COCs) and/or create new technologies, if needed.

- **Need:** New assembly cost line items and analytical templates are needed due to Department of Defense (Federal Facility) and regulator concern with respect to human health and environmental risk associated with emerging contaminants. Various existing models would need to be enhanced with analytical template selections that cover different categories of emerging contaminants. These include perflourinated compounds (PFCs) (such as perfluorooctane sulfonate [PFOS] and perfluorooctanoic acid [PFOA]), alkylphenols (found in oil field chemicals, fire retardant materials tires, adhesives, coatings, and high performance rubber products); brominated flame retardant [BFRs] (including polybrominated diphenyl ethers [PBDEs] and polybrominated biphenyl [BB 153]); and explosives (such as 1,4, dioxane, dinitrotoluene [DNT], 2,4,6 trinitrotoluene [TNT], 1,2,3 trichloropropane, N-nitroso-dimethylamine [NDMA]). In addition, the USEPA has issued National Primary Drinking Water Regulations (Maximum Concentration Levels, or MCLs) for over twenty pesticides, including atrazine (3 parts per billion [ppb]), alachlor (2 ppb), and dibromochloropropane (DBCP, 0.2 ppb).

3-8

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

3.2.11 ECP 13-04: Accounting for Costs Associated with Well Development in GMW

- **Description:** Project costs for groundwater monitoring well development methods and associated IDW disposal are not currently calculated in RACER.

- **Need:** Well installation technology should be assessed to determine the feasibility to include algorithms to calculate well development activity costs and volume of IDW generated to be imported into the WMS model.

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

3.2.12 ECP13-06: Dewatering (Sludge) Technology: Parameter Passing

- **Description:** Parameter passing is a feature that some users desire to have added to water treatment technologies, particularly with respect to the passing of parameters to the sludge dewatering technology. For example, if the metals precipitation technology is selected within the same phase as dewatering and is estimated before, a value for Dry solids flow rate would be automatically passed from metals precipitation to dewatering and populated upon running the dewatering technology for the first time.

- **Need:** The RACER parameter passing feature was not incorporated in the Microsoft .NET reprogramming effort converting RACER 10.4 (FY2011) to RACER 11.0 (FY2012). The feature was removed because parameter passing automatically loads a "required" technology parameter. Some users would like this functionality reinstated into RACER.

- **Implementability:** Parameter passing is a feature that requires separate application code for various RACER technologies to communicate data. As described above, this ECP includes a combination of new cost models and revisions to existing cost models. Significant historical project research has been completed by EPA and its contractor. The new models would be developed per the Tri-Service Parametric Modeling standard and RACER change management procedures. This ECP will require development of new assemblies and new CSI tasks in the database. New and revised help topics will be required.

- **Timeframe for Implementation:** TBD

3.2.13 ECP 13-07: Changes to Site-Level Setup Templates

- **Description:** The current list of Site-Level Setup Templates is outdated and requires update.

- **Need:** Several TRG agencies use the Setup Templates in RACER to pre-populate phase types and phase names so that they are consistent with

> **Comment [KSR1]:** This ECP will be removed as soon as the funding comes through.

their agency reporting database, the relevant regulatory program or both. For example, the FAA uses templates but there are none listed for this agency; currently they have to modify an existing template to generate estimates that comply with their reporting database.

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

3.2.14 ECP 14-01: New Electrical Resistance Heating Technology

- **Description:** A new model should be developed to estimate costs for remediating a site via Electrical Resistance Heating (ERH).

- **Need:** ERH is becoming a more commonly applied technology on Government restoration sites. However, RACER currently RACER does not contain a technology to estimate ERH. Currently RACER users desiring to develop on estimate for ERH must develop a User Defined Estimate and/or make significant edits assemblies in the Soil Vapor Extraction cost model.

- **Implementability:** Several case studies and technology research for ERH are currently available in the open literature. The engineering logic and assemblies for ERH will build upon the methods of currently in the soil vapor extraction model but with the inclusion of using thermal rods in the soil. New assemblies will be required, and some new CSI Tasks may be needed to support the new assemblies.

- **Timeframe for Implementation:** TBD

3.2.15 ECP 14-02: Reengineer Site Investigation Technology

- **Description:** The Site Investigation cost model should be reengineered to better reflect current best practices. The model should be expanded to include Military Munitions Response Program site capability and to include more current sampling media and frequency.

- **Need:** The Site investigation cost model estimates cost for planning, investigating, installing groundwater monitoring wells and sampling during the investigation to determine if there are potential impacts to human health and the environment. This model needs the capability to include additional costs to estimate a site inspection for an MMRP site. Other updates needed for this model include correcting formulas in the addendum updating the sampling/monitoring to be consistent with other models.

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

3.2.16 ECP 14-03: Changes to the Markup Templates

- **Description:** The current markup template percentages should be reviewed to ensure they still follow best practices.

- **Need:** Several TRG agencies have indicated that the markup templates may need to be updated. RACER would provide a more realistic marked up cost if the markup templates were reviewed and updated where needed.

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

3.2.17 ECP 14-04: RACER Export to MII

- **Description:** RACER should be enhanced with the capability to produce an export file that can be uploaded into Micro-Computer Aided Cost Estimating System (MCACES) second generation (MII).

- **Need:** Users would like to be able to take a parametric estimate they prepared in RACER for liability purposes and export it to MII. With this new MII estimate, the user would be able to develop the parametric estimate into a detailed estimate that is suitable for an IGE.

- **Implementability:** TBD

- **Timeframe for Implementation:** TBD

4.0 Funding Requirements for FY15 - FY19

4.1 FY15

Activity	Estimated Cost (in $000s)
Maintenance & Support Contract (contract price for Task Order 0003 + 2.5% escalation per year)	TBD
Government QA & Acceptance Testing	$
V&V Activities	$
TRG and RSC Meetings	$
ECP # 11-06: Reengineer Five Year Review Technology	TBD
ECP # 11-07: Reengineer Natural Attenuation Technology	TBD
ECP # 11-08: Revisions to Monitoring Technology / Sampling & Analysis mini-model	TBD
ECP #11-12: New Cost Model for Remediation System Decommissioning	TBD
ECP # 14-03: Changes to the Markup Templates	TBD

4.2 FY16

Activity	Estimated Cost (in $000s)
Maintenance & Support Contract (contract price for Task Order 0003 + 2.5% escalation per year)	TBD
Government QA & Acceptance Testing	$
V&V Activities	$
TRG and RSC Meetings	$
ECP # 11-09: Reengineer In-Situ Biodegradation Technology	TBD
ECP # 11-11 Residual Waste Management	TBD
ECP# 13-02: Folder Level Cost Display	TBD
ECP # 13-04: Accounting for Costs Associated with Well Development in GMW	TBD
ECP # 14-01: New Electrical Resistance Heating Technology	TBD

4.3 FY17

Activity	Estimated Cost (in $000s)
Maintenance & Support Contract (contract price for Task Order 0003 + 2.5% escalation per year)	TBD
Government QA & Acceptance Testing	$
V&V Activities	$
TRG and RSC Meetings	$
ECP # 11-10: Include Remaining Drilling Models in Well Abandonment Technology	TBD
ECP # 11-14: Revision of Existing Models to Include Lead Abatement	TBD
ECP# 13-06: Dewatering (Sludge) Technology – Parameter Passing	TBD

4.4 FY18

Activity	Estimated Cost (in $000s)
Maintenance & Support Contract (contract price for Task Order 0003 + 2.5% escalation per year)	TBD
Government QA & Acceptance Testing	$
V&V Activities	$
TRG and RSC Meetings	$
ECP # 13-03: Emerging Contaminant	TBD
ECP # 14-02: Reengineer Site Investigation Technology	TBD
ECP # 14-04: RACER Export to MII	TBD

4.5   FY19

Activity	Estimated Cost (in $000s)
Maintenance & Support Contract (contract price for Task Order 0003 + 2.5% escalation per year)	TBD
Government QA & Acceptance Testing	$
V&V Activities	$
TRG and RSC Meetings	$
	$

Appendix A

RACER **Technology History Tables**