

The Remediation Data Repository (RADAR) Tool



MEMORANDUM

DATE: November 28, 2017

SUBJECT: System Components, Entity Relationship Diagram, and Future Enhancements for the Remediation Data Repository (RADAR) Web-based Tool

1. Introduction

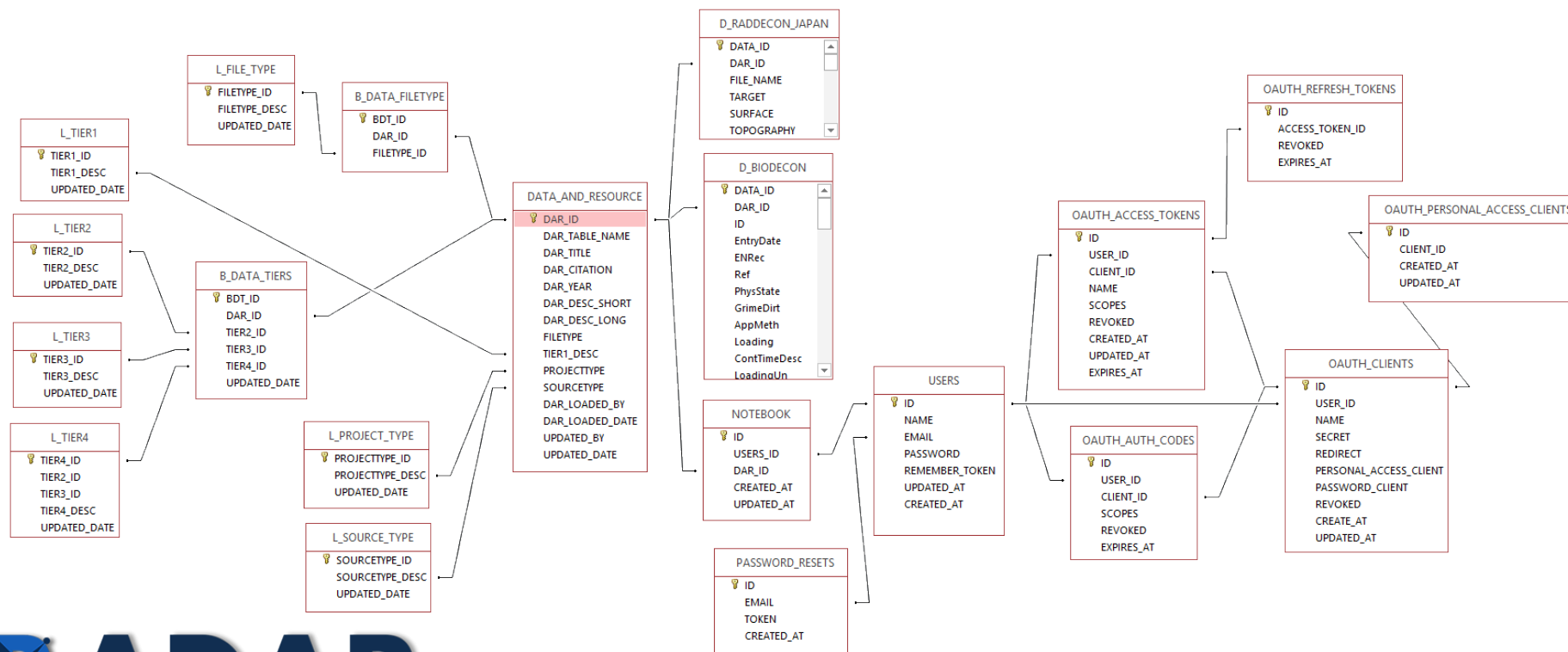
This memorandum describes the final system components, database entity relationship diagram (ERD), and future enhancements for the Remediation Data Repository (RADAR) Web-based tool. The tool provides a simple, user-friendly interface to search and explore National Homeland Security Research Center (NHSRC)-generated data using web services to communicate with the database. The tool is intended for a wide audience including scientists, engineers, and researchers.

2. System Components

The **front-end** component powers the user experience. It provides the interface to the user to allow interaction with all the pages, data, document access, etc. The front-end also utilizes a subset of the data that drive the application and support several operational and navigational features. The front-end presentation component consists of HTML 5, CSS, JavaScript, and API web services consumption. The front-end was implemented with React.js with Redux.

The **back-end** powers the website and consists of web servers, databases, and the server-side programming components and business logic. The back-end component provides web services to supply data to the front-end, as needed, based on user actions. Back-end data are stored in a MySQL database and server-side programming in the middle-tier was implemented with PHP (Laravel 5).

3. Entity Relationship Diagram



4. Hosting

The RADAR prototype is currently hosted in a temporary cloud environment. Following a prototype review phase, EPA will navigate the application deployment process to facilitate a transition to an EPA-approved environment. Activities will include:

- Determination of the most appropriate deployment environment
- Completion of application security reviews and security plans
- Completion of application readiness reviews and checklists
- Transition to EPA's environment
- Testing and deployment to development, staging and production environments

It is recommended that an evaluation be performed of whether a cost-sharing opportunity for multiple NHSRC applications (e.g., share a dedicated server with I-WASTE modernization) deployed to a dedicated server in EPA's traditional hosting environment provides a more cost effective option than current cloud offerings. The technology in which the tool is developed could be deployed in either environment.

5. Potential Future Features

Throughout prototype development, many additional features were identified as potential future enhancements for consideration. A listing of features to consider is provided below:

1. Create Admin Module Functions

- a. Create an admin user management feature to approve/deny account requests and access and log usage data
- b. Enhance user account management features
 - i. Allow users to recover their password if they forget it
 - ii. Implement registration confirmation whereby when users register an account, they must confirm their e-mail address before they can log in
 - iii. Implement new registration notification mechanism
- c. Develop a data registry mechanism/standard operating procedures (SOPs)
 - i. Establish requirements and protocol for proposing new data sets to include in the repository
 - ii. Establish a workflow to propose, review, approve, and publish data sets
 - iii. Specify required metadata and keyword tagging
- d. Design an admin module to modify (add, edit, delete) tool metadata used throughout
 - i. Categories
 - ii. Keywords
 - iii. Project types

2. Enhance Search Results

- a. Enhance Filter Panel – Provide more sophisticated prompts whereby counts of sources associated with keywords can be included and dynamically updated based on layering additional filters
- b. Create a Manage Notebook Feature – Provide a mechanism to Manage Notebook (e.g., like Quick Cart View) to allow users to “uncheck” and remove data sets added to their notebook without having to find the search result entry on the page
- c. Enable Dynamic Results Entry/Available Data Tab – Create dynamic listing of available data fields based on data registry input (e.g., Identify fields upon upload that should be listed on the available data tab); Require data field descriptions to improve context display
- d. Evaluate applicability and feasibility of Elasticsearch¹ to improve data mining opportunities as repository grows over time

3. Enhance View Notebook

- a. Define and implement a header to describe each data table (e.g., source, date, etc.)
- b. Implement “Merge Data” – Create functionality to merge “relatively similar” datasets into a single data table
 - i. Need to define business rules for when datasets can be aggregated (e.g., within the same category and at least one keyword in common)
- c. Allow users to reorder or filter their notebook
- d. Offer expanded data set views – Currently, datasets displayed in View Notebook are abbreviated to improve performance (implemented with the react-virtualized library). If users want the full data set, they can download the data.
The prototype is optimized for search/filter. Consider offering a pop-out view or send user to a new page optimized for selected data (selected columns and filtered set if applicable).
- e. Consider (facilitated through a data registry mechanism) initially displayed specific default columns to manage initial display rather than load all possible columns

4. Dynamic Stats Tab

- a. Create a dynamic data feed to source the treemap of research coverage accessible from the Stats tab

5. Enhanced Widget Features

- a. Consider what features to offer and how to facilitate creating tools/calculators using data stored in the repository

6. General

- a. Incorporate a data loading indicator for large data sets (e.g., BioDecon widget load time and View Notebook data sets)
- b. Consider storing keyword terms searched by users to quantify what information users seek
- c. Where appropriate, incorporate “upcoming feature” indicators to alert users
- d. Consider utility of incorporating a decision tree framework to assist users in identifying the most relevant data stored in the repository

¹ <http://www.elastic.co/products/elasticsearch>

Appendix A: RADAR Prototype Evaluation Worksheet

RADAR Evaluation

Introduction

The Remediation Data Repository (RADAR) Tool is a Web-based tool developed to enable data sharing across EPA's Homeland Security Research Program's models and decision support tools. Improving the way in which information is shared amongst decision makers, scientists, and responders, as well as models and decision support systems, is critical to the success of any response or recovery operation. Current data sharing capabilities exist; however, the ability to fully operate in a holistic manner is lacking. Providing the capability for the immediate distribution of up-to-date research amongst stakeholders and tools or models will enable more efficient and informed decision making, greatly enhance the communication of the latest decontamination technology performance metrics, and therefore facilitate better estimates of the resources necessary to characterize and cleanup a contaminated area.

RADAR consists of a range of topics and information derived from EPA's NHSRC research efforts. The purpose of RADAR is threefold: 1) emergency support: provide support to cleanup and recovery operations; 2) research: inform research and facilitate use of results; and 3) provide models and software tools with the most up-to-date research. Figure 1 illustrates the basic methodology of RADAR.

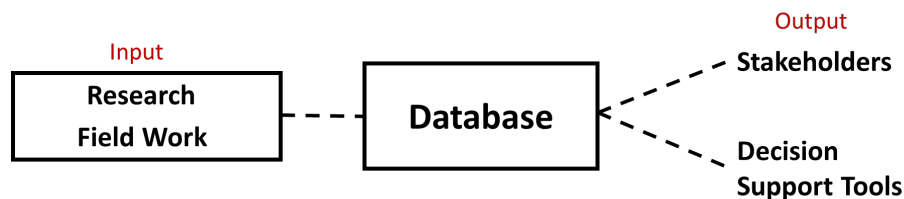


Figure 1. RADAR Methodology

The RADAR site consists of five primary features:

- Landing Page (search and results): the landing page is the starting point for users. Searches can be initiated through a predictive search box or by clicking on the relevant agent icon. Results are displayed based on the users search and filter specifications;
- Widgets: build custom widgets using data stored on RADAR. These widgets can be used to aid in decision making, scale data, or test operational feasibility;
- Share: share data with other applications using RADAR's application programming interface (API). With this feature, users can access data stored within RADAR for use in their applications;
- Upload: upload custom data to RADAR. Once approved, these data are shared with other RADAR users and applications; and
- Stats: metrics illustrating the availability of current research data that are included in RADAR are displayed below. Use this information to gain a better understanding of available data, as well as data gaps.

Purpose

The purpose of this evaluation is to test the basic functionality of RADAR (i.e., search and results). The system is currently in a feasibility testing phase. This testing will determine whether the basic "look and

feel” of RADAR meets the needs of potential end-users. Furthermore, testing will further determine whether users can easily navigate and utilize the basic features of RADAR.

Instructions

This worksheet was created to evaluate RADAR, which is necessary fulfill NHSRC’s technical review requirements. Please print or enter your answers using Adobe. Once finished, return the completed worksheet to Timothy Boe @ boe.timothy@epa.gov. Once your worksheet has been received, you will receive an answer key. If you were able to complete all of the directions with a “Yes” and answer all of the questions correctly, then consider recommending this product as “Acceptable as is.”

Name: _____

Step 1: Log in to RADAR

Note: RADAR is based on a staging server and requires 2-step login process.

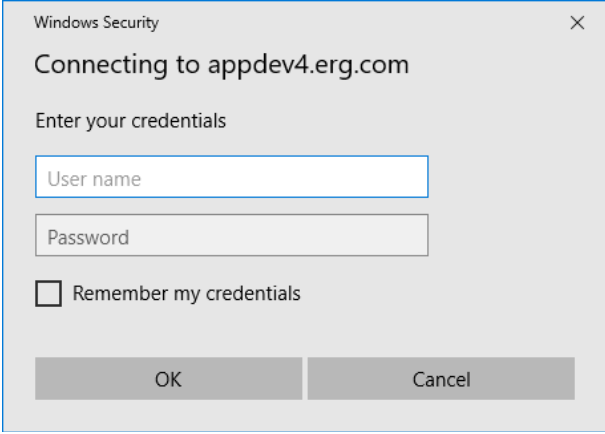
The browser-based login:

Note: it is recommended that you copy and paste the username and password.

url: <https://appdev4.erg.com/radar/>

username: radar

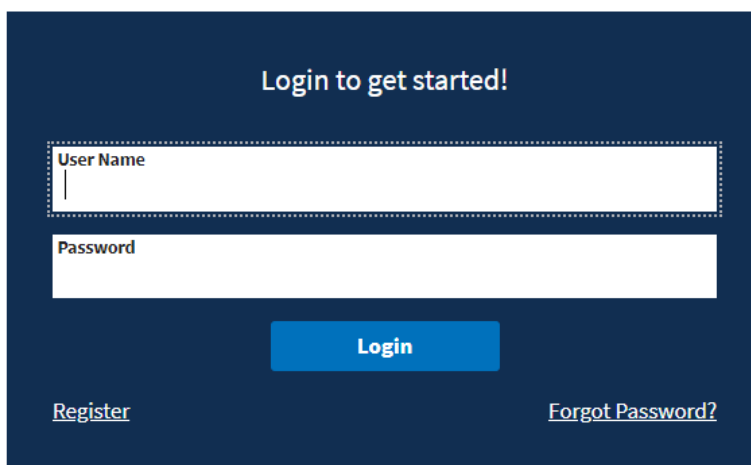
password: epa4Review!

A screenshot of a Windows Security dialog box titled "Connecting to appdev4.erg.com". The dialog prompts the user to "Enter your credentials". It contains two input fields: "User name" and "Password". Below these fields is a checkbox labeled "Remember my credentials", which is currently unchecked. At the bottom of the dialog are two buttons: "OK" and "Cancel".

RADAR login:

username: nhsrc.user@erg.com

password: password



Login to get started!

User Name

Password

Login

[Register](#) [Forgot Password?](#)

Were you able to log in?

Yes _____ No _____ Explain:

Step 2: Text Search

Enter the word “**Rad**” in the search box.

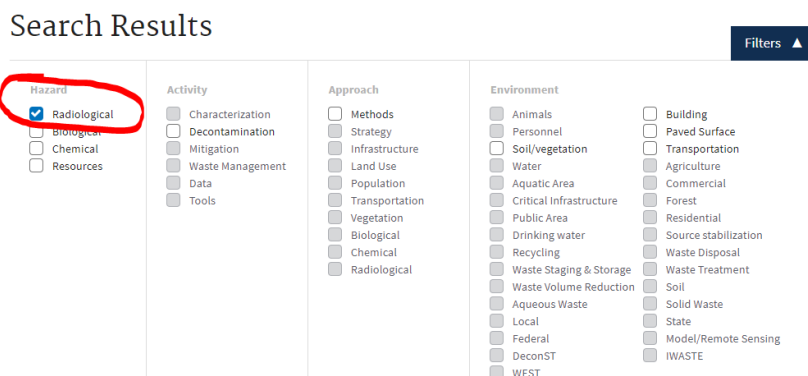
Did the word “Radiological” appear as a suggested search term?

Yes _____ No _____ Explain:

Step 3: Topic Search

Click the icon “**Radiological**” under “Browse by Topic”.

Did the search results page appear with a checkbox next to “Radiological”?



Search Results Filters ▲

Hazard	Activity	Approach	Environment
<input checked="" type="checkbox"/> Radiological	<input type="checkbox"/> Characterization	<input type="checkbox"/> Methods	<input type="checkbox"/> Animals
<input type="checkbox"/> Biological	<input type="checkbox"/> Decontamination	<input type="checkbox"/> Strategy	<input type="checkbox"/> Personnel
<input type="checkbox"/> Chemical	<input type="checkbox"/> Mitigation	<input type="checkbox"/> Infrastructure	<input type="checkbox"/> Soil/vegetation
<input type="checkbox"/> Resources	<input type="checkbox"/> Waste Management	<input type="checkbox"/> Land Use	<input type="checkbox"/> Water
	<input type="checkbox"/> Data	<input type="checkbox"/> Population	<input type="checkbox"/> Aquatic Area
	<input type="checkbox"/> Tools	<input type="checkbox"/> Transportation	<input type="checkbox"/> Critical Infrastructure
		<input type="checkbox"/> Vegetation	<input type="checkbox"/> Public Area
		<input type="checkbox"/> Biological	<input type="checkbox"/> Drinking water
		<input type="checkbox"/> Chemical	<input type="checkbox"/> Recycling
		<input type="checkbox"/> Radiological	<input type="checkbox"/> Waste Staging & Storage
			<input type="checkbox"/> Waste Volume Reduction
			<input type="checkbox"/> Aqueous Waste
			<input type="checkbox"/> Local
			<input type="checkbox"/> Federal
			<input type="checkbox"/> DeconST
			<input type="checkbox"/> WEST
			<input type="checkbox"/> Building
			<input type="checkbox"/> Paved Surface
			<input type="checkbox"/> Transportation
			<input type="checkbox"/> Agriculture
			<input type="checkbox"/> Commercial
			<input type="checkbox"/> Forest
			<input type="checkbox"/> Residential
			<input type="checkbox"/> Source stabilization
			<input type="checkbox"/> Waste Disposal
			<input type="checkbox"/> Waste Treatment
			<input type="checkbox"/> Soil
			<input type="checkbox"/> Solid Waste
			<input type="checkbox"/> State
			<input type="checkbox"/> Model/Remote Sensing
			<input type="checkbox"/> IWASTE

Yes _____ No _____ Explain:

Step 4: More Info

Scroll to the bottom of the page and click the title of the search result (i.e., Remediation of Contaminated Areas in the Aftermath...)

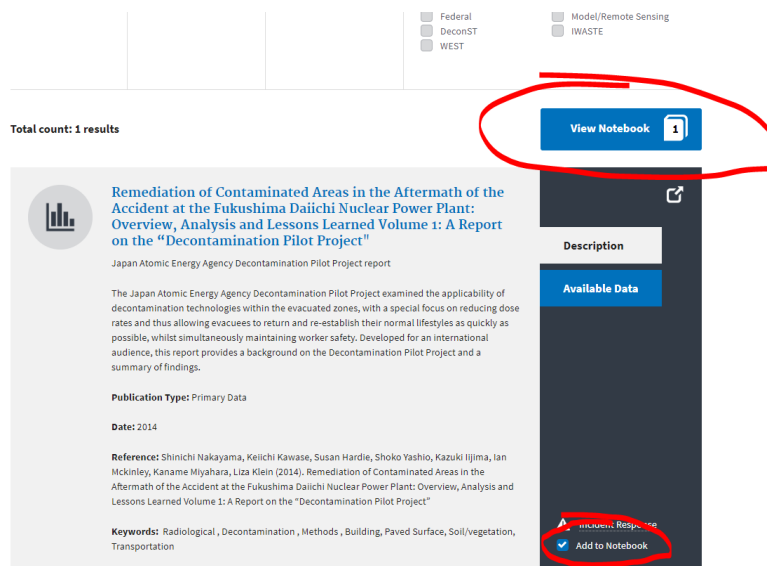
Did an expanded view appear describing the source in more detail?

Yes _____ No _____ Explain:

Step 5: Add to Notebook

Click the “**Add to Notebook**” check box (bottom right of information pane under Remediation of Contaminated Areas in the Aftermath...) The checkbox should now be checked. Click the **View Notebook** button (bottom right of the search filter).

Did the “View Notebook” page appear with an expandable bar showing the title of the resource that was selected?



Yes _____ No _____ Explain:

Step 6: Customize Columns and Search Results

Expand the results by clicking on the title of the saved resource (e.g., Remediation of Contaminated Areas in the Aftermath...). Click the “**Customize Columns**” button and deselect every option except (by unchecking the checkbox):

- Target
- Decon_Method
- Machinery_Required
- Surface

In the local search bar (under the customize columns box) enter the word “**nozzle**” (all lower-case; no quotes).

Does your table look similar to the image below? (i.e., single result for tree trunk washing)

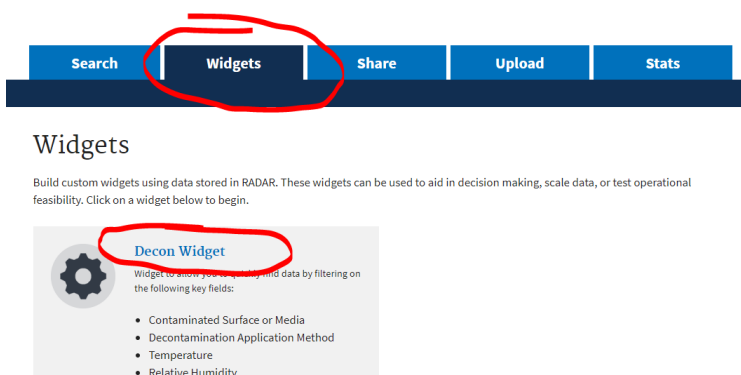
Search

TARGET	SURFACE	DECON_METHOD	MACHINERY_REQUIRED
Forest	Trees	Trunk washing and surface bark stripping	Nozzle-type high-pressure washing machine (~ 8 MPa), high platform

Yes _____ No _____ Explain:

Step 7: Widget

Click the **Widget** tab and select the decon widget (click the widget name).



Using the dropdown box (directly above the table), select the following options:

Surface or media: carpet

Application method: liquid spray

Temperature: all

RH: all

How many results/rows appear in the table? _____

Which decon agent had the highest log reduction when using a liquid spray method on carpet (circle the correct response)?

- A) Hydrogen peroxide
- B) Sodium hypochlorite
- C) Kool-Aid
- D) Combination of A & B

Congratulations! You have completed the RADAR Evaluation Worksheet. Please send your results to Timothy Boe: boe.timothy@epa.gov.



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