



GREENER CLEANUPS

ESTIMATING ENVIRONMENTAL FOOTPRINTS USING SEFA

***S*SPREADSHEETS *FOR* *E*ENVIRONMENTAL *F*FOOTPRINT *A*ANALYSIS**

October 28, 2014

Carlos Pachon, US EPA HQ (Superfund)

Karen Scheuermann, US EPA Region 9

Purpose of SEFA Webinar

- *Provide a basic understanding of SEFA*
- *Demonstrate general organization and specific functions of the SEFA worksheets*
- *Open forum for discussion of footprint analyses and advanced features in SEFA*

Notes:

This webinar will be very technical, getting into the details of the SEFA worksheets

Participants should already have a solid understanding of greener cleanups

Participants should already be familiar with EPA's Footprint Methodology

SEFA

Spreadsheets
for
Environmental
Footprint
Analysis

*Additional
experience likely
needed to run a
footprint analysis
on SEFA*

Agenda

- | | |
|-------------------------------------------------------------------------------|---------------|
| 1) Overview Carlos Pachon | 10 min |
| 2) Basics of SEFA Karen Scheuermann | 30 min |
| 3) Q/A on Basics Carlos Pachon | 10 min |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min |
| 5) Q/A on Key Features Carlos Pachon | 10 min |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min |
| 7) Wrap-up Carlos Pachon | 10 min |

SEFA

Spreadsheets
for
Environmental
Footprint
Analysis

Overview of Greener Cleanups

→ **Green Remediation: The practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions**

→ **Goal of Footprint Analysis: Identify the most significant contributors to a project's environmental footprint and better focus efforts to reduce them**

→ **EPA published Footprint Methodology February 2012**

→ **SEFA is a companion tool to EPA's Footprint Methodology**

→ **SEFA was originally posted on Clu-in April 2012 and updated August 2014**

Find the Footprint Methodology and SEFA at
<http://clu-in.org/greenremediation/methodology/index.cfm>

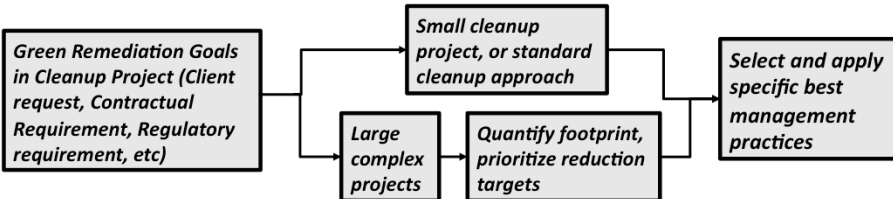
SEFA

Spreadsheets
for
Environmental
Footprint
Analysis

*EPA's May 2013
Webinar discussed
the Methodology
in greater detail*

The Role of Footprint Analysis in Greener Cleanups

SEFA



→ **ASTM Standard Guide for Greener Cleanups (E2893):**

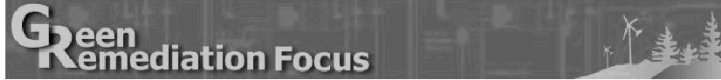
- Codifies best practices and defines a process for reducing environmental footprint
- Includes over 160 BMPs and outlines process for straight BMP application or use of quantification
- Useful protocol for contracting purposes
- Results in a transparent documented process that is reported publicly



Cluin.org/greenremediation

SEFA


Spreadsheets
for
Environmental
Footprint
Analysis




Footprint Assessment

• Home

Methodology

 EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint supplements EPA's 2008 green remediation primer (EPA 542-F-08-001), an approach to quantify energy, air, and waste that comprise the environmental remedy. It also provides suggestions on how to during the remedy selection, design, implement phases. After finalizing the methodology in 2012, EPA publicly released the Spreadsheets for Environmental Footprint Analysis (SEFA), which are designed to help users apply methodology's metrics on a site-specific basis.


Spreadsheets for Environmental Footprint Analysis (SEFA) **Updated August 2014**

 EPA's Spreadsheets for Environmental Footprint Analysis (SEFA) are designed to assist EPA in conducting an



A Standard Guide for Greener Cleanups


• Home

 **May 22, 2013, Web Seminar**
EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint. This seminar discussed the regulatory framework, summarized the methodology, and explained the steps of performing an environmental footprint analysis.
[>>> Click here to view the archived webinar.](#)

EPA representatives worked with ASTM International to develop a consensus-based standard intended to encourage property owners, agencies, responsible parties, developers and communities to voluntarily use greener practices for contaminated site cleanup. As part of the standard development process, EPA's Office of Solid Waste and Emergency Response (OSWER), EPA regional offices and stakeholders developed a framework outlining the desired outcomes of a potential standard for greener cleanups. The framework reflected EPA's *Greener Cleanups*, which focus on five core elements associated with a cleanup project's environmental footprint.

ASTM International issued the final *Standard Guide for Greener Cleanups (E2895-13)* in November 2013. The guide includes:

- A systematic protocol to identify, prioritize, select, implement and report on the use of best management practices (BMPs) to reduce the environmental footprint of cleanup activities
- A list outlining more than 160 greener cleanup BMPs that are linked to the core elements of a greener cleanup and to relevant cleanup technologies
- Guidelines to quantify the environmental footprint of cleanups

 **April 25, 2014, Web Seminar**
ASTM Greener Cleanup Standard Guide: An Introduction
This seminar provided insight on development of a new *Standard Guide for Greener Cleanups* (ASTM E2895-13).

| Agenda | | <div style="border: 1px solid black; padding: 5px; display: inline-block;">SEFA</div> Spreadsheets <i>for</i> Environmental Footprint Analysis |
|-------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Overview Carlos Pachon | 10 min ✓ | |
| 2) Basics of SEFA Karen Scheuermann | 30 min ← | |
| 3) Q/A on Basics Carlos Pachon | 10 min | |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min | |
| 5) Q/A on Key Features Carlos Pachon | 10 min | |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min | |
| 7) Wrap-up Carlos Pachon | 10 min | |

Basics of SEFA

Spreadsheets for Environmental Footprint Analysis

SEFA is...

- a set of Excel workbooks developed by EPA
- designed for conducting environmental footprint analyses at clean-up sites
- compatible with EPA's Footprint Methodology
- set up in "blank slate" template format
- structured for inputting data, running calculations, and organizing outputs

*originally
designed for
internal EPA use*

*placed on EPA
web page for
public access*

*updated in
August 2014*

SEFA has been updated for ease of use and flexibility of application

- ✓ **Simplified and consolidated data entry**
- ✓ **Increased flexibility for user-specific inputs**
- ✓ **Graphical outputs in chart format**
- ✓ **Notes and instructions for all key features**
- ✓ **Calculator for groundwater well construction**

Acknowledgements to the following TetraTech staff (past and present) who developed the original SEFA worksheets and made the current updates:

**Doug Sutton
Mike Pavarini
Rob Greenwald**

In this webinar we will focus on the features of the updated SEFA worksheets

Notes

→ **Simplified and consolidated data entry**

- * all site and remedy data entry is consolidated in one workbook
- * drop-down menus expanded for ease of selecting inputs

→ **Increased flexibility for user-specific inputs**

- * user overrides added for fuel usage rates
- * capacity increased for user-defined footprint conversion factors

→ **Graphical outputs in chart format**

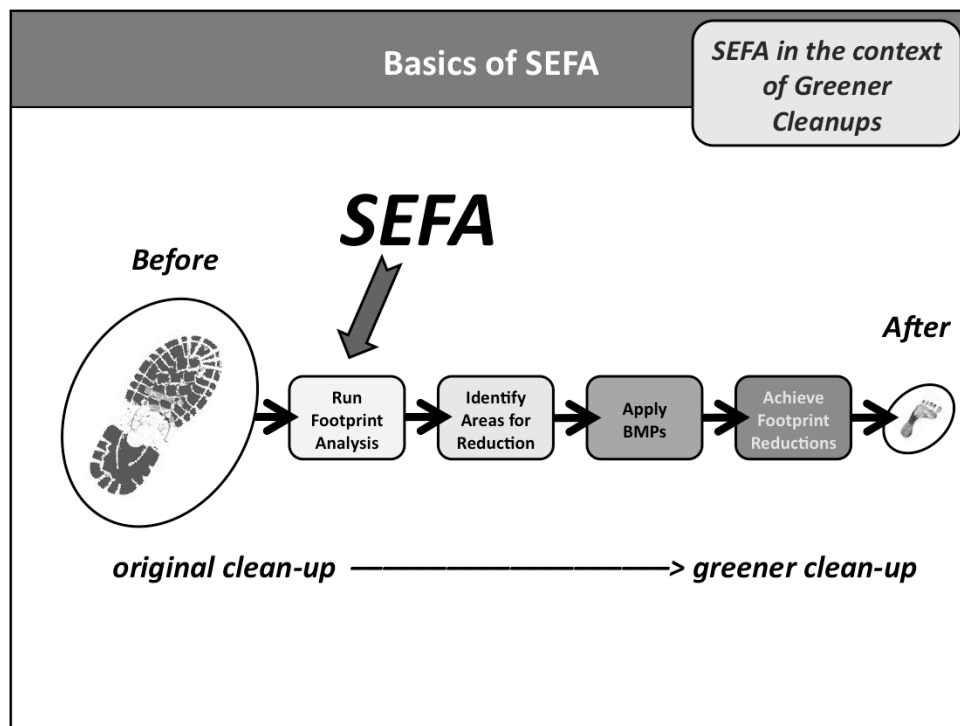
- * bar charts and pie charts for results in energy usage and air emissions
- * automatically populated

→ **Notes and instructions for all key features**

- * notes and instructions expanded and placed on new tabs in the excel workbooks
- * abbreviated reminders and notes remain in the data entry tabs

→ **Calculator for groundwater well construction**

Terminology and labels have also been updated for clarity and consistency.



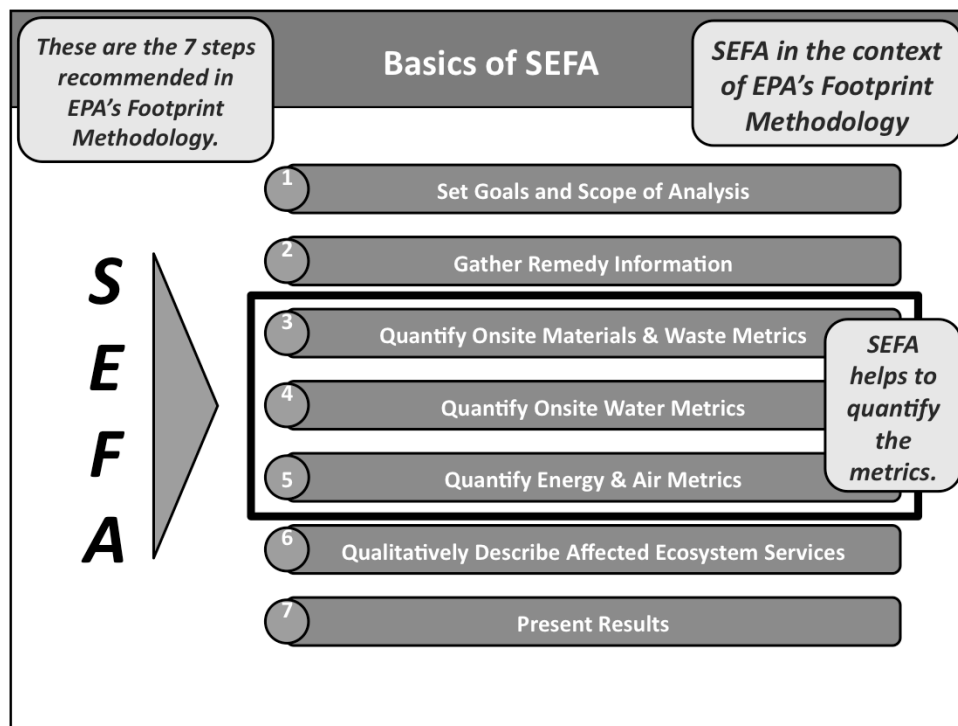
Notes

→To move from the larger footprint (before) to the smaller footprint (after), you will likely go through the following steps:

- * Identify Areas for Reduction
- * Apply BMPs
- * Achieve Footprint Reduction

→If you choose to do a footprint analysis, it would be most beneficial before you identify areas for reduction.

→EPA's Footprint Methodology and SEFA can help you with the footprint analysis.



Notes

These seven steps are described in detail in EPA's Footprint Methodology.

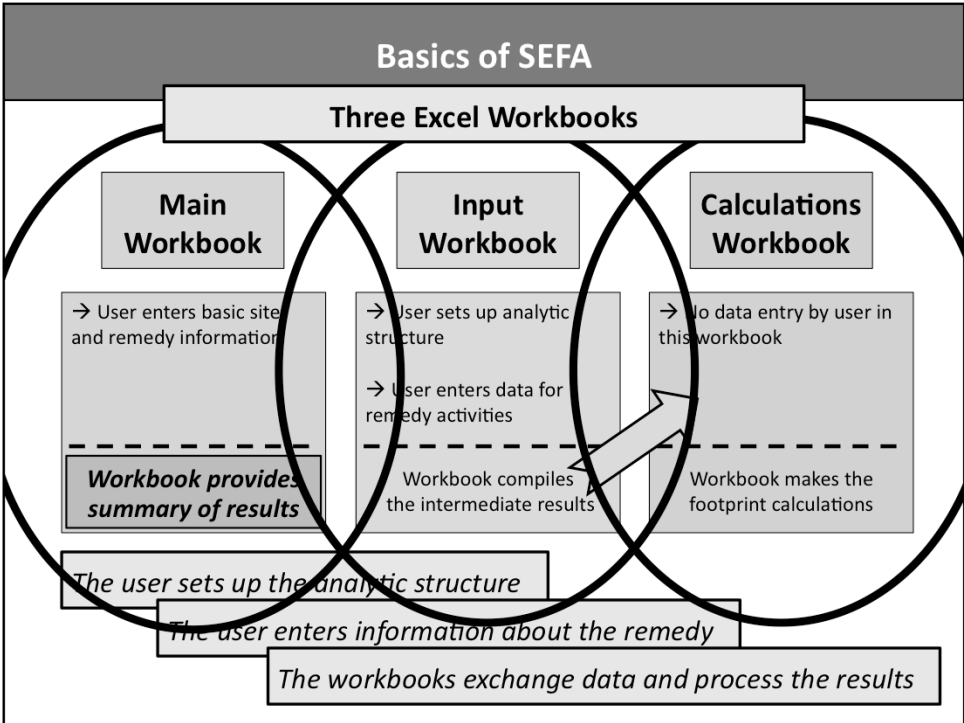
→Step 1. The project manager should establish the goals and scope of the footprint analysis to ensure that the questions of interest for the site and remedy are addressed. This is an important step, because the design of the footprint analysis will depend on the goals and scope. SEFA does not help with Step 1.

→Step 2. The project manager (or contractors or in-house experts conducting the footprint analysis) will gather the data required for the analysis. SEFA does not help with Step 2.

→Steps 3, 4, and 5. These are the "number crunching" steps of the Footprint Methodology. SEFA is designed to assist with Steps 3, 4, and 5.

→Step 6. The project manager should prepare a qualitative description of affected ecosystem services. SEFA does not help with Step 6

→Step 7. SEFA provides the numerical results of the analysis, but in Step 7 it will be up to the project manager to present and interpret the results.



MAIN WORKBOOK

User sets up the basic structure of the footprint analysis

Greener Cleanups: EPA Spreadsheets for Environmental Footprint Analysis - August 2014
Main Workbook

Site Name: **Green Hills**

Remedy: **Dig & Haul**

Site Name and Remedy Name

Identify the site name and remedy name in the spaces above. These will be populated on all of the worksheets for the project.

User may identify up to six Remedy Components ...

... to reflect stages of the remedy

| Component | Remedy Component Names* |
|-------------|-------------------------|
| Component 1 | Site Investigation |
| Component 2 | Excavation |
| Component 3 | Soil Sent Off-Site |
| Component 4 | Backfill |
| Component 5 | Long-term Monitoring |
| Component 6 | |

*Fill in unique names for Remedy Components (optional). These names will be populated on all of the worksheets for the project.

Intro to SEFA | **General** | Instructions | Summary | Totals by Scope and Component | End

PAGE: 1 OF 1

13

Notes

- This is a screen shot of the tab in the Main Workbook where the user sets up the basic structure of the footprint analysis.
- There is also space at the bottom of the worksheet for adding a narrative description of the Site and Remedy.

MAIN WORKBOOK

User sets up the basic structure of the footprint analysis

Greener Cleanups: EPA Spreadsheets for Environmental Remediation
Main Workbook

Site Name: Greener Cleanups
Remedy: Dig

Identify the site name and remedy name. These names will be populated on all of the worksheets.

Enter the path name (if not saved in the "Calculations" workbook).

Path Name: SEFA_Tutorial_calculations

Calculations File Name: SEFA_Tutorial_calculations

The Remedy Components can be set up to differentiate among various aspects of the remedy.

- different stages of the remedy
- alternative remedy designs
- specific remedy activities
- separate years in the remedy

| Component | Remedy Component Names* |
|-------------|---------------------------------|
| Component 1 | Hazardous Waste Transport |
| Component 2 | Municipal Solid Waste Transport |
| Component 3 | Remediation Materials |
| Component 4 | Grid Electricity |
| Component 5 | Off-Site Services |
| Component 6 | Personnel Transportation |

*Fill in unique names for Remedy Components (optional). These names will be populated on all of the worksheets for the project.

Intro to SEFA | General | Instructions | Summary | Totals by Scope and Component | End

PAGE: 1 OF 1

14

Notes

→The way in which you set up the Remedy Components will depend on the goals and scope of the footprint analysis.

→For example:

* ***Different stages of the remedy.*** You may have questions about how the footprints for the various stages of the remedy differ from one another (illustrated here for a dig & haul remedy).

* ***Alternative remedy designs.*** You may want to compare permutations of the same basic remedy (illustrated here for a pump & treat remedy).

* ***Specific remedy activities.*** You may want to consolidate all similar activities into key groups such (illustrated here for fuel usage, waste management, etc.)

* ***Separate years in the remedy.*** You may want to track the footprint for each year of the remedy (illustrated here for a bioremediation remedy).

→The user should establish the goals and scope of the footprint analysis in advance, and then set up the Remedy Components to reflect the goals and scope.

INPUT WORKBOOK

User sets up the structure for data entry

Input Worksheet for Site Investigation

Please specify which Remedial Component this Input Worksheet is part of:

General Scope:
 Dig 100 soil borings using hollow stem auger, up to 20 feet deep.
 Collect 100 soil samples for SVOCs.
 Collect 100 soil samples metals.

Example Items Eliminated through Screening Phase:
 Not included in computer analysis:
 - equipment and material used in collecting samples
 - potable water for equipment decontamination
 - personal protective equipment.

Other Notes and References:

User sets up a data entry tab for each activity in the footprint analysis

→ **Make a copy of the Input Template tab**

→ **Name the new tab to reflect the activity**

Up to 14 data entry tabs can be included in each footprint analysis.

| Equipment Type* | HP** | Load Factor (%) | Efficiency (%) | Electricity Rating (kW)* | Hours Used | Energy Used (kWh) | Notes |
|-----------------|------|-----------------|----------------|--------------------------|------------|-------------------|-------|
| Excavator | 100 | 75% | 90% | 45 | 100 | 3375 | |
| Generator | 100 | 75% | 90% | 100 | 50 | 3750 | |
| Backfill | 100 | 75% | 90% | 100 | 50 | 3750 | |

Site Investigation

Excavation

Soil Sent Off-Site

Backfill

Groundwater Monitoring

Input Instructions

Detailed Notes and Explanations

Input Summary

Site Investigation

Excavation

Soil Sent Off-Site

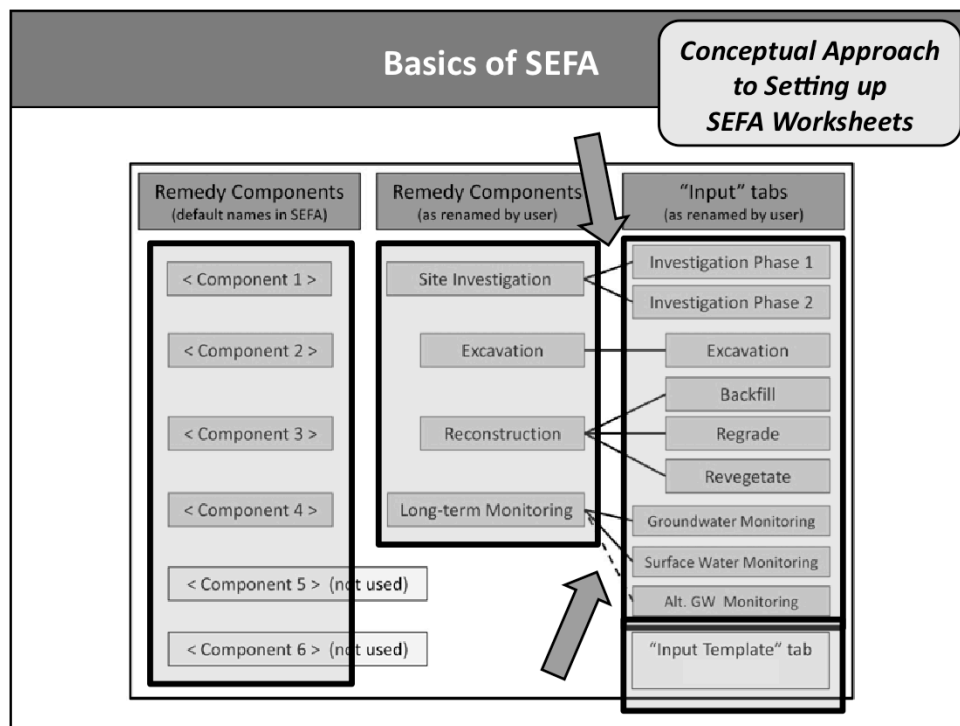
Backfill

Groundwater Monitoring

ALCULATE PAGE: 2 OF 18

Notes

→ The number of tabs you make and what activities you use them for will depend on the goals and scope of the footprint analysis.



Notes

→ This illustrates the conceptual approach to organizing the Remedy Components and the data entry tabs.

→ SEFA is set up with default names for the Remedy Components (Main Workbook), and a single Input Template tab (Input Workbook).

→ In this schematic representation:

- * Four of the Remedy Components have been named by the user.
- * Data entry tabs have been made for nine separate activities.
- * Each of the activities is associated with the one of the Remedy Components.

→ This allows flexibility for the user to subdivide the Remedy Components, if that is useful for the goals of the footprint analysis.

INPUT WORKBOOK

User enters specific information about the remedy

Link to Remedy Component

Input Template page 1

Personnel Transportation

On-site Equipment Use

Looks like lots of blank cells to fill in, but...
→ use only the cells that are relevant to the site
→ enter as much (or as little) detail as needed

On-Site Electricity Usage

Natural Gas and Landfill Gas

User should note any assumptions and items that are screened out

INPUT WORKBOOK

[Link to the Input Summary tab](#)

*Greener Cleanups: EPA Spreadsheets for Environmental Footprint Analysis - August 2014
Green Hills - Dig & Haul*

Remedy Component Number →

Input Summary

Columns headings to flow to input match the name of "input" tabs in this workbook. How 4 means "input" tabs to be used and will not be grouped to a

| | 1 | 2 | 3 | 4 | 5 | |
|-------------------------------------------------|---------------------|------------|--------------------|----------|------------------------|--------|
| | Site Investigation | Excavation | Soil Sent Off-Site | Backfill | Groundwater Monitoring | Total |
| On-site Renewable Energy | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 0 | 0 | 0 | 0 |
| Landfill gas combusted on-site for energy use | ccf CH ₄ | 0 | 0 | 0 | 0 | 0 |
| On-site bioremediation | gal | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 |
| On-site Conventional Energy | | | | | | |
| Grid electricity | MWh | 0 | 0.32 | 0 | 0 | 0.32 |
| On-site diesel use | Gal | 653 | 3,375 | 0 | 2,241 | 6,274 |
| On-site propane use | gal | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 |
| Other On-site Emissions | | | | | | |
| On-site HAP process emissions | Lbs | 0 | 0 | 0 | 0 | 0 |
| On-site GHG emissions | CO ₂ e | 0 | 0 | 0 | 0 | 0 |
| On-site carbon sequestration | CO ₂ e | 0 | 0 | 0 | 0 | 0 |
| GHG avoided by Emission Reduction | CO ₂ e | 0 | 0 | 0 | 0 | 0 |
| Other on-site NO _x emissions | lbs | 0 | 0 | 0 | 0 | 0 |
| Other on-site SO _x emissions | lbs | 0 | 0 | 0 | 0 | 0 |
| Other on-site PM ₁₀ emissions | lbs | 0 | 0 | 0 | 0 | 0 |
| Transportation | | | | | | |
| Transportation petroleum use | gal | 283 | 620 | 10,952 | 1,967 | 13,862 |
| Transportation propane use | gal | 120 | 120 | 0 | 32 | 292 |
| Transportation natural gas use | ccf | 0 | 0 | 0 | 0 | 0 |
| User-defined transportation petroleum use #1 | TBD | 0 | 0 | 0 | 0 | 0 |
| User-defined transportation petroleum use #2 | TBD | 0 | 0 | 0 | 0 | 0 |
| Renewable Energy | | | | | | |
| Transportation biodiesel use | gal | 0 | 0 | 0 | 0 | 0 |
| User-defined renewable energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 |
| User-defined renewable energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 |

On-site diesel use

Diesel & gasoline for transport

Three pages of compiled results

The results are sent to the Calculations Workbook

Input Instructions Detailed Notes and Explanations Input

PAGE: 2 OF 3

22

Notes

→ This is a screen shot of the Input Summary tab in the Input Workbook.

→ A maximum of 14 data entry tabs can be compiled at one time on this tab.

CALCULATIONS WORKBOOK

Make footprint calculations

Greener Cleams: EPA Spreadsheets for Environmental Footprint Analysis - August 2014 Green Hills
Dig & Haul
All Components

All Components - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy | GHG | NOx | SOx | PM | HAPs |
|----------------------------------------|------------|-------|----------|--------|----------|--------|----------|---------|
| Construction Materials | | | | | | | | |
| Cement | dry-Btu | 0 | 0.0031 | | | | 3.11E-06 | 0 |
| Concrete | Btu | 0 | 0.00041 | | | | 0.00001 | 0 |
| Gravel/sand/clay | Btu | 0 | 0.000028 | | | | 0.000002 | 0 |
| CDPE | Btu | 20000 | 0.01 | | | | 0.0062 | 12.8 |
| Photovoltaic system (installed) | W | 0 | 0.0136 | | | | 0.0063 | 0 |
| PVC | Btu | 0 | 0.02 | | | | 0.0013 | 0 |
| Stainless steel | Btu | 0 | 0.0116 | | | | | 0 |
| Steel | Btu | 0 | 0.0044 | | | | | 0 |
| Other refined construction materials | Btu | 0 | 0.01422 | | | | | 0 |
| Other unrefined construction materials | Btu | 0 | 0.000028 | 0 | 0.0033 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | |
| Fuels | | | | | | | | |
| Chesse whis | Btu | | | 0 | 0.000062 | 0 | 0.000033 | |
| Emulsified | Btu | | | | 0 | 0.0066 | 0 | 0.0019 |
| Molasses | Btu | | | | 0 | 0.0011 | 0 | 0.00024 |
| Crude oil | Btu | | | | 0 | 0.014 | 0 | 0.004 |
| Other (residual) (residue of oil) | Btu | | | | 0 | 0.003 | 0 | 0.0005 |
| Notes: | | | | | | | | |
| Fuel Processing | | | | | | | | |
| Biodiesel produced | gal | 399.2 | 0.011 | 0.3242 | 2.4 | 12.038 | 0.008 | 2.4016 |
| Diesel produced | gal | 0 | 0.0032 | 0 | 2.2 | 0 | 0.0097 | 0 |
| Gasoline produced | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Natural gas produced | cf | 0 | | | | | | |
| Notes: | | | | | | | | |
| Public Water | | | | | | | | |
| Public water | gal x 1000 | 4200 | 0.0092 | 38.64 | 5 | 21000 | 0.0097 | 40.74 |
| Notes: | | | | | | | | |

Materials, Energy, Water, Waste, and Off-site Support Activities

Units and Usage

The Calculations Workbook receives results from the Input Workbook ...

... and applies footprint conversion factors.

Seven pages of footprint calculations

No data entry by the user in this Workbook ... but the user may access the intermediate results from the worksheets.

Results are sent to Main Workbook

Notes

→ This is a screen shot of one of the tabs in the Calculations Workbook which receives the results of the Input Workbook. This is where the footprint calculations are made.

→ There is a calculations tab for each Remedy Component, and for all Remedy Components combined.

→ The footprint conversion factors in this table are based on information from public sources and references are included in the SEFA workbooks.

→ The intermediate results in the Calculations Workbook are useful for understanding nuances of the footprint.

→ The metrics on this worksheet are calculated and compiled as suggested in the Footprint Methodology.

MAIN WORKBOOK

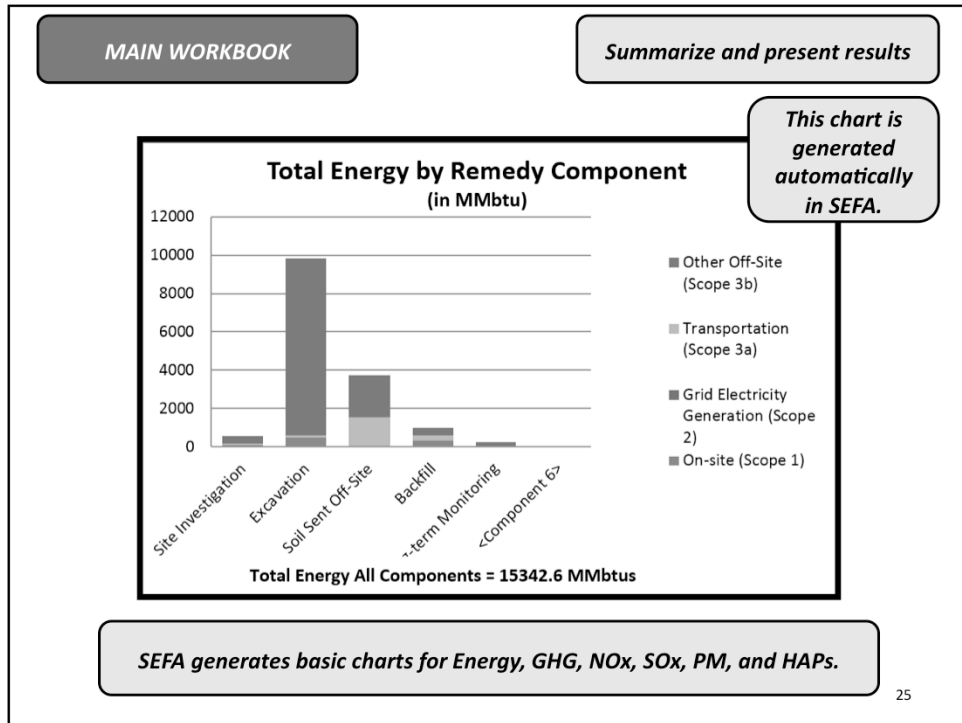
Summarize and present results

| Environmental Footprint Summary | | | | | | | | |
|---------------------------------|---------------------------------------------------------------------------------------------------------|-----------------|-------------------|------------|--------------------|----------|----------------------|--------|
| Core Element | Metric | Unit of Measure | Footprint | | | | | Total |
| | | | Site Inauguration | Excavation | Soil Sent Off-Site | Backfill | Long-term Monitoring | |
| Materials & Waste | Refined materials used on-site | Tons | 0 | 160 | 0 | 0 | 0 | 160 |
| | % of refined materials from recycled or reused material | % | | 0% | | | | 0% |
| | Unrefined materials used | Tons | 0 | 0 | 0 | 7,000 | 0 | 7,000 |
| | % of unrefined materials from recycled or reused material | % | | | | 70% | | 70% |
| Waste | On-site hazardous waste disposed or off-site | Tons | 10 | 0 | 3,312 | 0 | 0 | 3,322 |
| | On-site non-hazardous waste | Tons | 0 | 500 | 7,500 | 0 | 0 | 8,000 |
| Water (used on-site) | Surface water use | MG | 0 | 2.3 | 0 | 1.7 | 0 | 4.2 |
| | Groundwater use | MG | 0 | 0 | 0 | 0 | 0 | 0 |
| | Surface water use | MG | 0 | 0 | 0 | 0 | 0 | 0 |
| | Reclaimed water use | MG | 0 | 0 | 0 | 0 | 0 | 0 |
| | Storm water use | MG | 0 | 0 | 0 | 0 | 0 | 0 |
| | Other water resource #1 | MG | 0 | 0 | 0 | 0 | 0 | 0 |
| Energy | On-site energy used (on-site and off-site) | MWh | 397 | 0 | 0 | 0 | 0 | 397 |
| | Energy voluntarily derived from renewable resources | MWh | 0 | 0 | 0 | 0 | 0 | 0 |
| | On-site renewable energy generation or use + on-site bio-diesel use + bio-diesel use for transportation | MWh | 0 | 0 | 0 | 0 | 0 | 0 |
| | Voluntary purchase of renewable electricity | MWh | 0 | 0 | 0 | 0 | 0 | 0 |
| | Voluntary purchase of RECs | MWh | 0 | 0 | 0 | 0 | 0 | 0 |
| Air | On-site NO _x , SO _x , and PM emissions | Pounds | 117 | 603 | 0 | 401 | 1 | 1,122 |
| | On-site HAP emissions | Pounds | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total NO _x , SO _x , and PM emissions | Pounds | 738 | 7,666 | 11,203 | 1,272 | 305 | 21,183 |
| | Total NO _x emissions | Pounds | 469 | 3,164 | 4,728 | 951 | 168 | 9,480 |
| | Total SO _x emissions | Pounds | 237 | 3,420 | 1,773 | 256 | 123 | 5,810 |
| | Total PM emissions | Pounds | 32 | 1,081 | 4,701 | 65 | 14 | 5,893 |
| Total HAP emissions | Pounds | 8 | 89 | 41 | 1 | 4 | 144 | |
| Total greenhouse gas emissions | Tons CO ₂ e | 43 | 681 | 326 | 77 | 37 | 1,147 | |

This table compiles the results as recommended in EPA's Footprint Methodology.

Notes

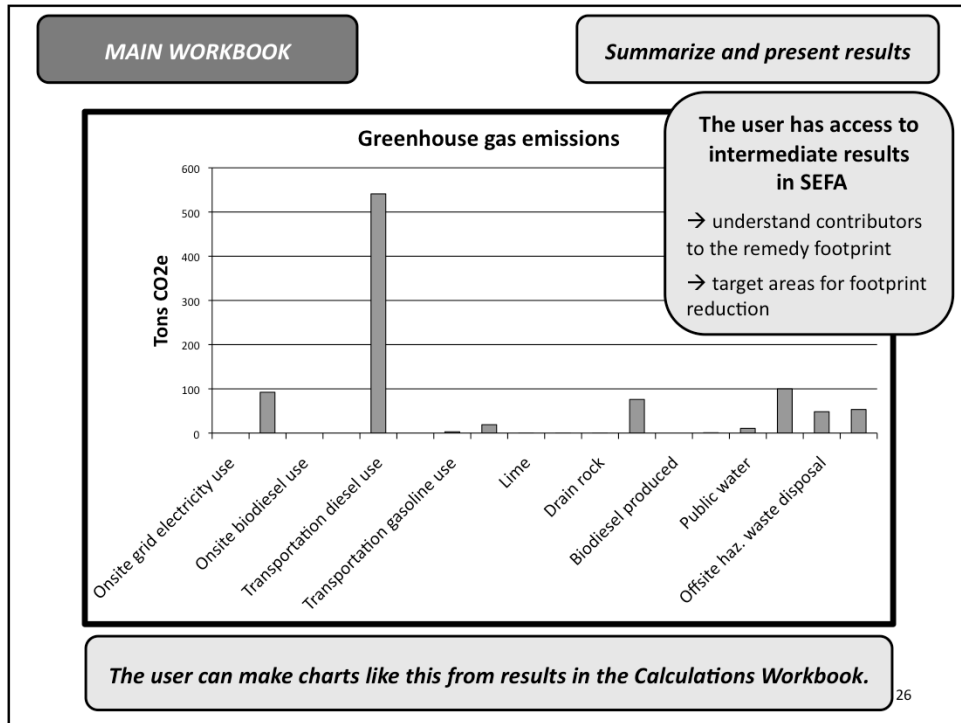
- This is a screen shot of the Summary Table in the Main Workbook, where the results of the footprint analysis are presented.
- The metrics on this worksheet are presented as suggested in the Footprint Methodology, for the core elements of Materials, Waste, Water, Energy, and Air Emissions.



Notes

→ This is an example of a chart that is generated in the Main Workbook.

→ This type of chart is useful for identifying which Remedy Components have the largest footprints.



Notes

→ This is an example of a chart that the user can make with relative ease from the intermediate results in the Calculations Workbook.

→ This chart is not provided automatically by the SEFA workbooks.

Basics of SEFA

Testing Alternative Scenarios



What if....

... I use reclaimed water instead of public water for dust control? ?

... I use biodiesel instead of conventional diesel? ?

... I conduct more extensive site investigation, leading to reduction of the amount of contaminated soil sent to the landfill? ?

SEFA can be used to compare footprints for alternative scenarios

Notes

→ The SEFA workbooks are designed to allow the user to assess alternative scenarios or BMPs fairly easily.

Basics of SEFA

Spreadsheets
for
Environmental
Footprint
Analysis

SEFA is...

- a set of Excel workbooks developed by EPA
- designed for conducting environmental footprint analyses at clean-up sites
- compatible with EPA's Footprint Methodology
- set up in "blank slate" template format
- structured for inputting data, running calculations, and organizing outputs

*Can be set up to
reflect any
remedy design*

*Automatically
applies footprint
conversion
factors*

*Compiles results
consistent with
EPA Methodology*

| Agenda | | SEFA |
|-------------------------------------------------------------------------------|----------|-------------|
| | | |
| 1) Overview Carlos Pachon | 10 min ✓ | |
| 2) Basics of SEFA Karen Scheuermann | 30 min ✓ | |
| 3) Q/A on Basics Carlos Pachon | 10 min ← | |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min | |
| 5) Q/A on Key Features Carlos Pachon | 10 min | |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min | |
| 7) Wrap-up Carlos Pachon | 10 min | |

| Agenda | | |
|-------------------------------------------------------------------------------|--------|---|
| 1) Overview Carlos Pachon | 10 min | ✓ |
| 2) Basics of SEFA Karen Scheuermann | 30 min | ✓ |
| 3) Q/A on Basics Carlos Pachon | 10 min | ✓ |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min | ← |
| 5) Q/A on Key Features Carlos Pachon | 10 min | |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min | |
| 7) Wrap-up Carlos Pachon | 10 min | |

SEFA

Spreadsheets
for
Environmental
Footprint
Analysis

Demonstrate Key Features in SEFA

(A) Brief walk-through of the workbooks

→ Highlight some features that don't show up on screenshots

→ Will visit only a few tabs in the workbooks

(B) Demonstrate three key features in SEFA

→ Add a new activity to the remedy

→ Provide the fuel mix for grid electricity

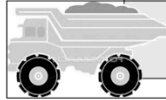
→ Add new remedy material with unique footprint conversion factors

Instructions in SEFA provide information on these three features

Demonstrate Key Features in SEFA

*Our
Hypothetical
Site*

*Simple
Dig & Haul
Remedy*



Remediation at "Green Hills" Site

- conduct site investigation
- excavate contaminated soil
- transport soil to off-site landfill
- backfill excavated areas
- pump and treat system
- conduct groundwater monitoring



In this demonstration a new activity (regrading) will be added to the remedy.

32

Demonstrate Key Features in SEFA

Instructor opens SEFA Workbooks and demonstrates key features in the worksheets

All three workbooks must be open at the same time

Demonstrate Key Features in SEFA

Recap

- *this has been a very simple site and remedy*
- *for a real site, can enter as much or as little detail as may be appropriate*

SEFA provides:

- *format for data entry*
- *application of footprint conversion factors*
- *compilation of results*

The user:

- *sets up structure of analysis to reflect site*
- *provides remedy inputs and documentation*
- *enters data directly into the spreadsheets*





*Your footprint analysis
can be tailored to
specific questions at
your site*

*EPA is using SEFA at
some of our cleanup
sites and we welcome
the use of SEFA by site
owners and PRPs*

34

Demonstrate Key Features in SEFA

SEFA has additional features such as:

-  **Modeling renewable energy sources**
-  **Modeling carbon storage (e.g. from planting trees)**
-  **Overriding fuel usage rates**
-  **Representing alternative modes of transport and fuels**

Instructions in SEFA provide full information on these features

Tutorial illustrating all features of SEFA will be available on Clu-in

These and other features in SEFA allow flexibility for accurately modeling specific site and remedy conditions.

| Agenda | | SEFA |
|-------------------------------------------------------------------------------|----------|-------------|
| | | |
| 1) Overview Carlos Pachon | 10 min ✓ | |
| 2) Basics of SEFA Karen Scheuermann | 30 min ✓ | |
| 3) Q/A on Basics Carlos Pachon | 10 min ✓ | |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min ✓ | |
| 5) Q/A on Key Features Carlos Pachon | 10 min ← | |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min | |
| 7) Wrap-up Carlos Pachon | 10 min | |

| Agenda | | SEFA |
|-------------------------------------------------------------------------------|----------|-------------|
| | | |
| 1) Overview Carlos Pachon | 10 min ✓ | |
| 2) Basics of SEFA Karen Scheuermann | 30 min ✓ | |
| 3) Q/A on Basics Carlos Pachon | 10 min ✓ | |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min ✓ | |
| 5) Q/A on Key Features Carlos Pachon | 10 min ✓ | |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min ← | |
| 7) Wrap-up Carlos Pachon | 10 min | |

| Agenda | | |
|-------------------------------------------------------------------------------|--------|---|
| 1) Overview Carlos Pachon | 10 min | ✓ |
| 2) Basics of SEFA Karen Scheuermann | 30 min | ✓ |
| 3) Q/A on Basics Carlos Pachon | 10 min | ✓ |
| 4) Demonstrate Key Features in SEFA Karen Scheuermann | 30 min | ✓ |
| 5) Q/A on Key Features Carlos Pachon | 10 min | ✓ |
| 6) Open Forum / Advanced Features Karen Scheuermann / Carlos Pachon | 15 min | ✓ |
| 7) Wrap-up Carlos Pachon | 10 min | ← |

SEFA

Spreadsheets
for
Environmental
Footprint
Analysis

Wrap-up

- *SEFA is one part of EPA's Greener Cleanups approach*
- *The SEFA worksheets are available on EPA's Clu-in website*
- *EPA is continuing to use SEFA for our footprint analyses*
- *We welcome the use of SEFA by site owners and PRPs*
- *We'd love to hear of your experiences. If you have interesting application of SEFA let's get the word out.*

Estimating Environmental Footprints Using SEFA

Resources

Footprint Methodology (full document)

www.clu-in.org/greenremediation/subtab_b3.cfm

Footprint Methodology (2-page fact sheet)

www.clu-in.org/greenremediation/methodology/docs/GR_Overview_of_Footprint_Methodology_FS_3-29-12.pdf

SEFA Worksheets

www.clu-in.org/greenremediation/subtab_b3.cfm

Contacts

Carlos Pachon, EPA OSRTI
pachon.carlos@epa.gov

Karen Scheuermann, EPA Region 9
scheuermann.karen@epa.gov

**Other
Related
Topics**

BMP Fact Sheets

www.clu-in.org/greenremediation/

Profiles of Green Remediation

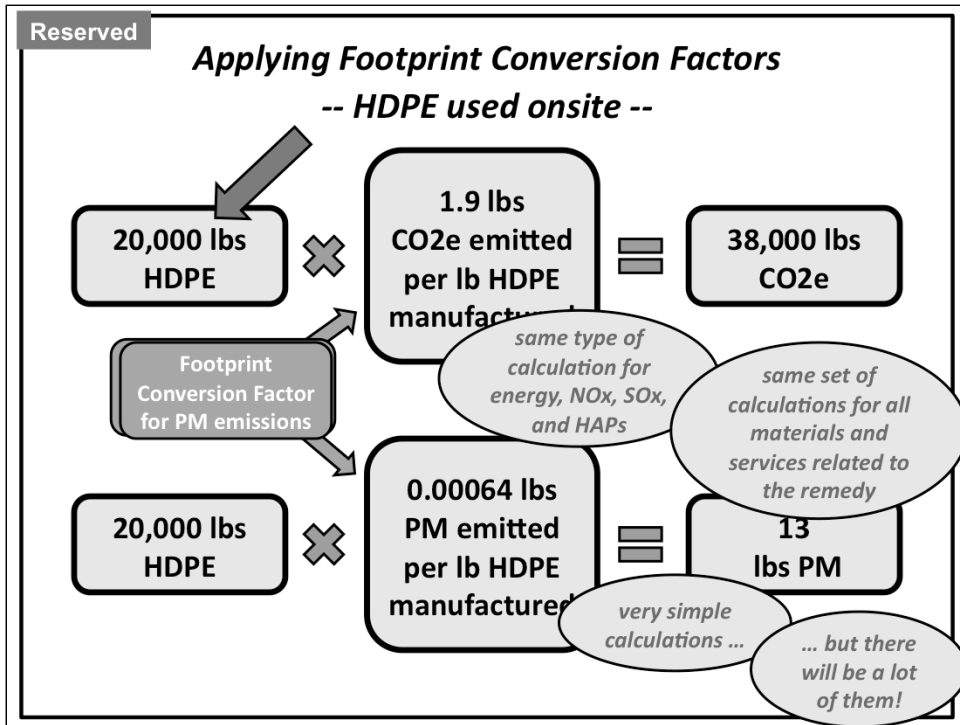
www.clu-in.org/greenremediation/tab_d.cfm

Archived Webinars

www.clu-in.org/greenremediation/subtab_b6.cfm



*Thank you for your
interest in Greener
Cleanups!*



Notes

→ This slide reserved for use if needed to demonstrate the application of footprint conversion factors.