



MPCA

Green and Sustainable Remediation Initiative

November 2014
Federal Remediation Technologies Roundtable
Nuclear Regulatory Commission
Rockville, MD

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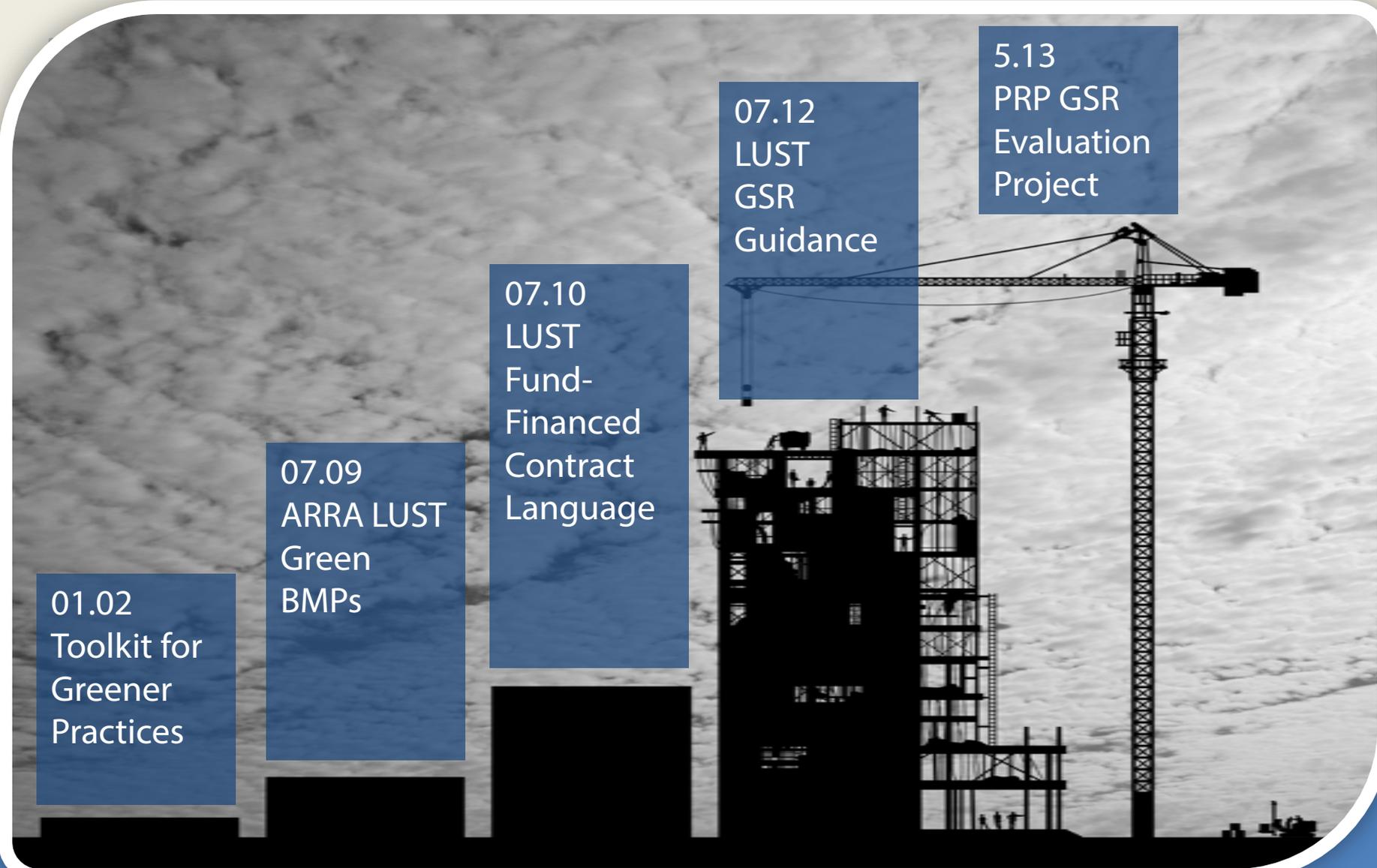


PRPs GSR Definition

Contaminant risk mitigation decision making cognizant of environmental effects, community goals and economic impacts.



MPCA's GSR Evolution



01.02
Toolkit for
Greener
Practices

07.09
ARRA LUST
Green
BMPs

07.10
LUST
Fund-
Financed
Contract
Language

07.12
LUST
GSR
Guidance

5.13
PRP GSR
Evaluation
Project

ITRC GSR Products

- Overview Document
Green and Sustainable Remediation: State of the Science and Practice
 - (GSR-1, 2011)

- Technical & Regulatory Guidance Document:
Green and Sustainable Remediation: A Practical Framework
 - (GSR-2, 2011)



ASTM Greener Cleanups Guide

Published
November 2013



ASTM's Standard Guide for Greener Cleanups: An Introduction

Learn how ASTM's new Standard Guide for Greener Cleanups (E2893-13) can inform project decisions to reduce the environmental footprint of contaminated site assessment and remediation.

April 25, 1:00 – 3:00 EST

For more information and registration go to:
www.clu-in.org/greenremediation/subtab_b5.cfm





PRP Guidance 1-10



VOLUNTARY



EVOLVING



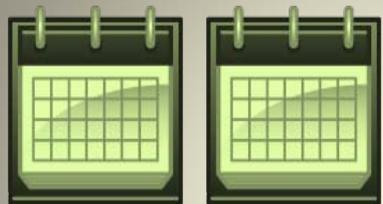
CASE STUDIES





Evaluation Project

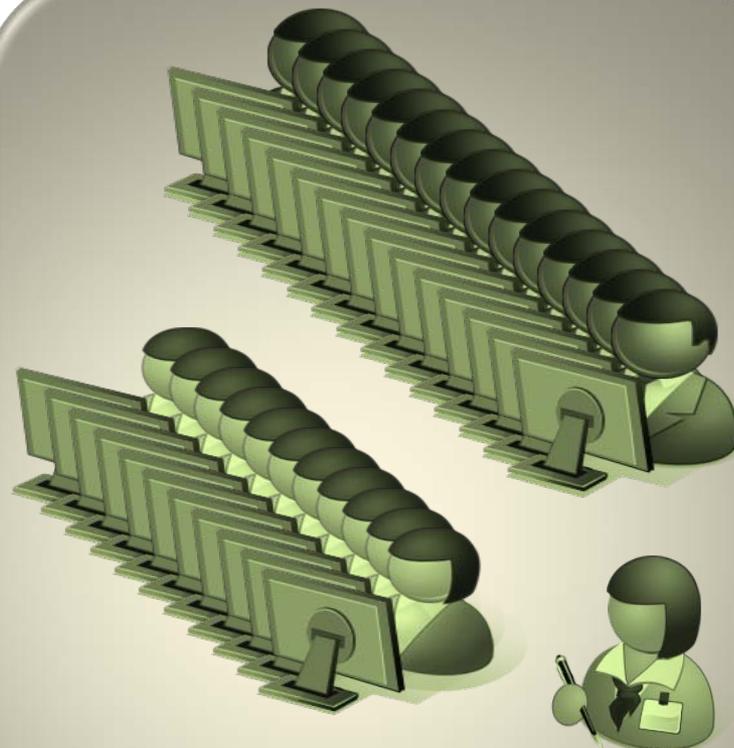




2 WEEKS

3 MEETINGS

1 HR EACH

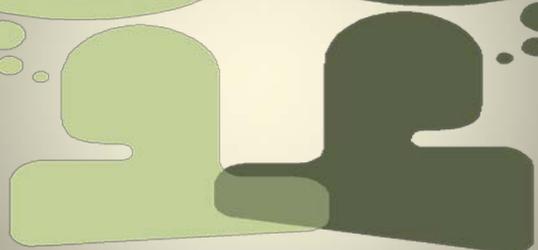


15 PMs

12 HYDROS

YES

NO

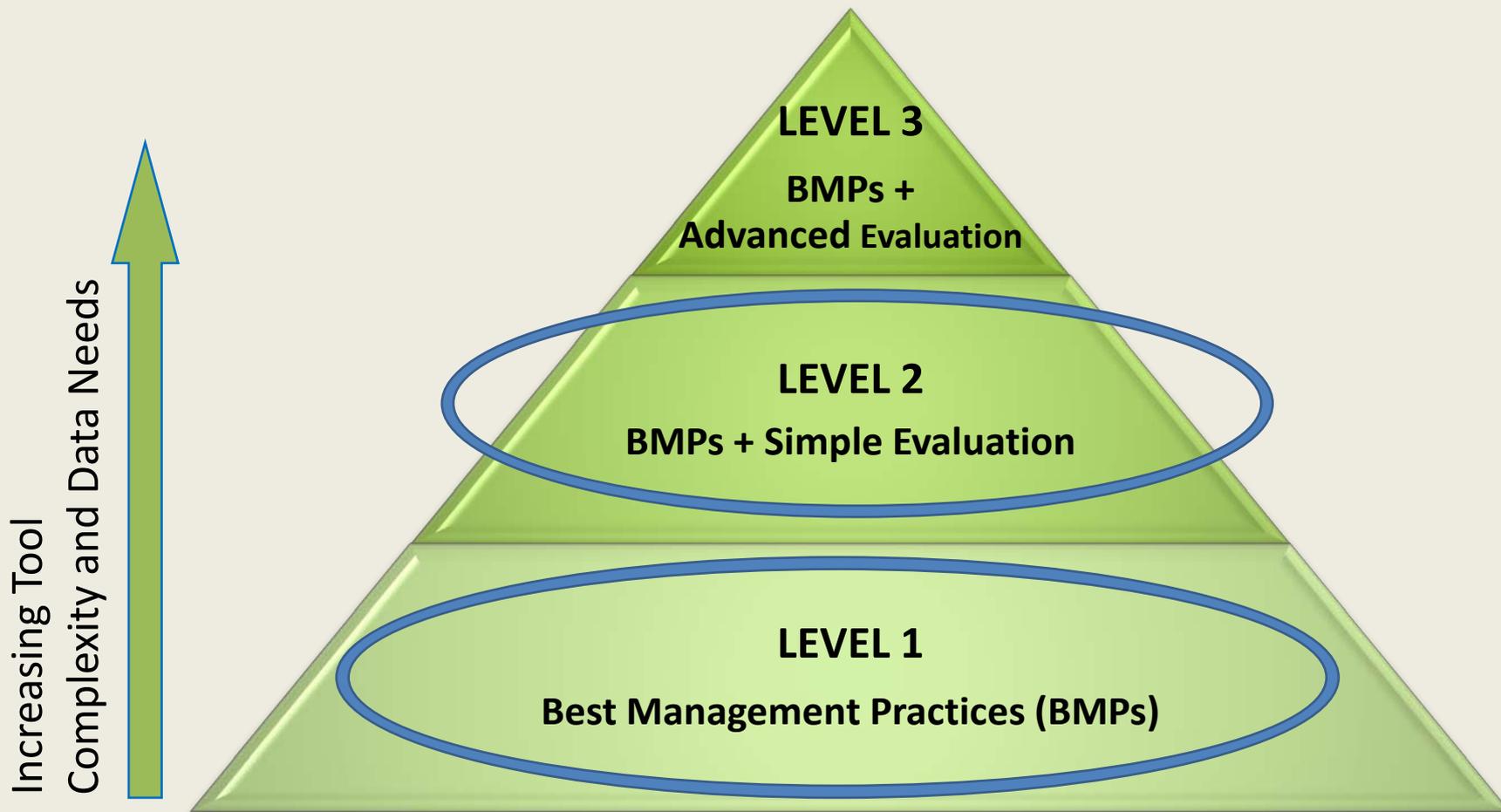


3 QUESTION SURVEY





Tools Selection





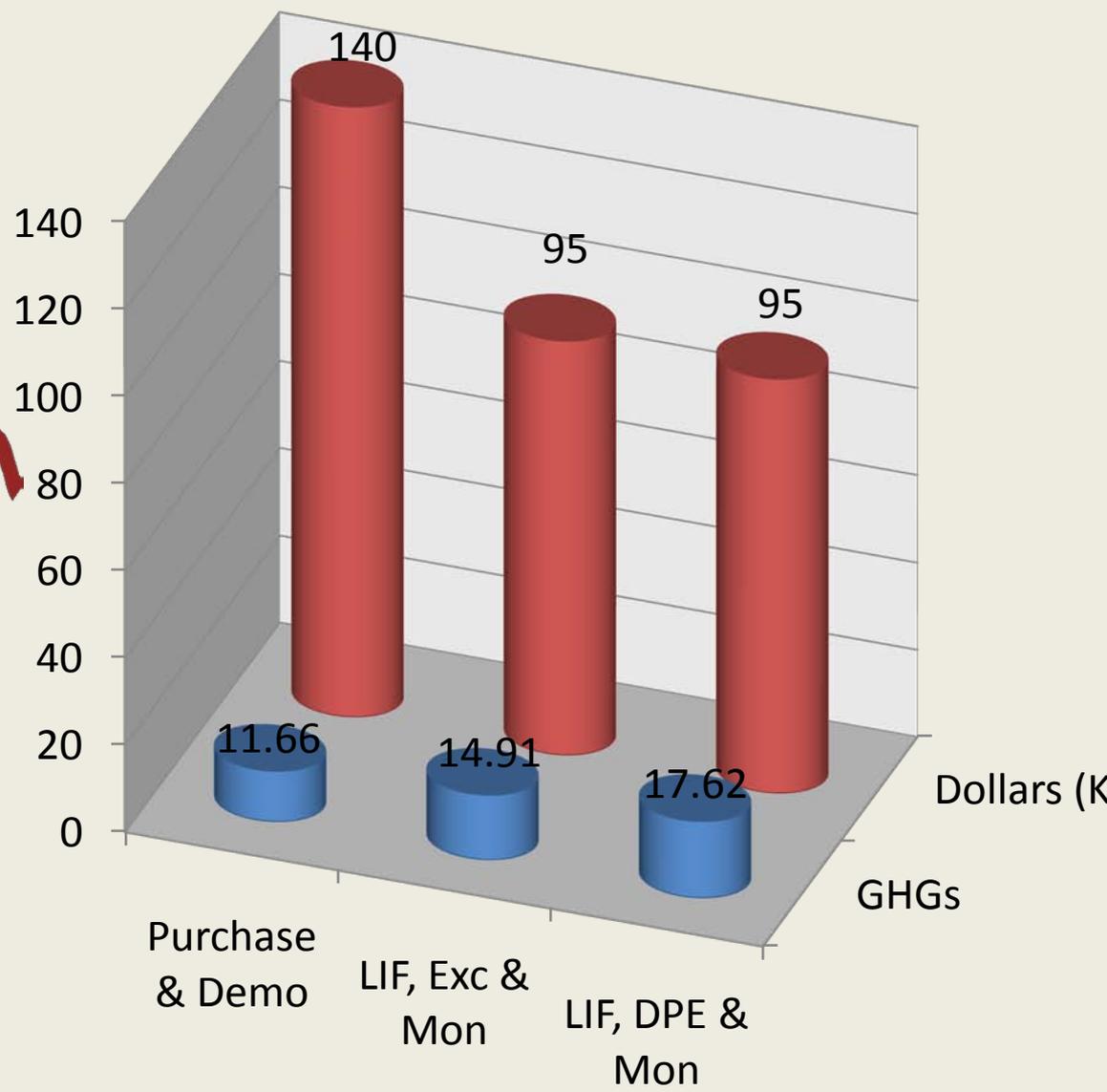
Green and Sustainable Remediation

Quantitative Evaluation

	Option 1 Purchase & Demo Building	Option 2 LIF, Excavate Source Area & Monitoring (2 yrs)	Option 3 LIF, Dual-Phase Extraction & Monitoring (1 yr post-CA)
Environmental Impact Total GHGs In Metric Tons	11.66	14.91	17.62
Economic Impact	\$140,000* Land & Bldg *Assessed Value (2012) \$86,300 Market Value (2012) \$69,400	\$95,000	\$95,000
Social Impact Degree of Difficulty to Implement	Difficult	Moderately Difficult	Moderately Difficult
Degree of Disturbance	High	Low to High	Low to Moderate



MEASUREMENT Impact



Green and Sustainable Remediation

Quantitative Evaluation

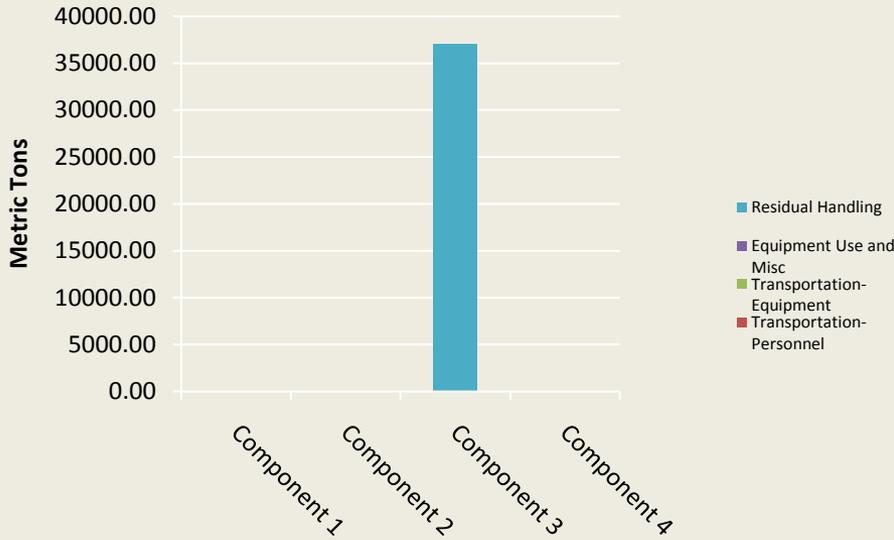
	Option 1 Sub-Slab Depressurization And Sanitary Sewer Lining	Option 2 Basement Filling And Sanitary Sewer Lining	Option 3 Source Area Excavation And Sanitary Sewer Lining
Environmental Impact			
Total GHGs (metric tons)	1.8	16	37,007
Economic Impact			
Costs to-date: \$98,180.22	\$71,100	\$169,320	\$345,090
Social Impact			
Degree of Difficulty to Implement	Low	Moderate	High
Degree of Disturbance	Low	Moderate to High	High
Degree of Stakeholder Preference	Moderate	High	Low

Important Message: The Project Team notes closure is anticipated post corrective action, but is not guaranteed until confirmation indoor air monitoring and other considerations are satisfied.

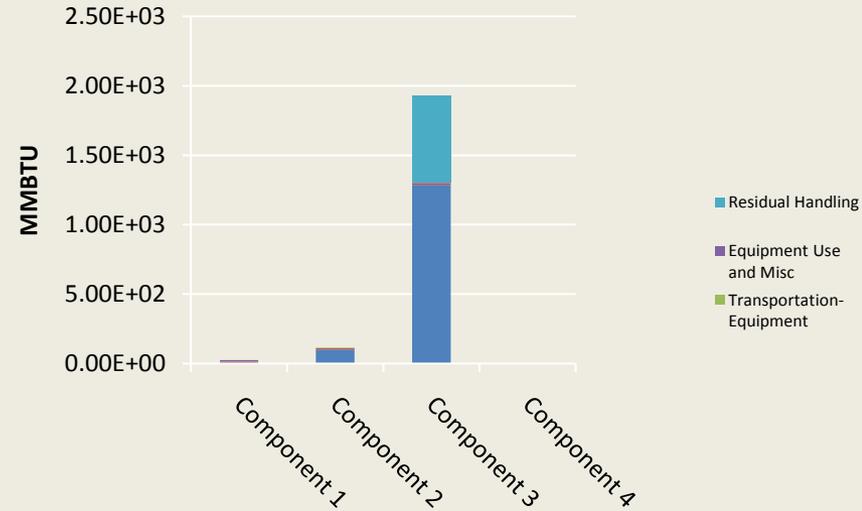
Sustainable Remediation - Environmental Footprint Summary (SiteWise)

Phase	Activities	GHG Emissions	Total Energy Used	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU		
Component 1	Consumables	0.12	2.5E+00	NA	NA
	Transportation-Personnel	0.69	8.7E+00	1.9E-05	1.5E-03
	Transportation-Equipment	0.13	1.8E+00	7.3E-07	5.9E-05
	Equipment Use and Misc	0.84	1.2E+01	0.0E+00	0.0E+00
	Residual Handling	0.00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	1.78	2.45E+01	1.97E-05	1.59E-03
Component 2	Consumables	14.40	1.0E+02	NA	NA
	Transportation-Personnel	0.79	9.9E+00	1.3E-05	1.0E-03
	Transportation-Equipment	0.38	5.0E+00	9.1E-07	7.3E-05
	Equipment Use and Misc	0.00	0.0E+00	0.0E+00	0.0E+00
	Residual Handling	0.00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	15.56	1.14E+02	1.40E-05	1.12E-03
Component 3	Consumables	92.89	1.3E+03	NA	NA
	Transportation-Personnel	0.66	8.3E+00	1.8E-05	1.5E-03
	Transportation-Equipment	0.09	1.2E+00	2.2E-07	1.8E-05
	Equipment Use and Misc	0.38	5.7E+00	2.1E-06	5.4E-04
	Residual Handling	36,912.87	6.2E+02	1.3E-05	1.0E-03
	Sub-Total	37,006.88	1.93E+03	3.34E-05	3.06E-03

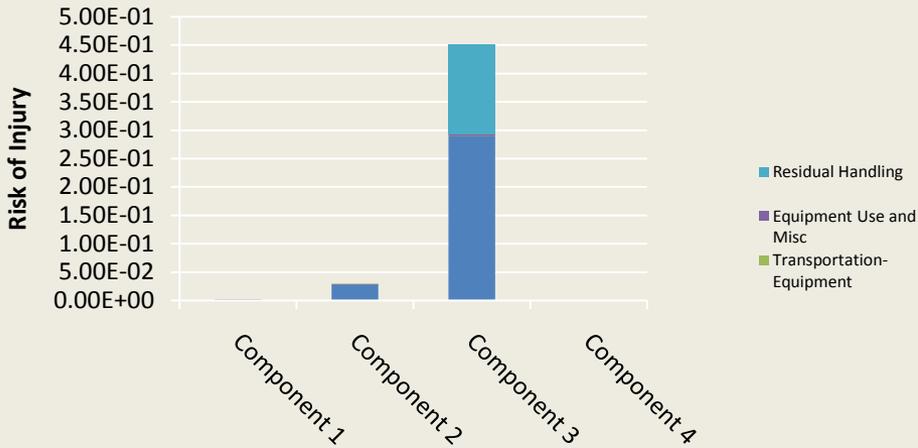
GHG Emissions



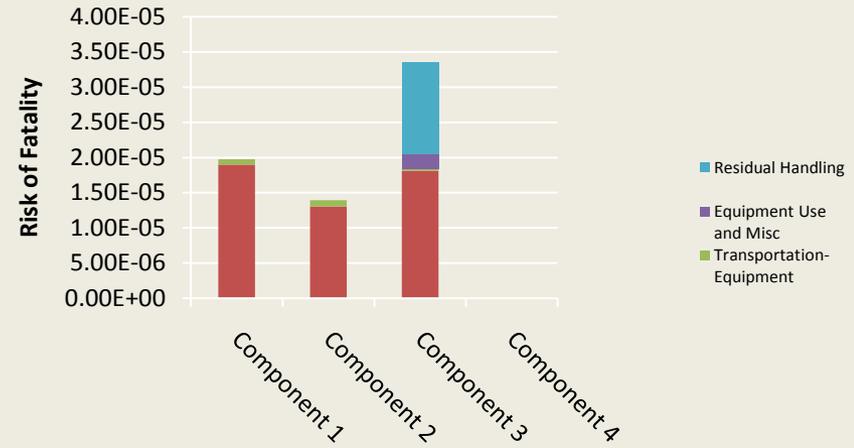
Total Energy Used



Accident Risk - Injury



Accident Risk - Fatality





**Toward Sustainability
Using Better-Informed
Decision-Making
And Demonstrable Impacts**

DRIVE

