

## Proposed Item for Biobased Designation

The following biobased product information has been collected to support item designation by USDA for the BioPreferred program. This summary reflects data available as of August 1, 2008.

**Title:** Bioremediation Materials

**Description:** Dry or liquid solutions (including those containing bacteria or other microbes but not including sorbent materials) used to clean oil, fuel, and other hazardous spill sites.

**Companies Supplying Item:** 31 companies supplying Bioremediation Materials have been identified through internet searches, manufacturer's directories, trade associations, and company submissions.

**Industry Associations Investigated:** The following industry associations have been investigated for member companies supplying Bioremediation Materials:

- United Soybean Board Association
- National Corn Growers Association
- Spill Control Association of America
- Association of Petroleum Industry Cooperative Managers
- Oil Spill Removal Organization
- Association for Environmental Health and Sciences

**Commercially Available Products Identified:** Of the companies identified, 53 Bioremediation Materials are commercially available on the market.

**Product Information Collected:** Specific product information including company contact, intended use, biobased content, and performance characteristics have been collected on 14 Bioremediation Materials.

**Industry Performance Standards:** Product information submitted by biobased manufacturers and suppliers indicate that have typically been tested to the following industry standards:

- American Type Culture Collection Biosafety Level 1 Minimal potential for causing diseases in humans, plants, animals and aquatic life
- California Air Resources Board Method 310 VOCs

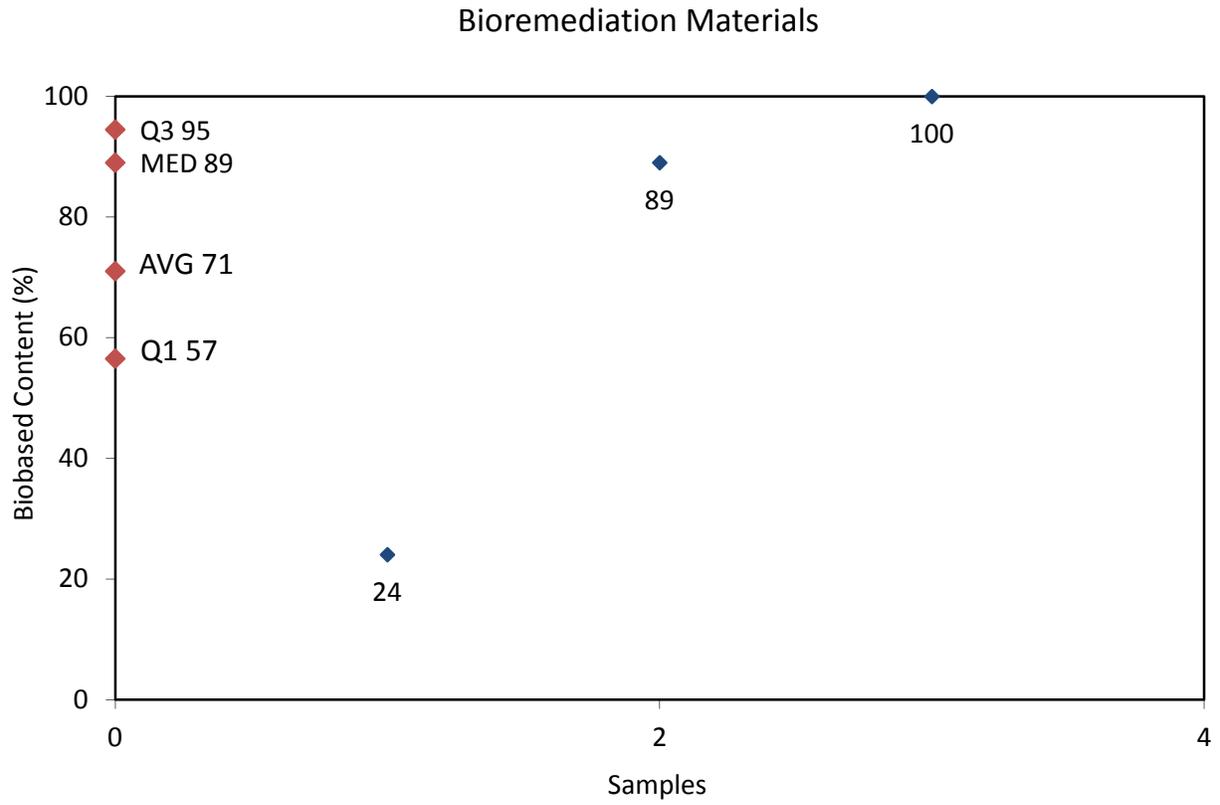
**Samples Tested for Biobased Content:** 3 samples of Bioremediation Materials have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

**Biobased Content Data:** Results from biobased content testing of Bioremediation Materials indicate a range of content percentages from 24% minimum to 100% maximum biobased content as defined by ASTM D 6866-04. A detailed distribution of biobased content levels is included as Appendix A.

**Products Submitted for BEES Analysis:** Life-cycle cost and environmental effect data for 1 Bioremediation Materials product has been submitted to NIST for BEES analysis.

**BEES Analysis:** The life-cycle costs of the submitted Bioremediation Materials range from \$224.85 minimum to \$224.85 maximum per usage unit. The environmental scores range from 0.0214 minimum to 0.0214 maximum. A detailed summary of the BEES results is included as Appendix B.

## Appendix A - Biobased Content Data



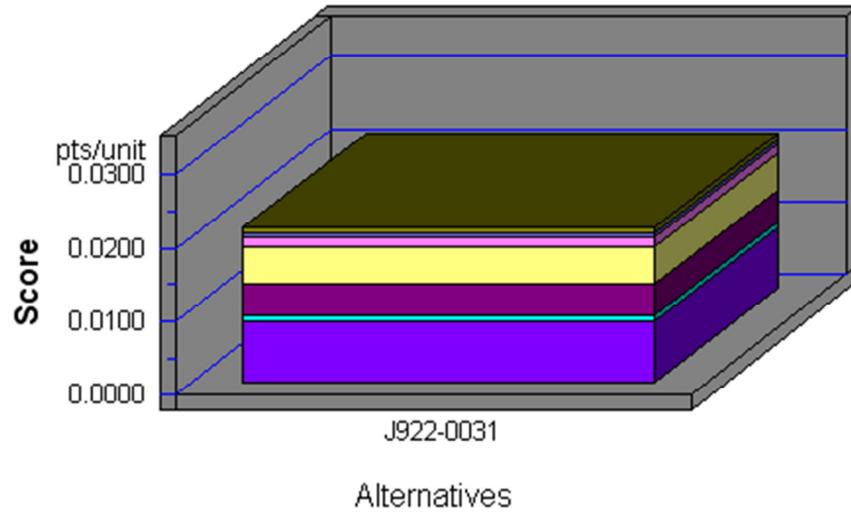
	Companies Identified	Products Identified	C14	BEES
1	VF27	VF27-0002	24	
2	J922	J922-0031	89	Yes
3	C4T6	C4T6-0003	100	

## Appendix B - BEES Analysis Results

Functional Unit: 100 cubic yards of soil treatment

### Environmental Performance

Acidification
Crit. Air Pollutants
Ecological Toxicity
Eutrophication
Fossil Fuel Depletion
Global Warming
Habitat Alteration
Human Health
Indoor Air
Ozone Depletion
Smog
Water Intake

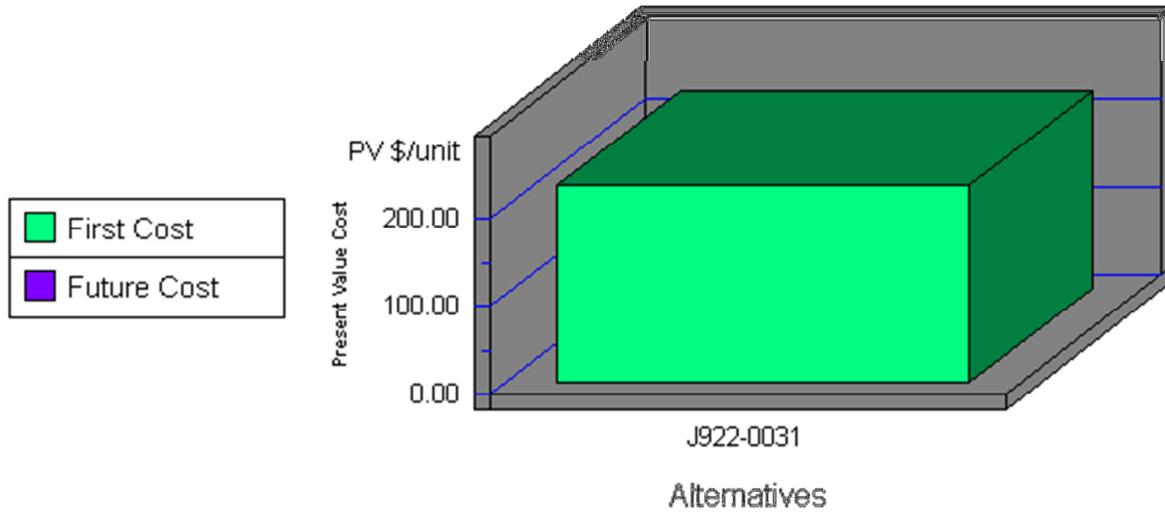


**Note: Lower values are better**

Category	J922-0031
Acidification-3%	0.0000
Crit. Air Pollutants-9%	0.0002
Ecolog. Toxicity-7%	0.0008
Eutrophication-6%	0.0004
Fossil Fuel Depl.-10%	0.0014
Global Warming-29%	0.0052
Habitat Alteration-8%	0.0000
Human Health-13%	0.0042
Indoor Air-3%	0.0000
Ozone Depletion-2%	0.0000
Smog-4%	0.0008
Water Intake-8%	0.0084
<b>Sum</b>	<b>0.0214</b>

<b>Bioremediation Materials</b>		
Impacts	Units	J922-0031
Acidification	millimoles H <sup>+</sup> equivalents	2.04E+03
Criteria Air Polutants	microDALYs	4.99E-01
Ecotoxicity	g 2,4-D equivalents	9.82E+00
Eutrophication	g N equivalents	1.19E+00
Fossil Fuel Depletion	MJ surplus energy	4.87E+00
Global Warming	g CO <sub>2</sub> equivalents	4.61E+03
Habitat Alteration	T&E count	0.00E+00
Human Health--Cancer	g C <sub>6</sub> H <sub>6</sub> equivalents	2.68E+00
Human Health--NonCancer	g C <sub>7</sub> H <sub>8</sub> equivalents	3.20E+03
Indoor Air Quality	g TVOCs	0.00E+00
Ozone Depletion	g CFC-11 equivalents	4.96E-07
Smog	g NO <sub>x</sub> equivalents	3.21E+01
Water Intake	liters of water	5.56E+02
Functional Unit	100 cubic yards of soil treatment	
<p>1 Following are more complete descriptions of units: Acidification: millimoles of hydrogen ion equivalents; Criteria Air Pollutants: micro Disability-Adjusted Life Years; Ecological Toxicity: grams of 2,4-dichlorophenoxy-acetic acid equivalents; Eutrophication: grams of nitrogen equivalents; Fossil Fuel Depletion: megajoules of surplus energy; Global Warming: grams of carbon dioxide equivalents; Habitat Alteration: threatened and endangered species count; Human Health-Cancer: grams of benzene equivalents; Human Health-NonCancer: grams of toluene equivalents; Indoor Air Quality: grams of Total Volatile Organic Compounds; Ozone Depletion: grams of chloroflouorocarbon-11 equivalents; Smog: grams of nitrogen oxide equivalents; and Water Intake: liters of water.</p>		

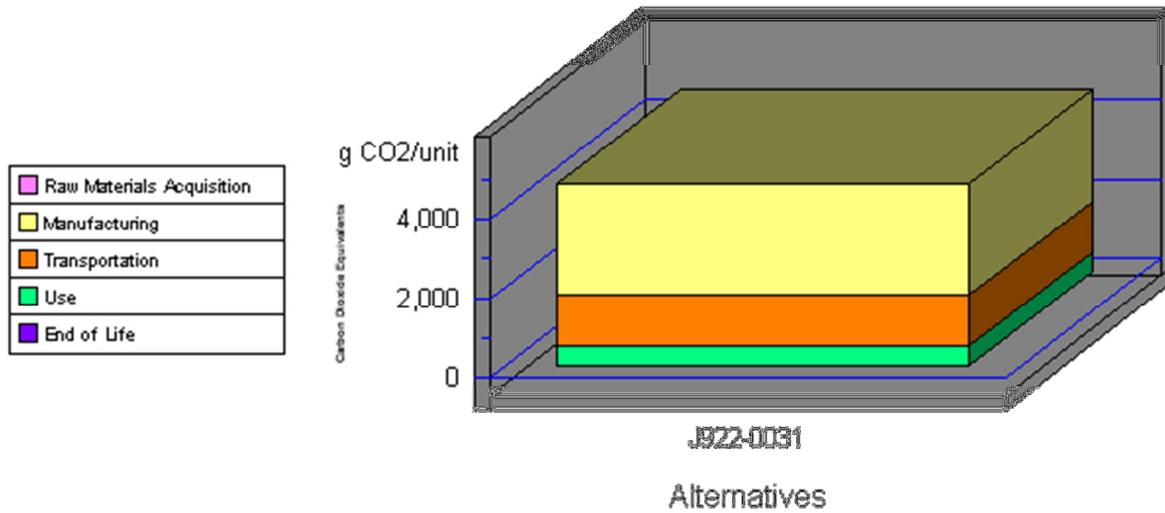
# Economic Performance



Category	J922-0031
First Cost	224.85
Future Cost-- 3.0%	0.00
<b>Sum</b>	<b>224.85</b>

\*This is a consumable product. Therefore, future costs are not calculated.

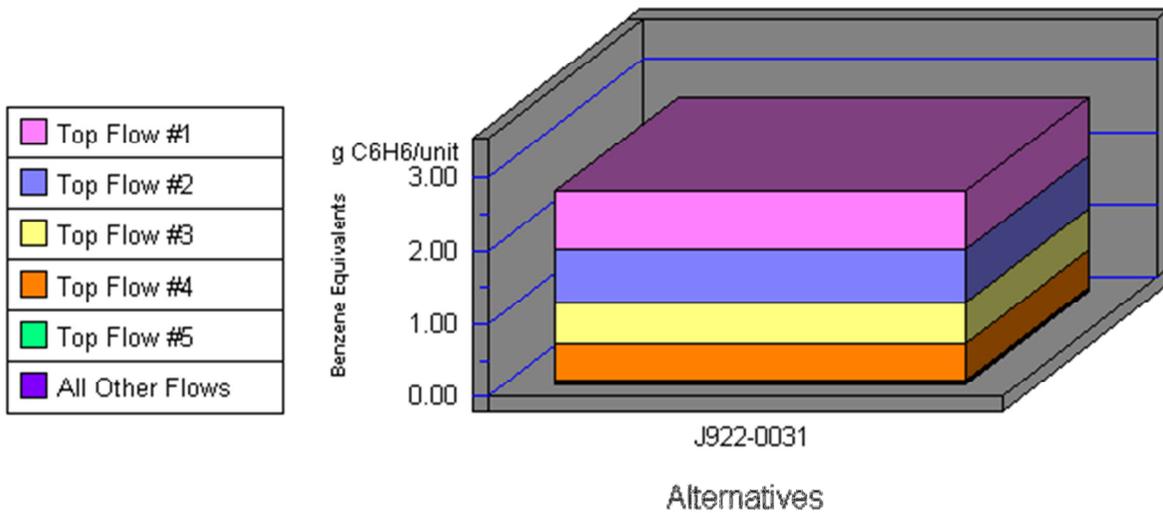
# Global Warming by Life-Cycle Stage



**Note: Lower values are better**

Category	J922-0031
1. Raw Materials	-6
2. Manufacturing	2831
3. Transportation	1270
4. Use	513
5. End of Life	0
<b>Sum</b>	<b>4607</b>

## Human Health Cancer by Sorted Flows\*

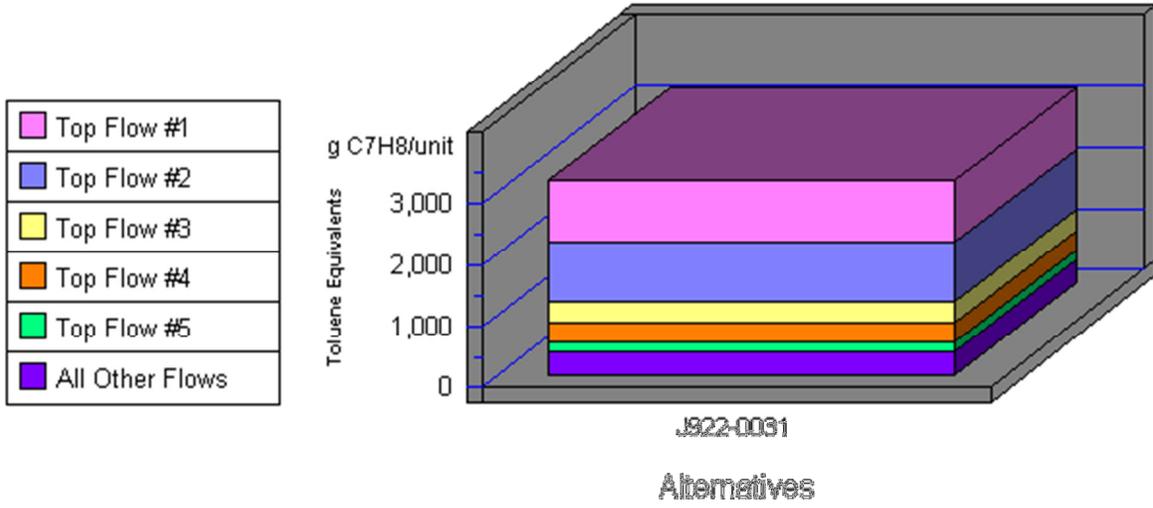


**Note: Lower values are better**

Category	J922-0031
Cancer-(s) Dioxins (unspecific)	0.81
Cancer-(s) Arsenic (As)	0.73
Cancer-(w) Arsenic (As <sup>3+</sup> , As <sup>5+</sup> )	0.57
Cancer-(w) Phenol (C <sub>6</sub> H <sub>5</sub> OH)	0.50
Cancer-(s) Chromium (Cr III, C	0.02
All Others	0.04
<b>Sum</b>	<b>2.68</b>

\*Sorted by five topmost flows for worst-scoring product

## Human Health Noncancer by Sorted Flows\*



**Note: Lower values are better**

Category	J922-0031
Noncancer-(a) Dioxins (unspeci)	1,025.71
Noncancer-(a) Mercury (Hg)	957.09
Noncancer-(a) Lead (Pb)	354.95
Noncancer-(w) Barium (Ba++)	319.49
Noncancer-(a) Cadmium (Cd)	162.88
All Others	377.21
<b>Sum</b>	<b>3,197.33</b>

\*Sorted by five topmost flows for worst-scoring product