Formidable Projects Made Manageable
by
Combining Risk Assessment Models in MS Excel

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Blankinship & Associates, Inc.
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What to Expect

I. Risk assessment challenges
II. Risk assessment solutions
III. Example: CRANK
IV. Benefits and Drawbacks

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Risk Assessments Inputs

Application Scenario Details
Chemical Properties
Receptor Details
Exposure Factors
Toxicity Values

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Risk Assessments Outputs

Risk Values

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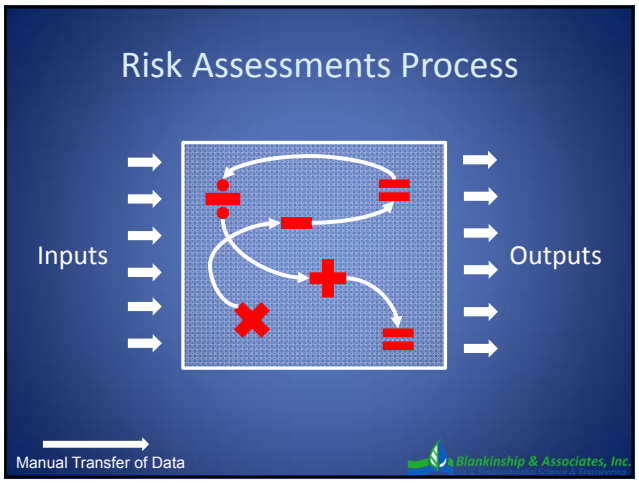
Risk Assessments Process
Inputs
Outputs
Manual Transfer of Data
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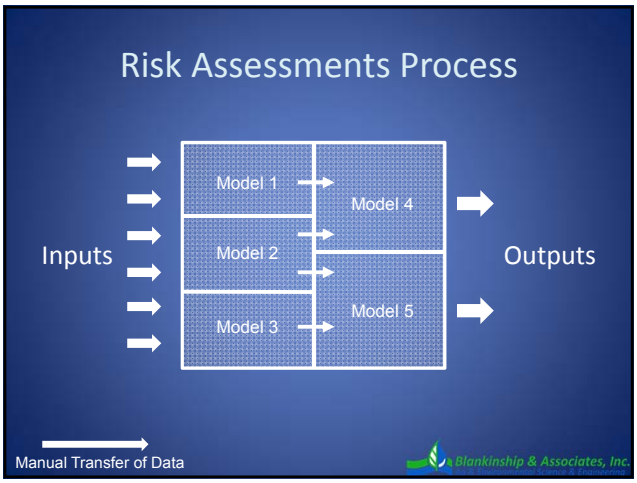
Risk Assessments Process
Inputs
Model 1
Model 2
Model 3
Model 4
Model 5
Outputs
Manual Transfer of Data
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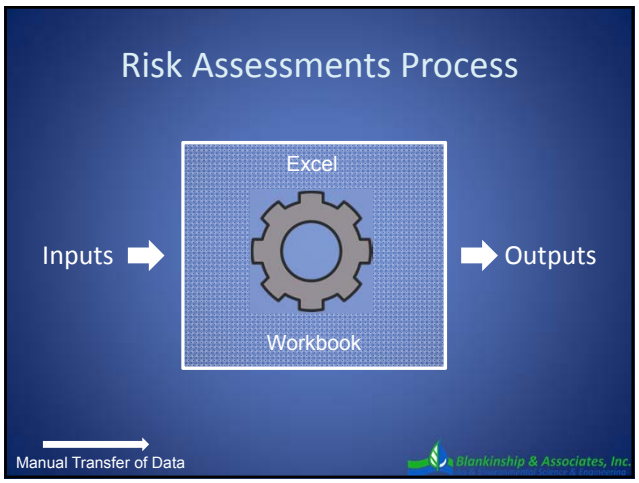
Risk Assessments Process
Inputs
Excel
Workbook
Outputs
Manual Transfer of Data
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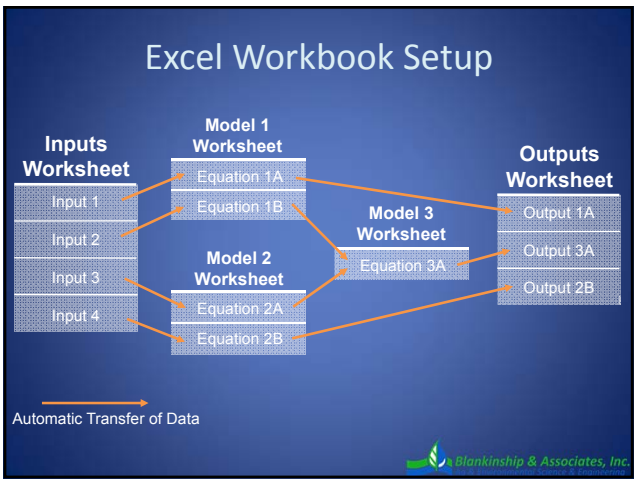
Excel Workbook Setup
Inputs Worksheet
Input 1
Input 2
Input 3
Input 4
Model 1 Worksheet
Equation 1A
Equation 1B
Model 2 Worksheet
Equation 2A
Equation 2B
Model 3 Worksheet
Equation 3A
Outputs Worksheet
Output 1A
Output 3A
Output 2B
Automatic Transfer of Data
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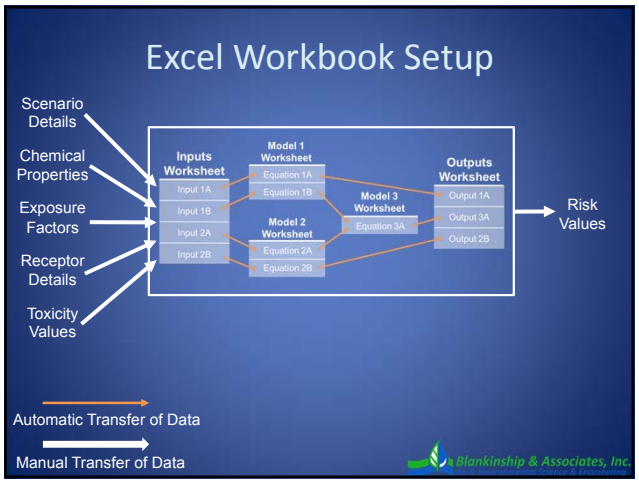

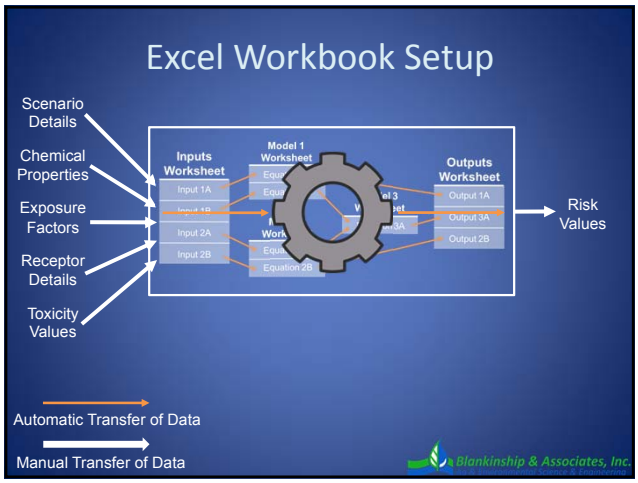

CRANK

Comprehensive Risk ANalysis Kalculator

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CRANK

107 Worksheets
5 Internal Models
3 External Models
10 Human Receptors
51 Ecological Receptors
69 Pest Control Products
213 Human Risk Scenarios
187 Ecological Risk Scenarios

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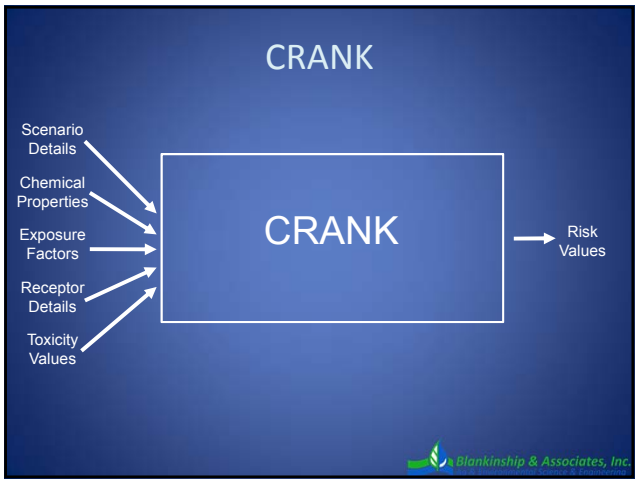
CRANK
Scenario Details
Chemical Properties
Exposure Factors
Receptor Details
Toxicity Values
CRANK
Risk Values
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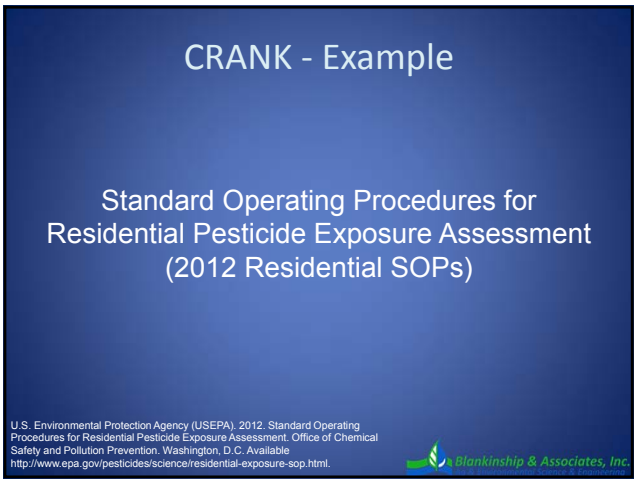
CRANK - Example
Standard Operating Procedures for Residential Pesticide Exposure Assessment (2012 Residential SOPs)
U.S. Environmental Protection Agency (USEPA). 2012. Standard Operating Procedures for Residential Pesticide Exposure Assessment. Office of Chemical Safety and Pollution Prevention. Washington, D.C. Available http://www.epa.gov/pesticides/science/residential-exposure-sop.html.
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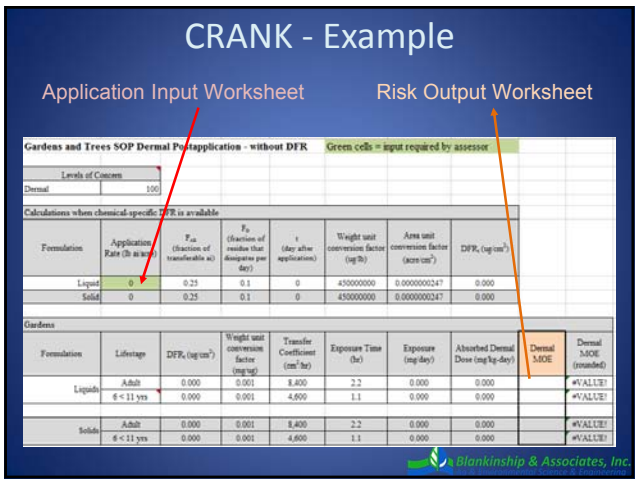
CRANK - Example
Application Input Worksheet
Risk Output Worksheet
Gardens and Trees SOP Dermal Postapplication - without DFR
Green cells = input required by assessor
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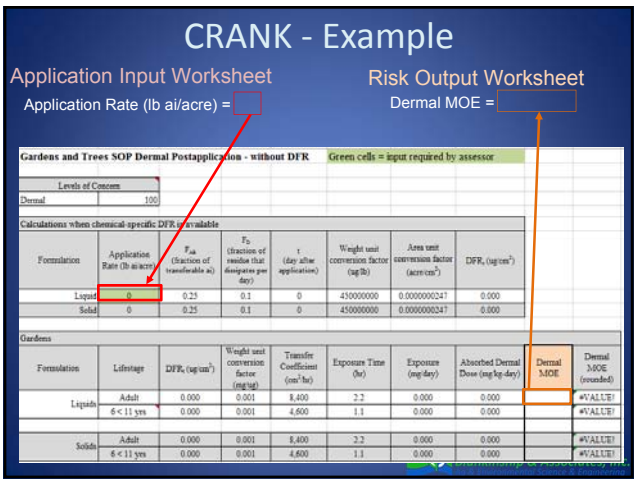

CRANK - Example
Application Input Worksheet
Application Rate (lb ai/acre) =
Risk Output Worksheet
Dermal MOE =
Gardens and Trees SOP Dermal Postapplication - without DFR
Green cells = input required by assessor

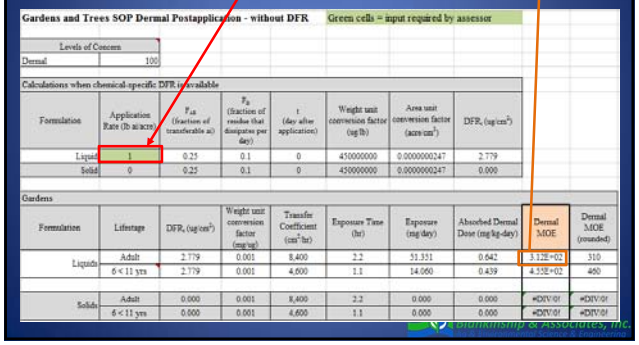
CRANK - Example

Application Input Worksheet

Application Rate (lb ai/acre) = 1

Risk Output Worksheet

Dermal MOE = 3.12E+02



Gardens and Trees SOP Dermal Postapplication - without DFR — Green cells = input required by assessor

Levels of Concern

Dermal	100

Calculations when chemical-specific DFR is available

Formulation	Application Rate (lb ai/acre)	F_{ai} (fraction of transferable ai)	F_D (fraction of residue that dissipates per day)	t (day after application)	Weight unit conversion factor (ug/lb)	Area unit conversion factor ($acre/cm^2$)	DFR, (ug/cm^2)
Liquid	1	0.25	0.1	0	450000000	0.0000000247	2.779
Solid	0	0.25	0.1	0	450000000	0.0000000247	0.000

Gardens

Formulation	Lifestage	DFR, (ug/cm^2)	Weight unit conversion factor (mg/ug)	Transfer Coefficient (cm^2/hr)	Exposure Time (hr)	Exposure (mg/day)	Absorbed Dermal Dose (mg/kg-day)	Dermal MOE	Dermal MOE (rounded)
Liquids	Adult	2.779	0.001	8,400	2.2	51.351	0.642	3.12E+02	310
	6 < 11 yrs	2.779	0.001	4,600	1.1	14.060	0.439	4.55E+02	460
Solids	Adult	0.000	0.001	8,400	2.2	0.000	0.000	#DIV/0!	#DIV/0!
	6 < 11 yrs	0.000	0.001	4,600	1.1	0.000	0.000	#DIV/0!	#DIV/0!

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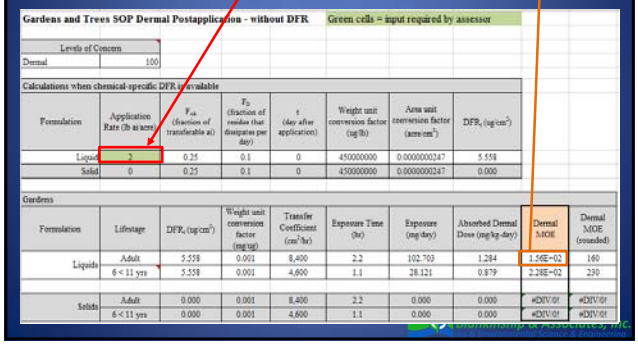
CRANK - Example

Application Input Worksheet

Application Rate (lb ai/acre) = 2

Risk Output Worksheet

Dermal MOE = 1.56E+02



Gardens and Trees SOP Dermal Postapplication - without DFR — Green cells = input required by assessor

Levels of Concern

Dermal	100

Calculations when chemical-specific DFR is available

Formulation	Application Rate (lb ai/acre)	F_{ai} (fraction of transferable ai)	F_D (fraction of residue that dissipates per day)	t (day after application)	Weight unit conversion factor (ug/lb)	Area unit conversion factor ($acre/cm^2$)	DFR, (ug/cm^2)
Liquid	2	0.25	0.1	0	450000000	0.0000000247	5.558
Solid	0	0.25	0.1	0	450000000	0.0000000247	0.000

Gardens

Formulation	Lifestage	DFR, (ug/cm^2)	Weight unit conversion factor (mg/ug)	Transfer Coefficient (cm^2/hr)	Exposure Time (hr)	Exposure (mg/day)	Absorbed Dermal Dose (mg/kg-day)	Dermal MOE	Dermal MOE (rounded)
Liquids	Adult	5.558	0.001	8,400	2.2	102.703	1.284	1.56E+02	160
	6 < 11 yrs	5.558	0.001	4,600	1.1	28.121	0.879	2.28E+02	230
Solids	Adult	0.000	0.001	8,400	2.2	0.000	0.000	#DIV/0!	#DIV/0!
	6 < 11 yrs	0.000	0.001	4,600	1.1	0.000	0.000	#DIV/0!	#DIV/0!

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CRANK - Benefits

- Inputs only need to be entered once for a given scenario
- Accurate and efficient
- Easy re-analysis

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CRANK - Drawbacks

- Development time
- Manual transfer of inputs and outputs
- Lots of data

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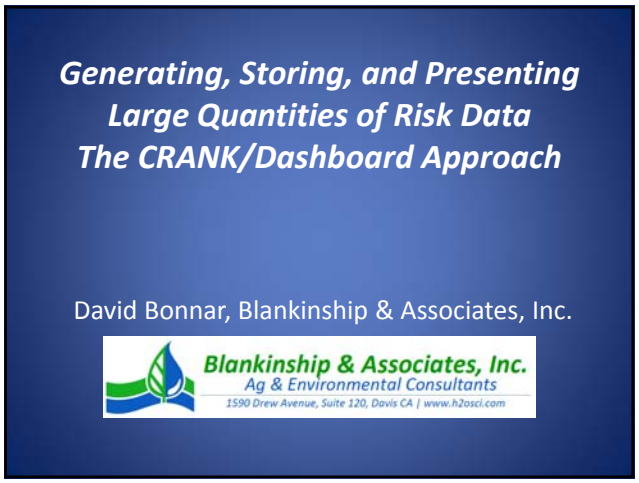
Generating, Storing, and Presenting
Large Quantities of Risk Data
The CRANK/Dashboard Approach
David Bonnar, Blankinship & Associates, Inc.
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Generating, Storing, and Presenting Large Quantities of Risk Data The CRANK/Dashboard Approach

David Bonnar, Blankinship & Associates, Inc.

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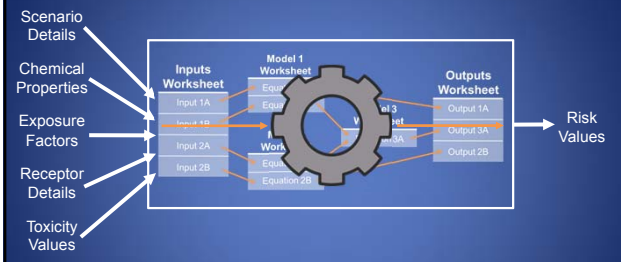
The CRANK



Automatic Transfer of Data

Manual Transfer of Data

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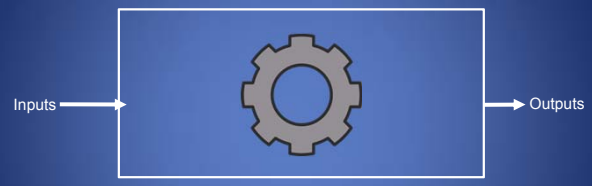
The CRANK



Manual Transfer of Data

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The CRANK

- **Pros:**
  - Allows for rapid automation and generation of risk assessment data
  - Generates large quantities of result data
- Cons:
  - Requires numerous inputs to perform a single model run
  - *Generates large quantities of result data*

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The CRANK

- **Pros:**
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- Cons:
  - Requires numerous inputs to perform a single model run
  - *Generates large quantities of result data*

SOLUTION!

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SOLUTION!

Link to Access Database!

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What can you *do* with an ACCESS DATABASE?

- Store Scenarios
- Store Inputs
- Store Results

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What are the *advantages* of ACCESS DATABASE?

- Reduce redundancy
- Centralized data repository
- Multiple User Accessible

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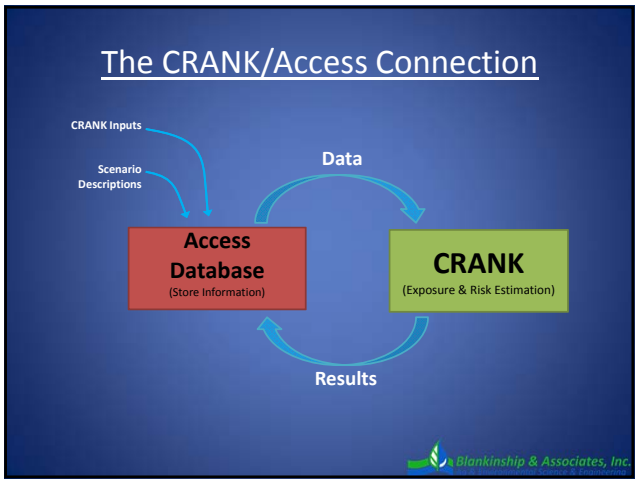
The CRANK/Access Connection
CRANK Inputs
Scenario Descriptions
Data
Access Database
(Store Information)
CRANK
(Exposure & Risk Estimation)
Results
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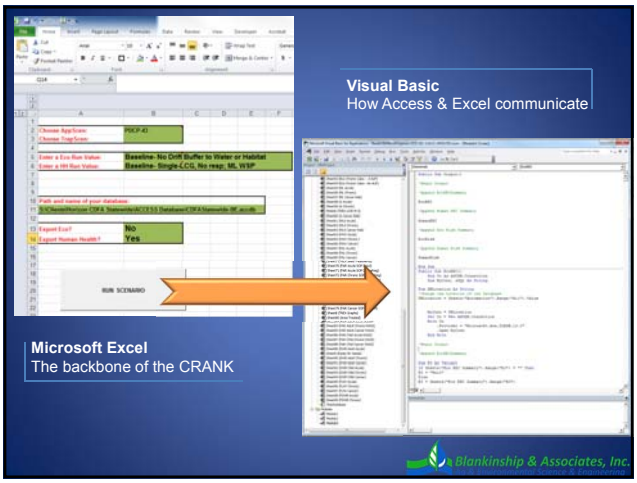
Visual Basic
How Access & Excel communicate
Microsoft Excel
The backbone of the CRANK
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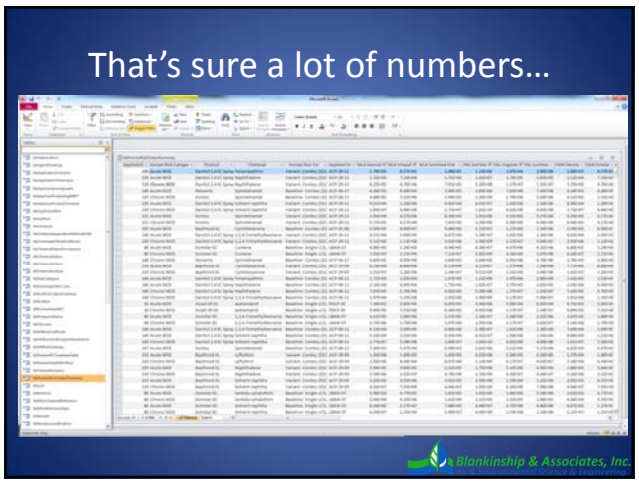
That's sure a lot of numbers…
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What else can you do with an ACCESS DATABASE?
• Ask It Questions!
• Display Results!*
*Through fancy User-Interfaces!
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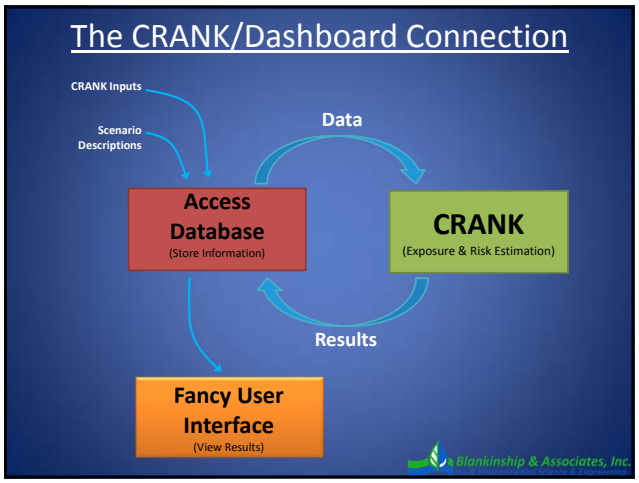
The CRANK/Dashboard Connection
CRANK Inputs
Scenario Descriptions
Data
Access Database
(Store Information)
CRANK
(Exposure & Risk Estimation)
Results
Fancy User Interface
(View Results)
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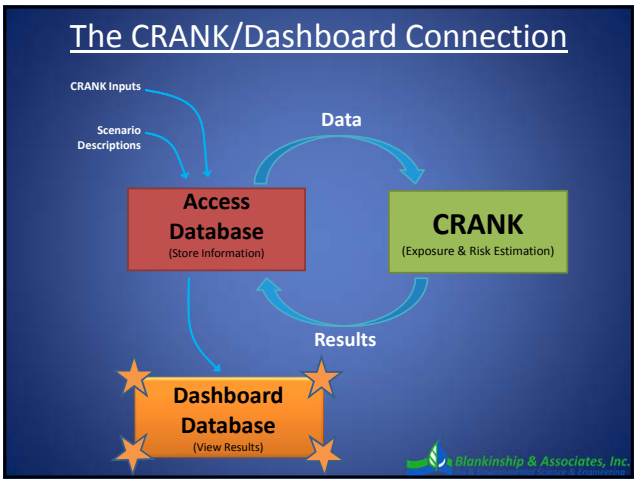
The CRANK/Dashboard Connection
CRANK Inputs
Scenario Descriptions
Data
Access Database
(Store Information)
CRANK
(Exposure & Risk Estimation)
Results
Dashboard Database
(View Results)
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CDFA Statewide PEIR Risk Assessment
Close System
"The Dashboard"
Version 1.1 (Revised: 12-2-2014)
Welcome to the CDFA Statewide PEIR Risk Assessment!
Click on your topic of interest below.
First time user? Start here:
Introduction
Pest Programs
Chemical Details
Risk Results
Navigation Aids
Authors
Glossary and Abbreviations
References
Methods
Fun Facts
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The "Dashboard" Database
Programs
Back to Dashboard

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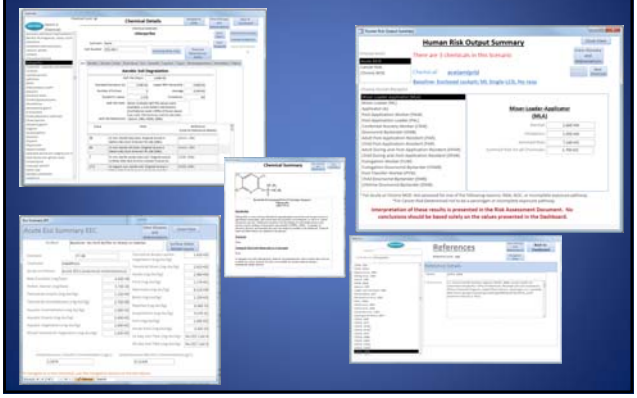
The "Dashboard" Database



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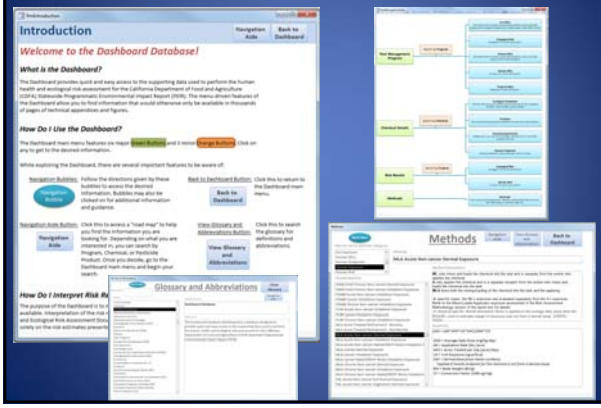
The "Dashboard" Database



SUMMARY

- Excel based mass models, such as the CRANK, allow for rapid automation and generation of risk assessment data
- Access Databases provide an excellent solution to managing large quantities of scenario, input, and result data
- Form based applications, such as the "Dashboard", allow users to access a mountain of information through an intuitive, interactive interface.

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Questions? =)

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