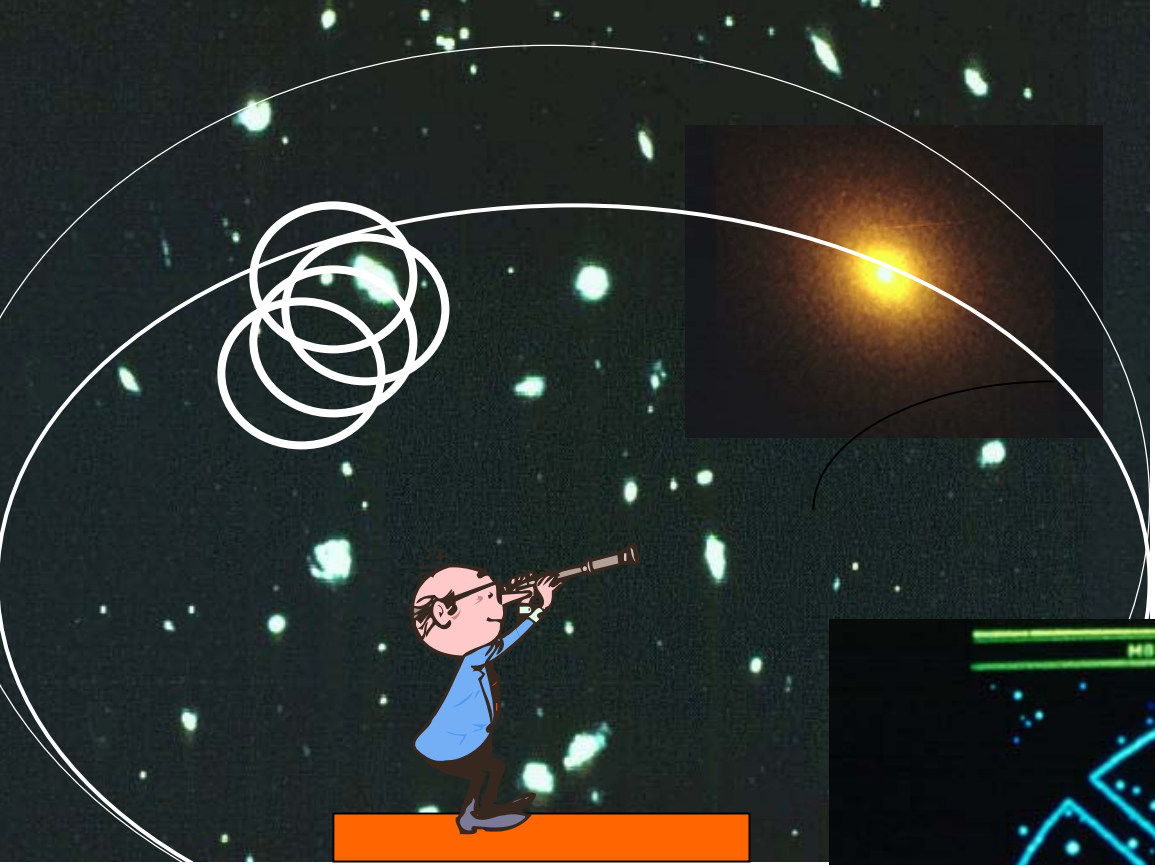
The Roles for Risk in DOE Cleanup

NGA Task Force and NAAG Meeting

November 10, 2002

Charles W. Powers, PI CRESP II

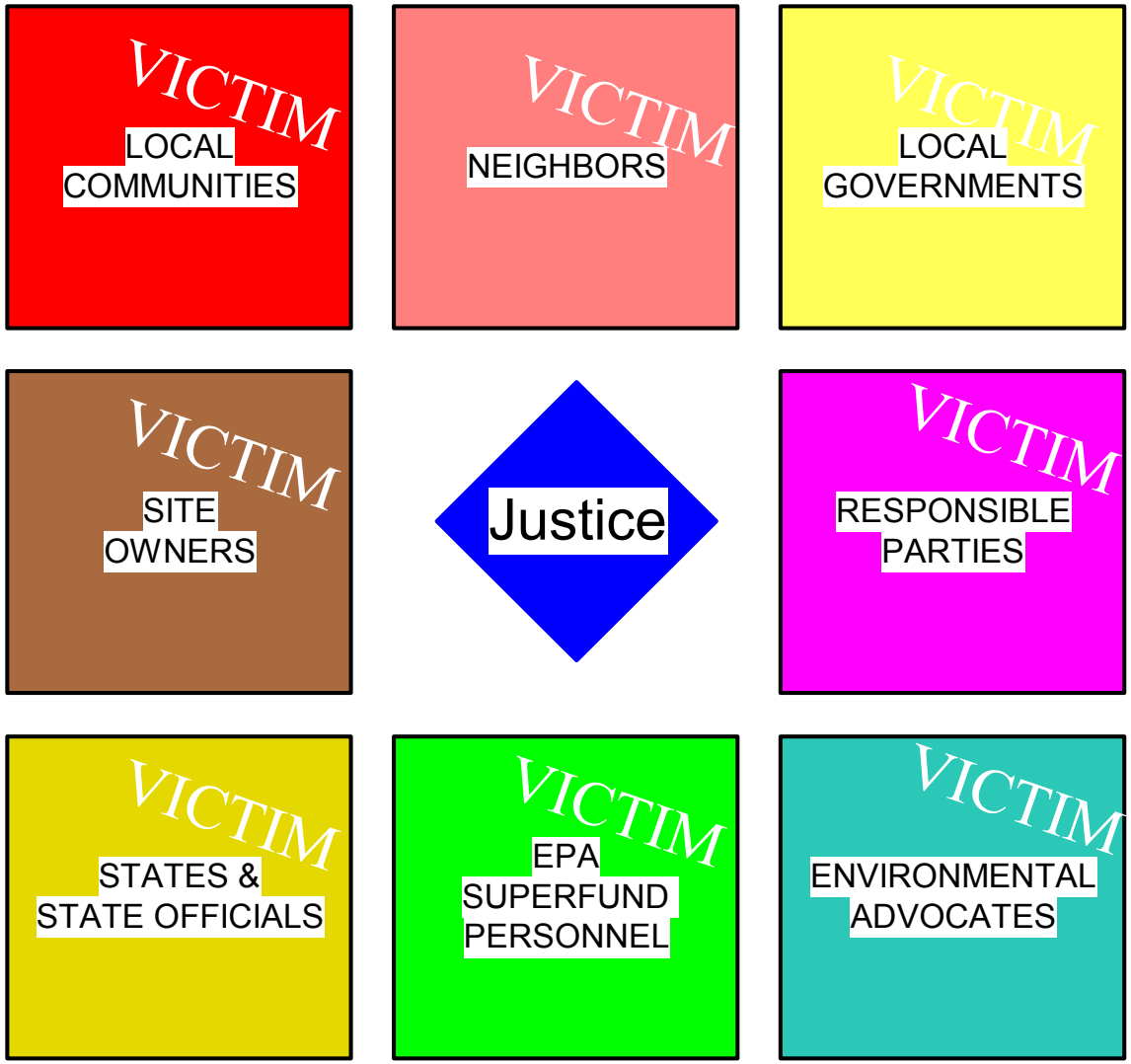


Could risk emerge from its mottled past and become an instrument to create

a Copernican Revolution to turn everything on its head for DOE Site cleanup?

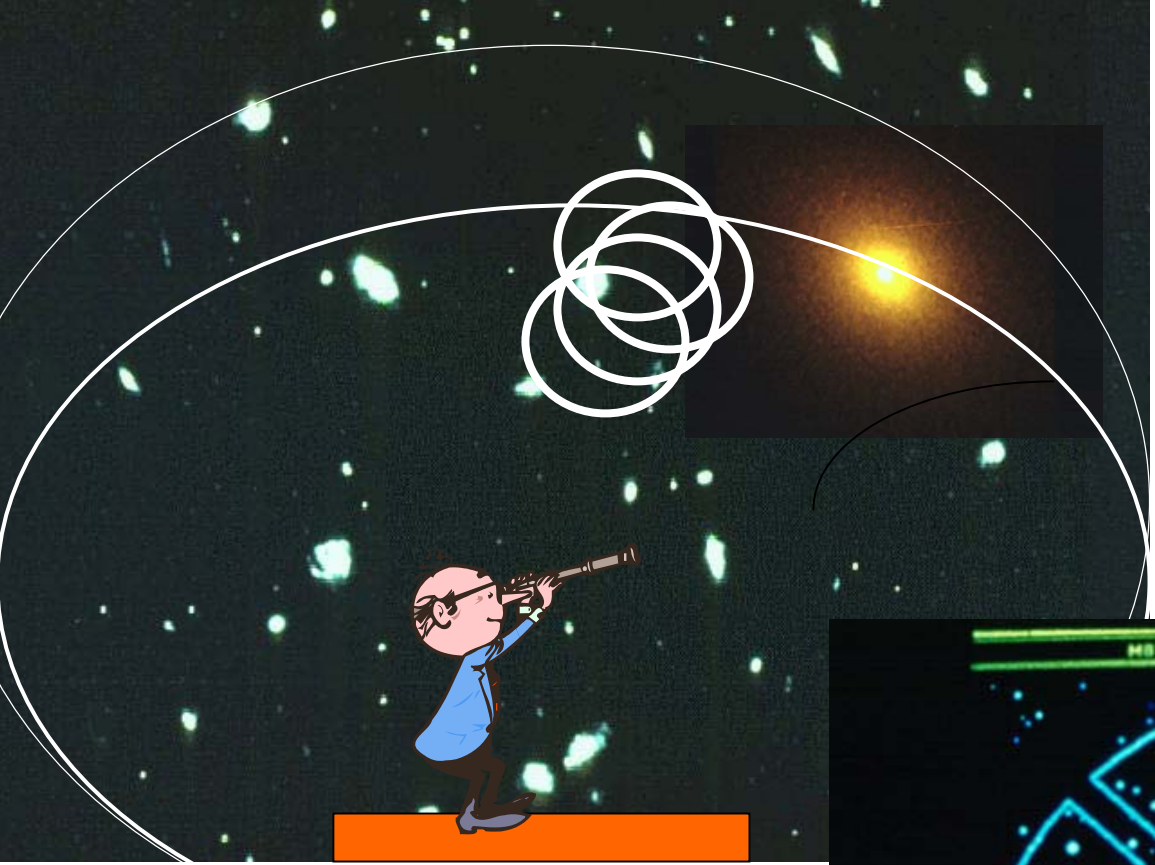
Developed by Charles W. Powers

WHERE WERE WE IN 1993? paralyzed



To the EPA Regions Waste Managers:

ARE YOU ADMINISTERING A LAW WHOSE IMPLICIT CONCEPT OF JUSTICE OFFENDS ALL OF THE STAKEHOLDERS?



Risk-Based Post-Remedy Use

A Copernican Revolution turned Everything on its Head

Developed by Charles W. Powers

Brownfields

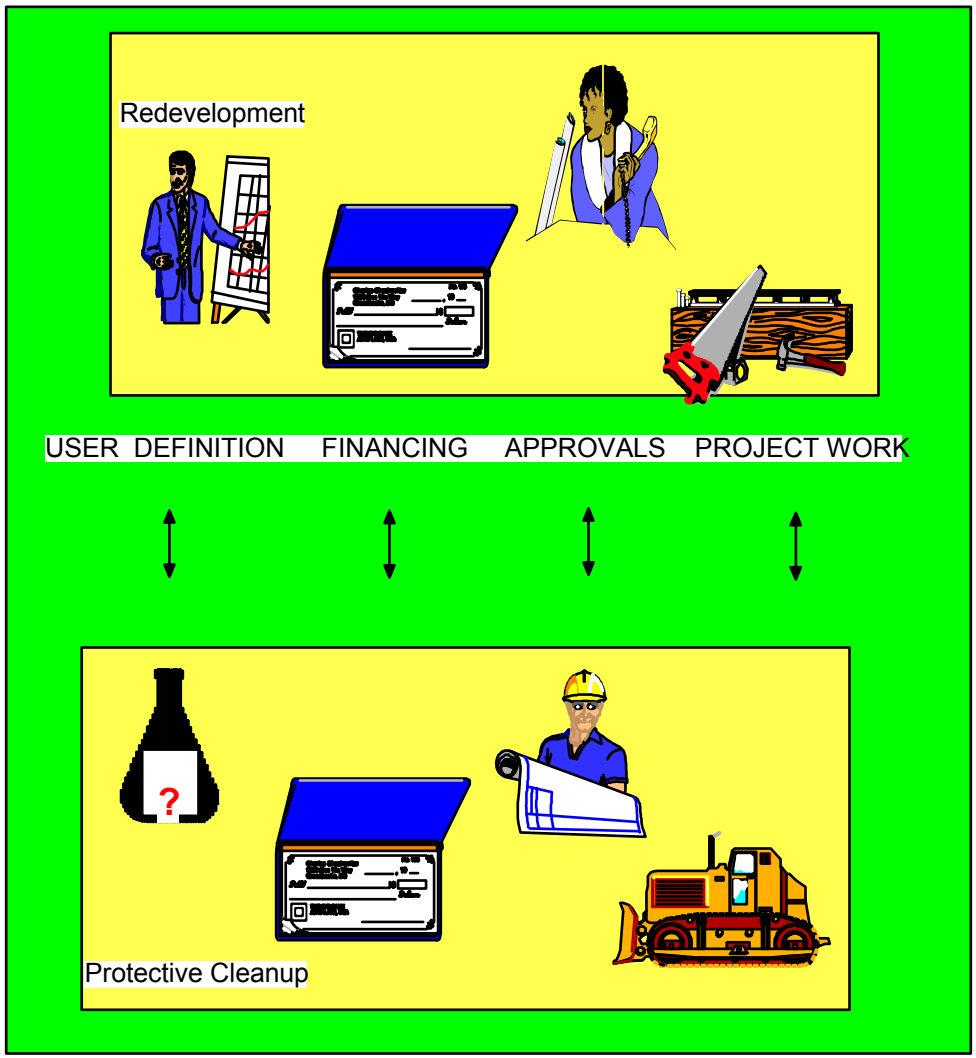
450,000 contaminated sites

little cleanup

paralyzed industrial/commercial real estate market

Is it safe?

How will I know?

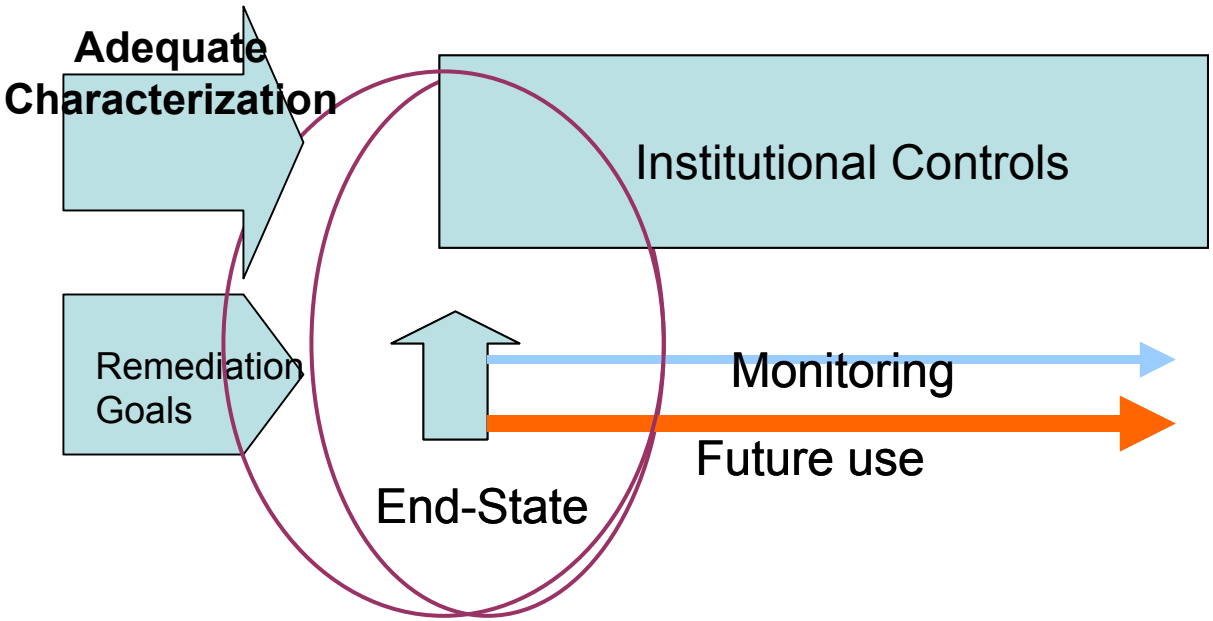


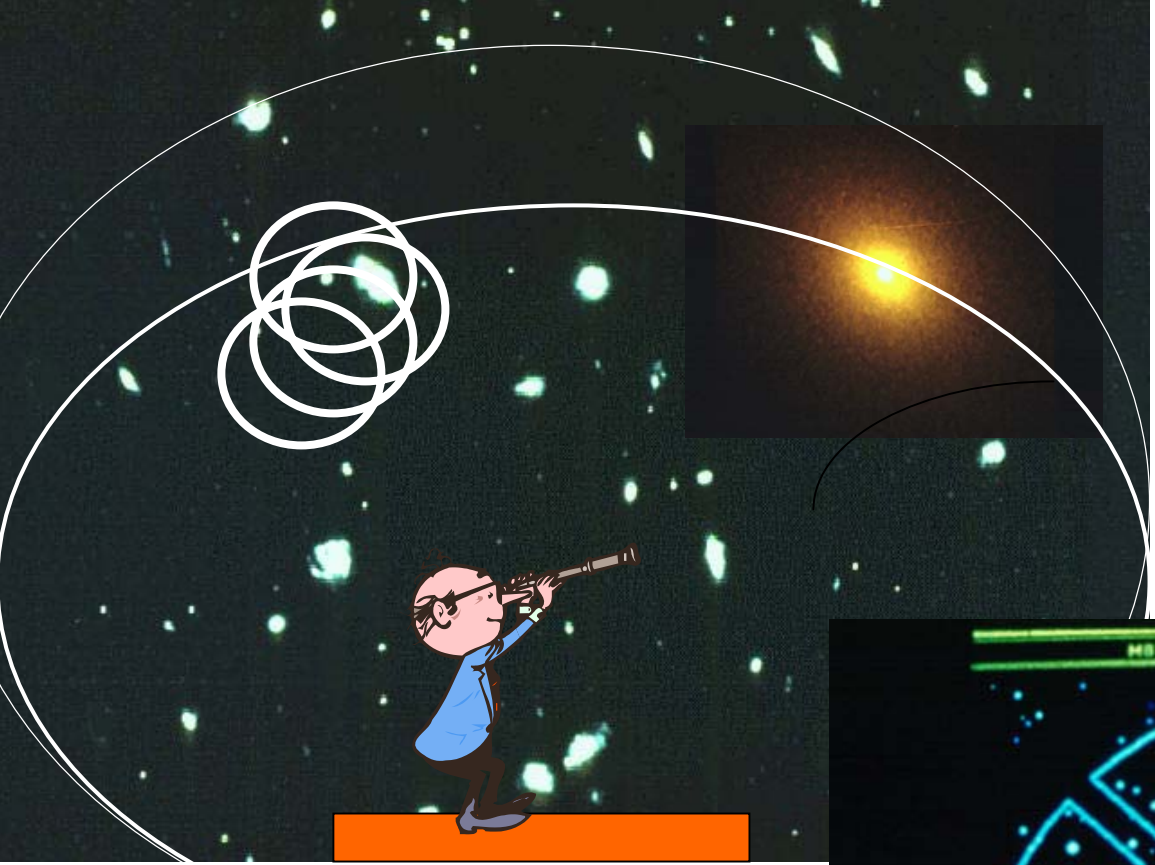
HOW CAN WE COORDINATE REDEVELOPMENT WITH CLEANUP?

Life-Cycle Performance Evaluation

We have learned that protectiveness is achieved/lost at the design stage and is understood only when life cycle costs and concepts are included

What we learned we had to have to address, remedy and reuse Brownfields



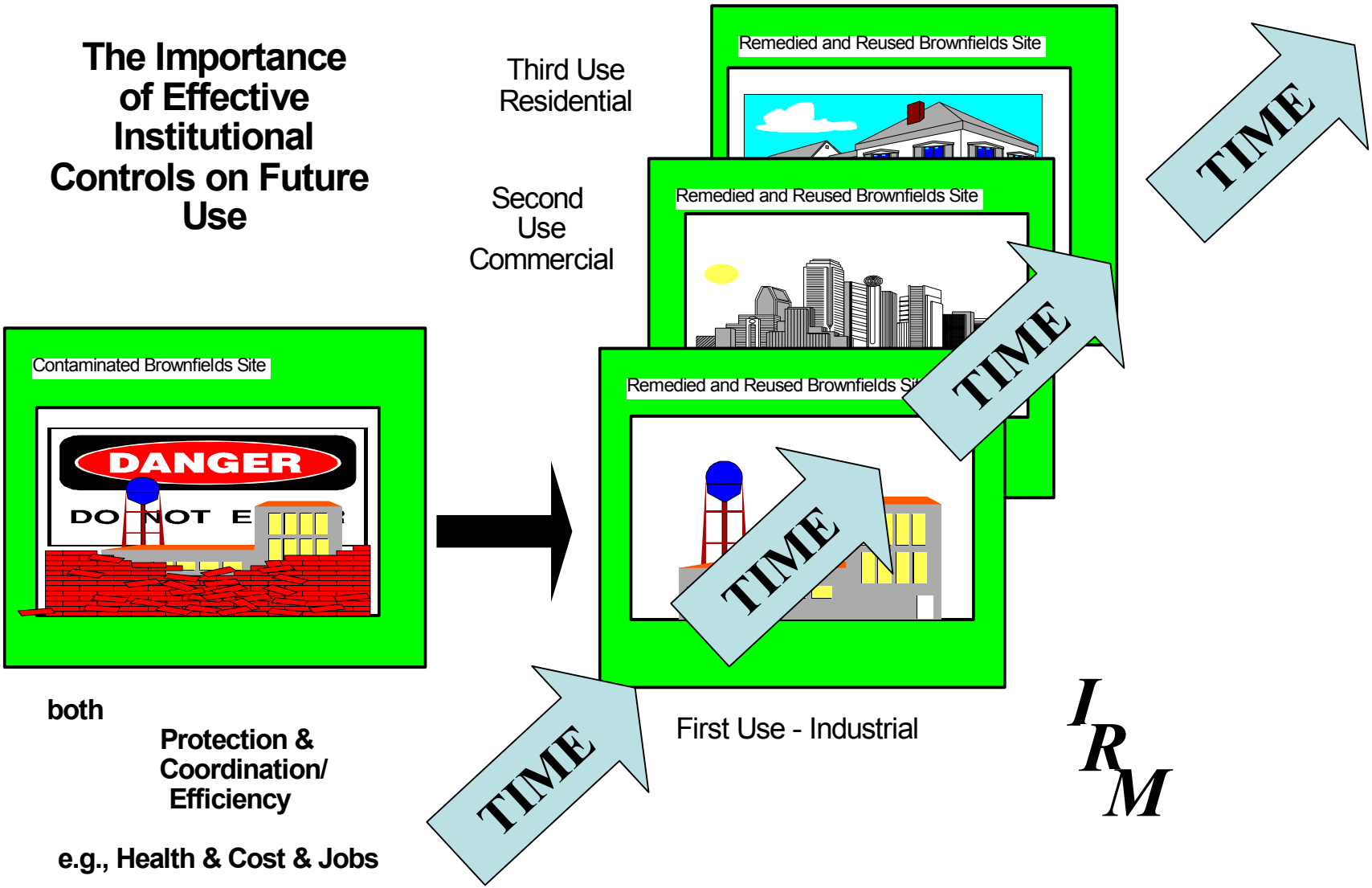


In Brownfields Work
The Integration of
Use and Cleanup
Led to

A Copernican
Revolution that
Turned Everything
on its Head

Developed by Charles W. Powers

The Importance of Effective Institutional Controls on Future Use



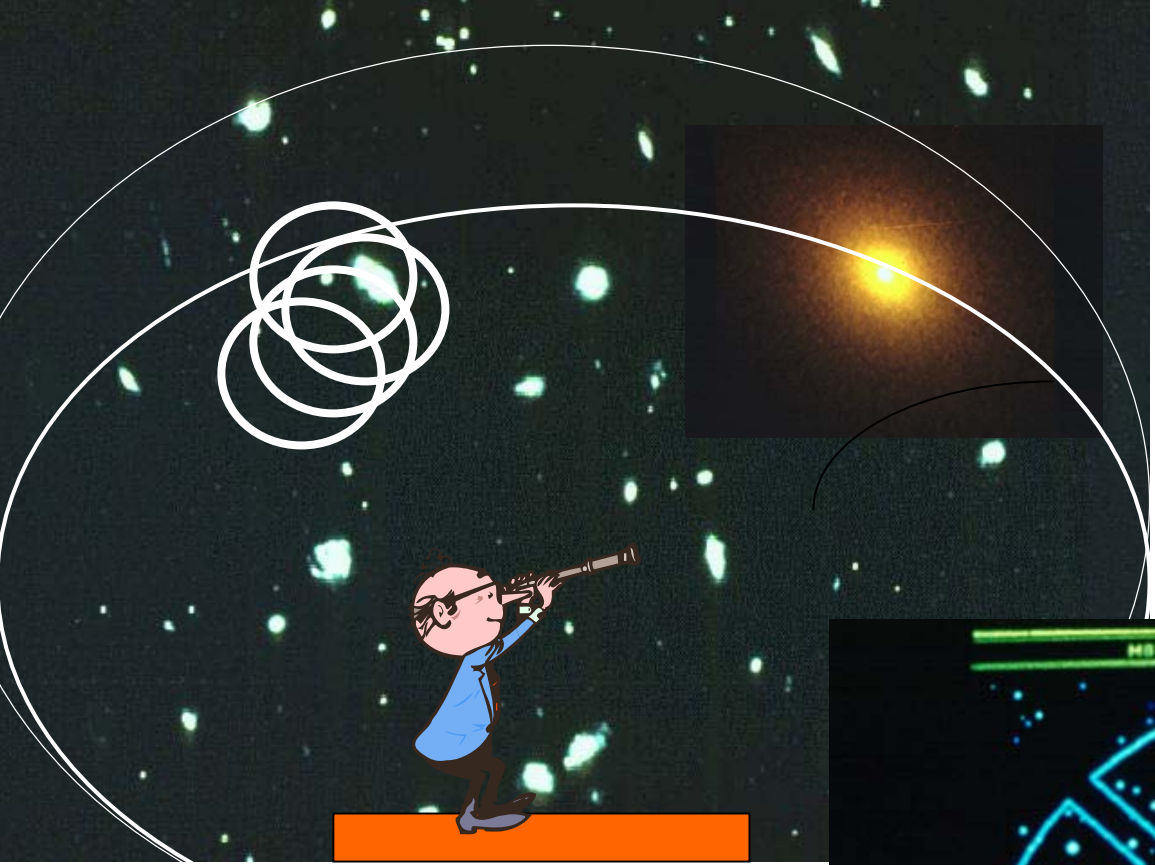
both

Protection & Coordination/ Efficiency

e.g., Health & Cost & Jobs

I_{RM}

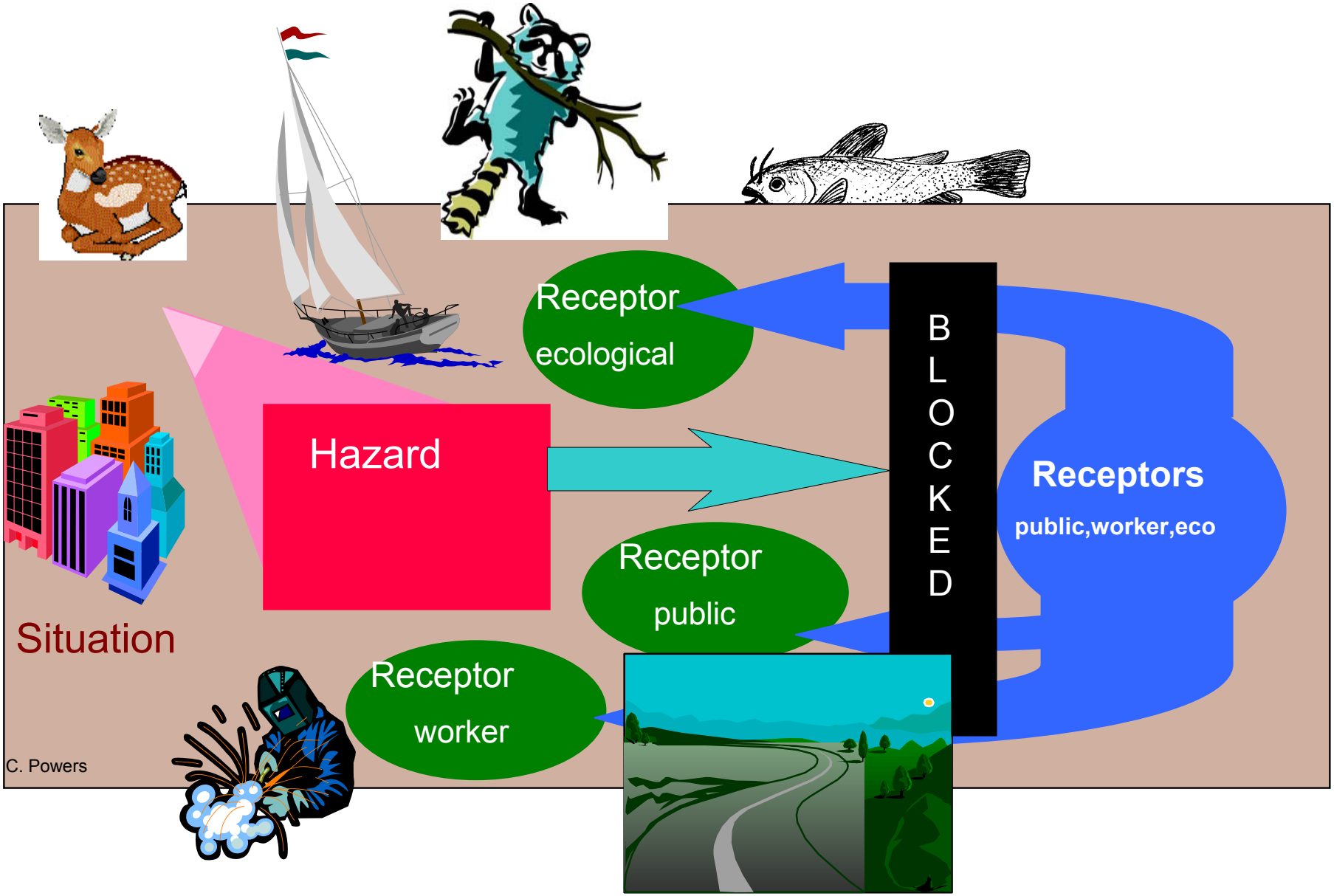
Problems which still need solving



At DOE the
TTBR found
paralysis
lack of progress
troubled process

How could
A Copernican
Revolution turn
Everything on its
Head for DOE?

Developed by Charles W. Powers



Risk and Receptor Protection

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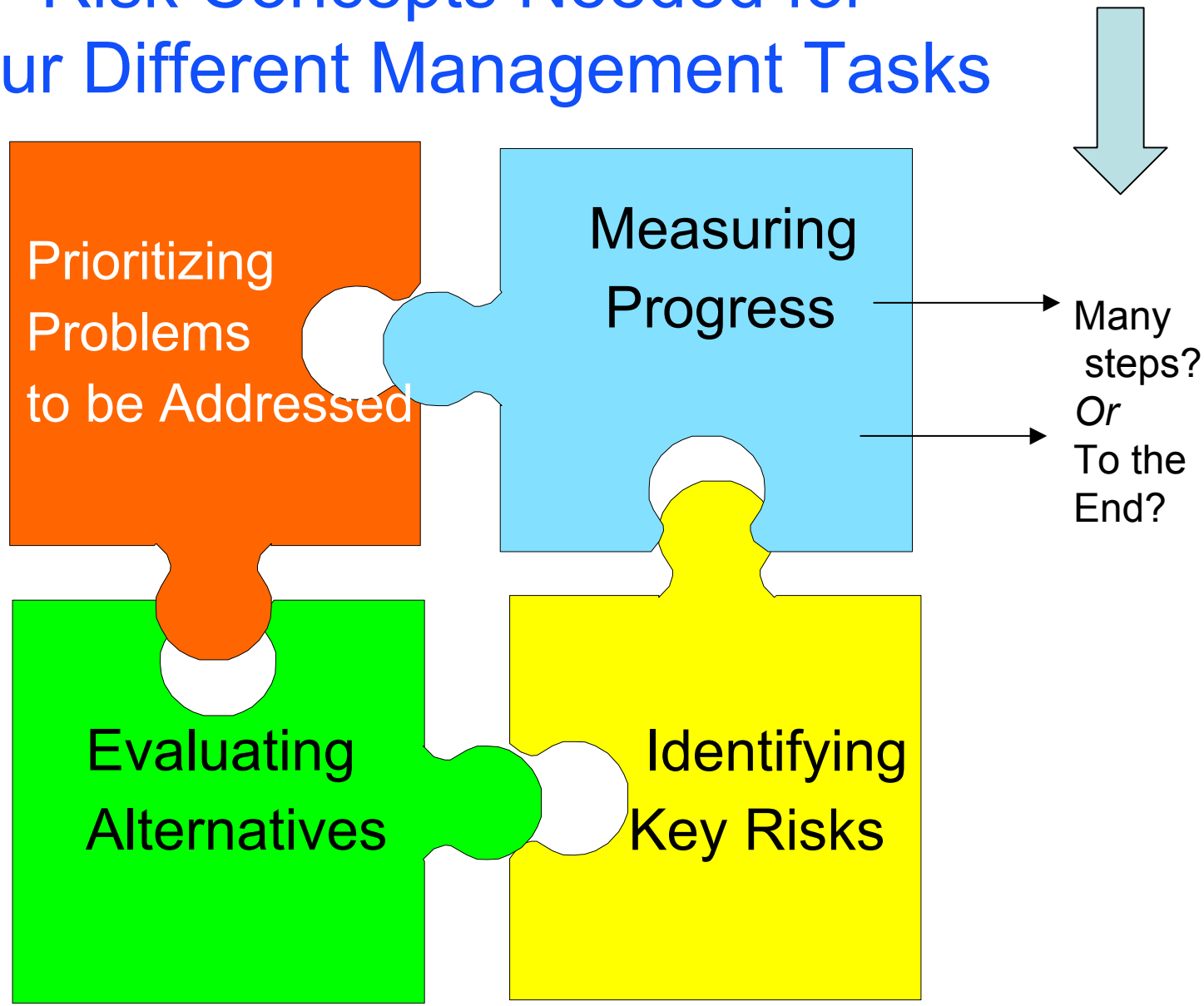
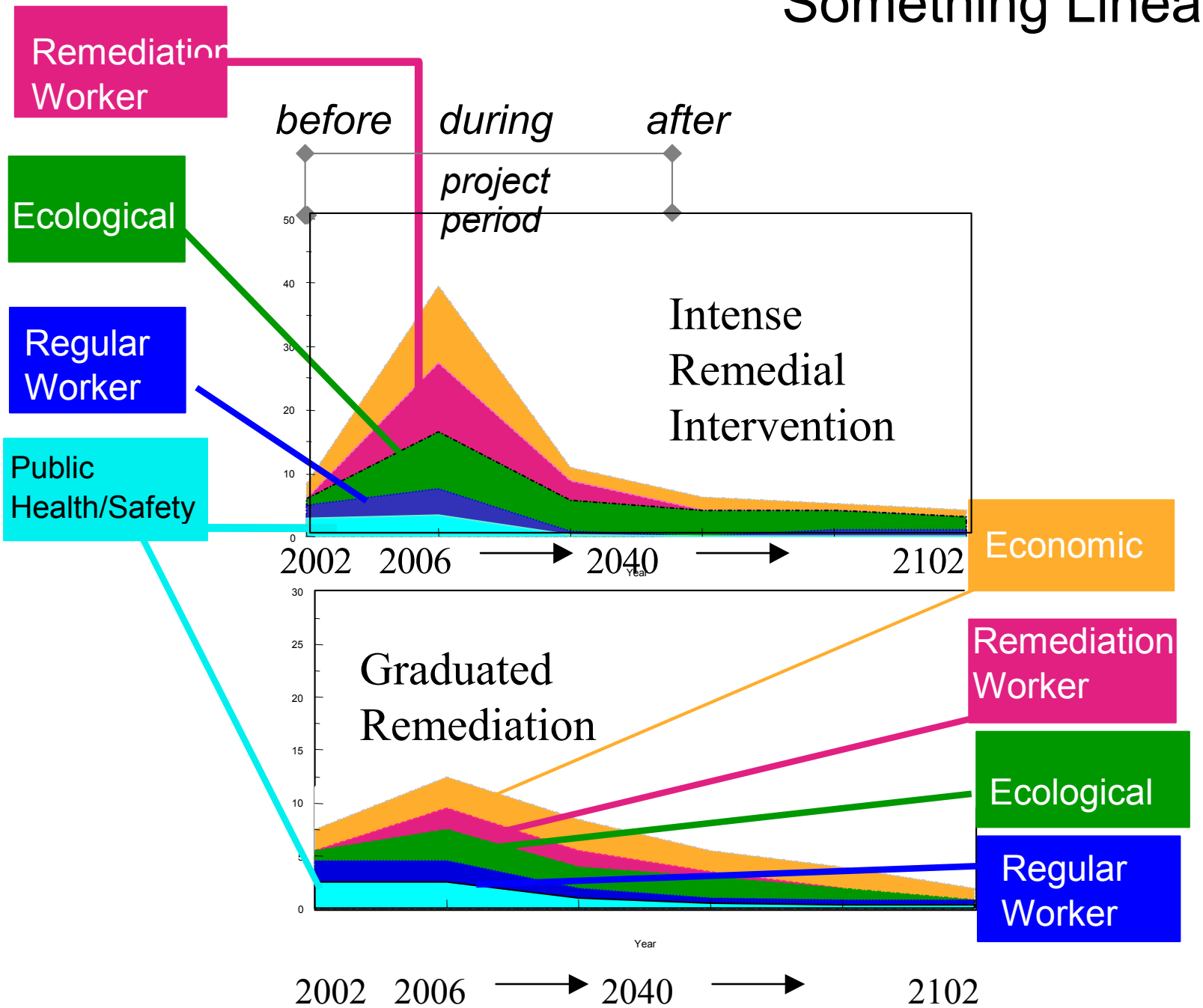
How have we used?

Risk Concepts Needed for Four Different Management Tasks

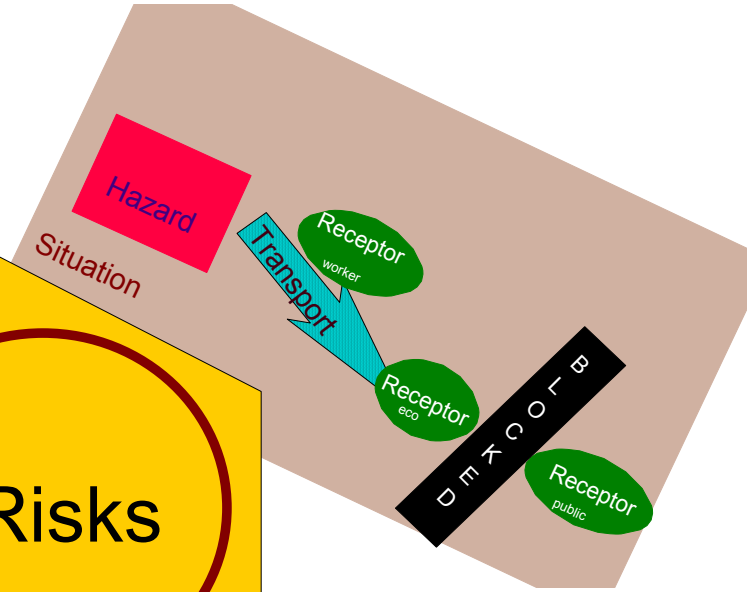


Something Linear



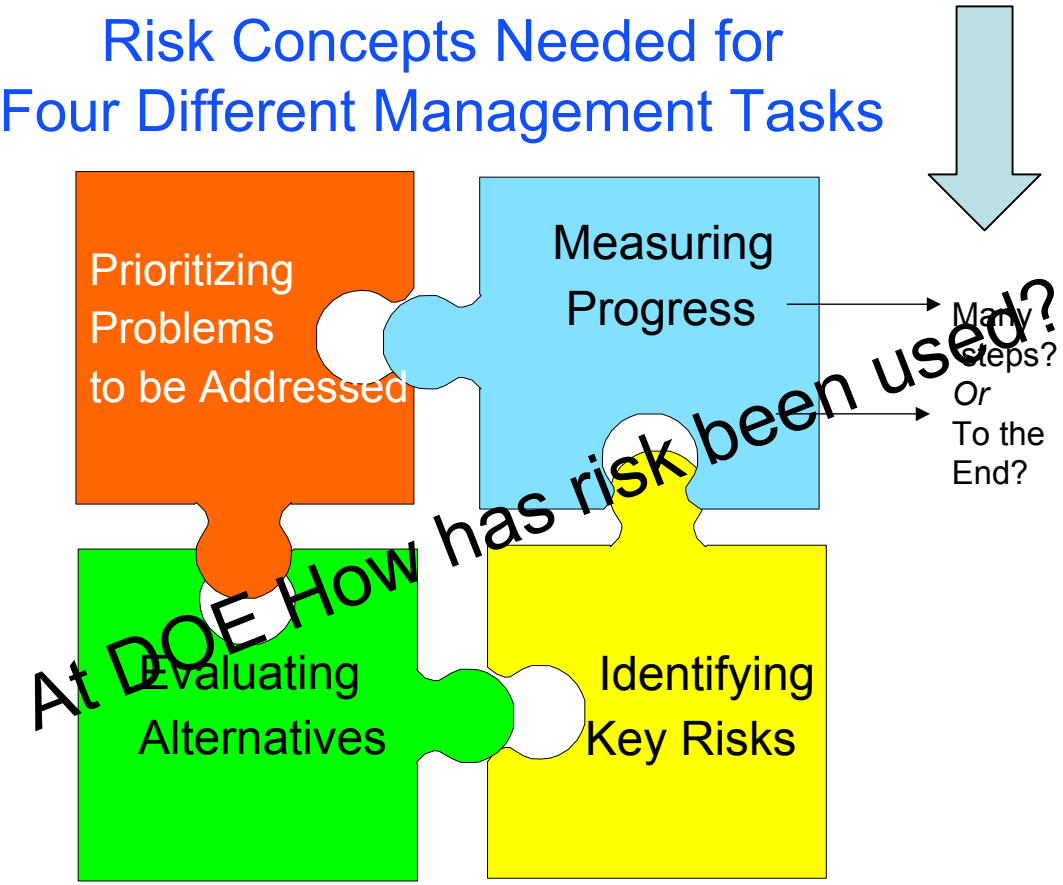
Developed by Charles W. Powers

The Presidential and Congressional Commission on Risk, 1997



Something Circular

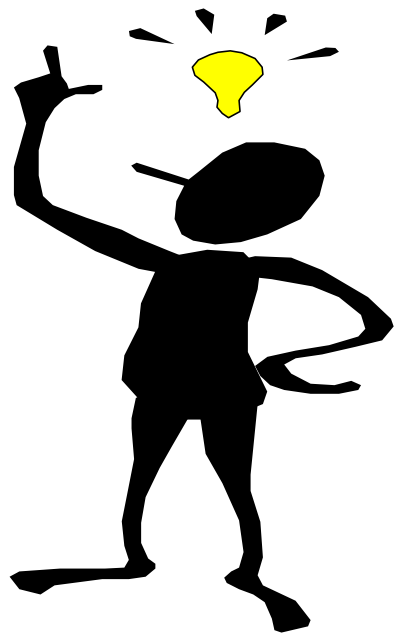
Risk Concepts Needed for Four Different Management Tasks



To be factual: Very infrequently, without rigor and largely to prioritize for budgetary justification

We need to start over!

But where?



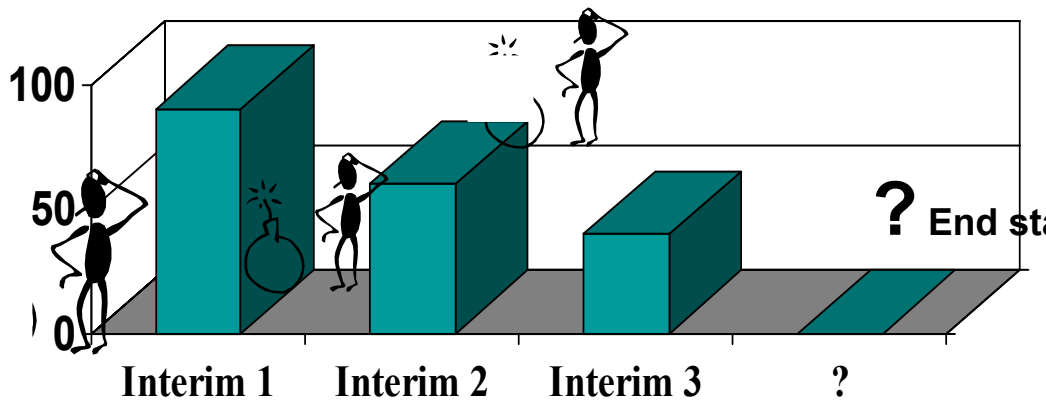
Risk–Based End States

A Copernican Revolution?

It depends on what we mean

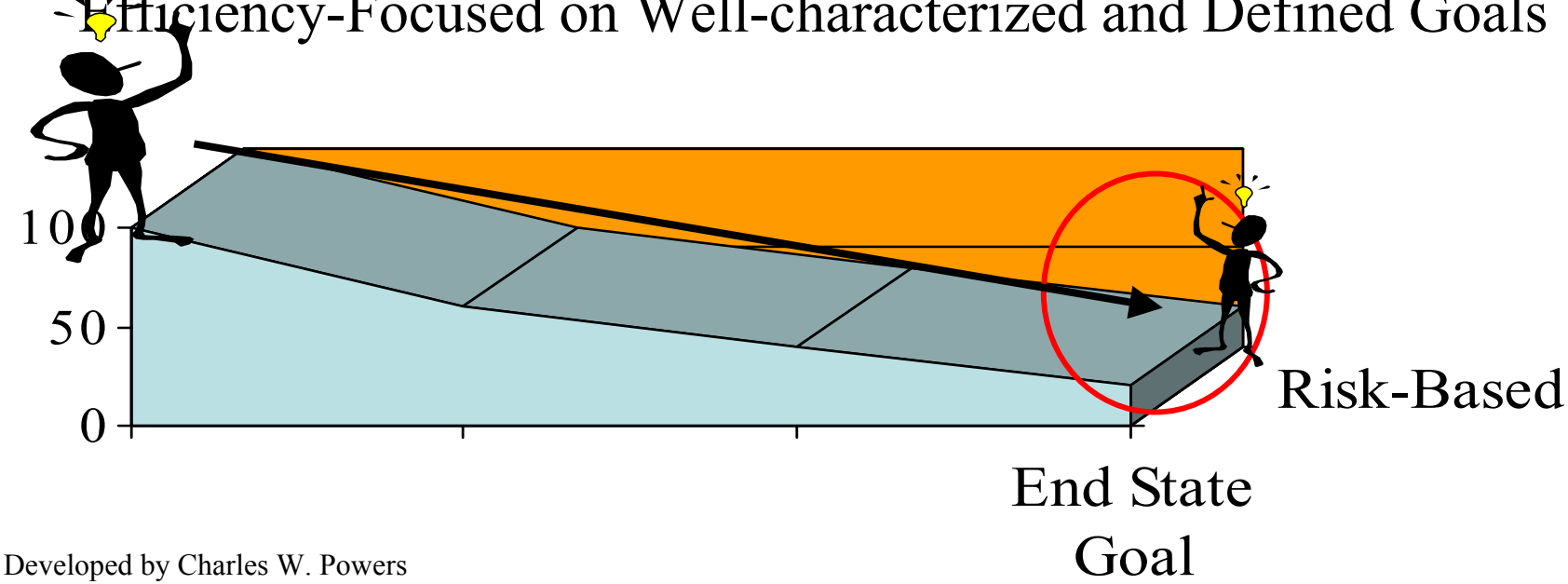
Two Approaches to Risk Reduction

Separate Step-by-Step Reduction w/ no Final Goals Specified



Lost in the process?

Efficiency-Focused on Well-characterized and Defined Goals



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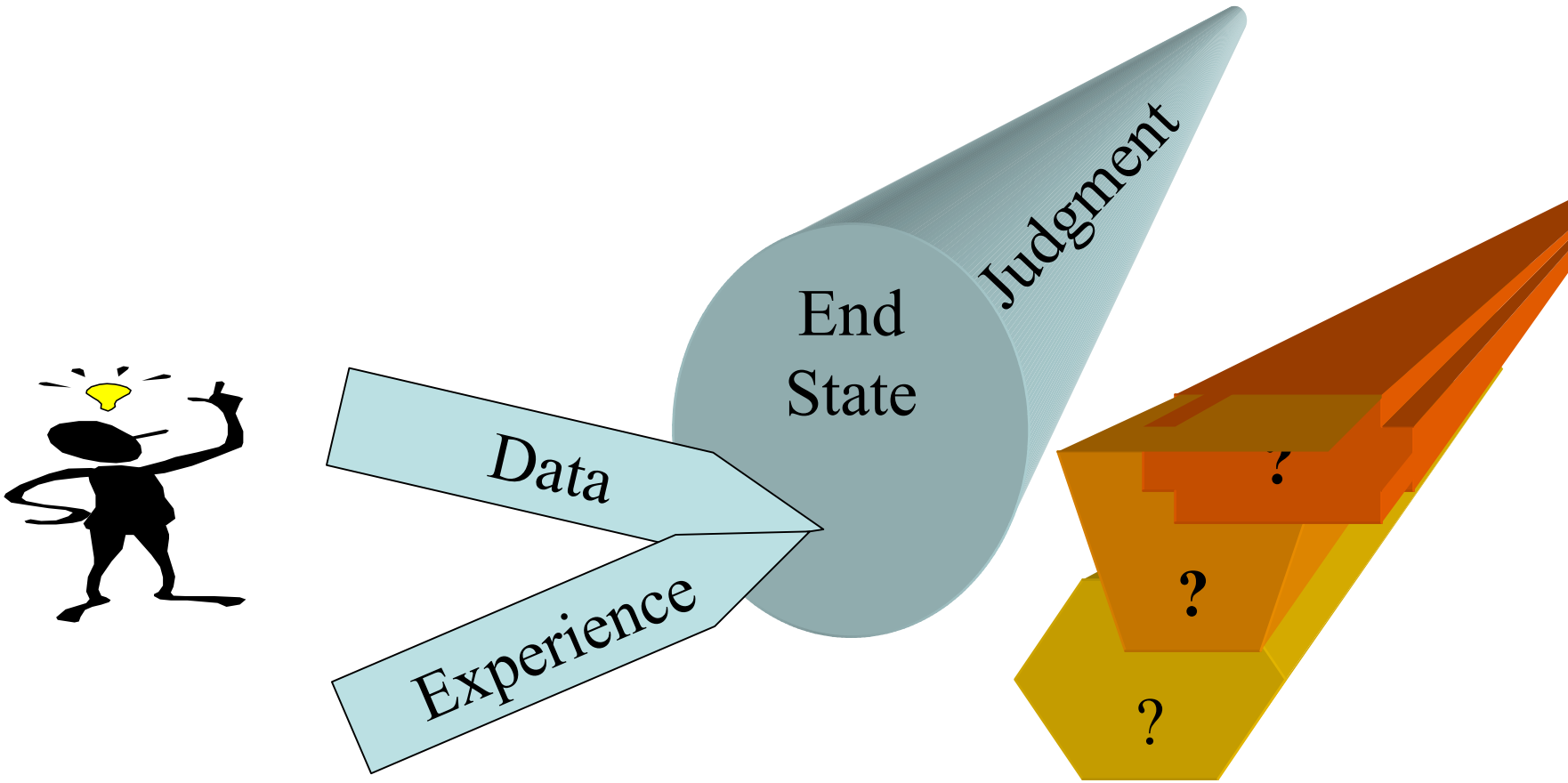
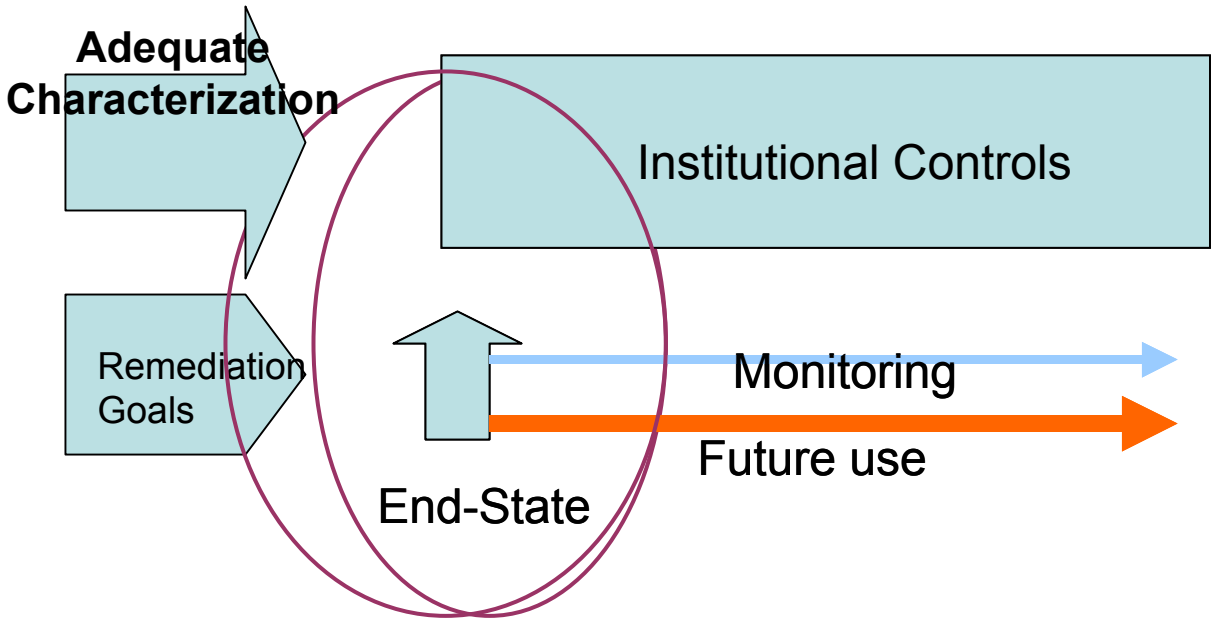
The Big Question:
When do we know enough to competently "imagine" an end state and exercise wise judgment
-- and when are we "simply imagining things"?



What would we have to have to do risk-based end-states?

Possess:

An ability to have adequately characterized the problem, to have forecast remediation achievements, linked them to a monitored future use, forecast controls needed both to secure the blocked pathway and to monitor performance



Are these the basic elements?

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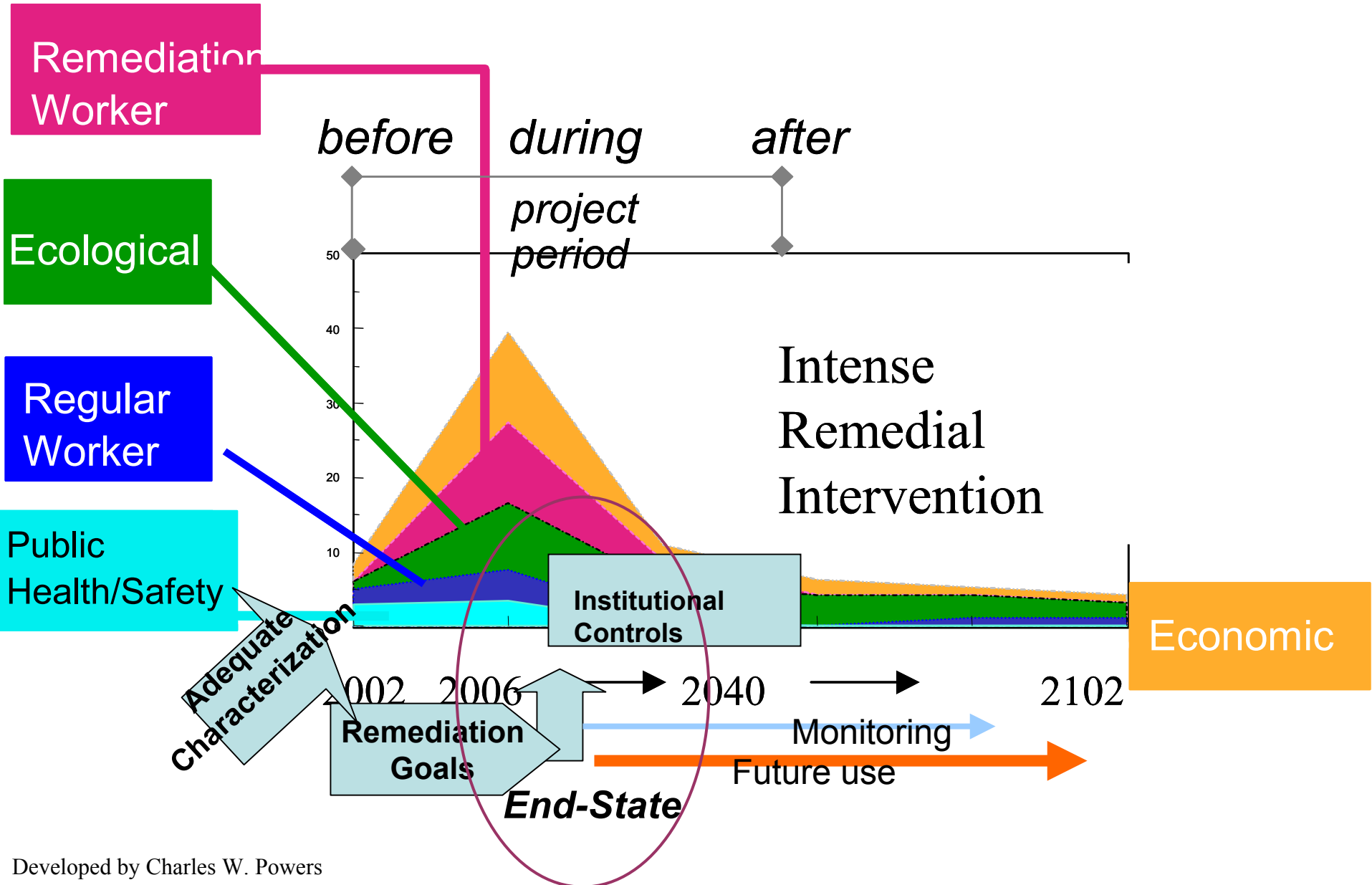

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Issues of Special Importance for Risk

Time

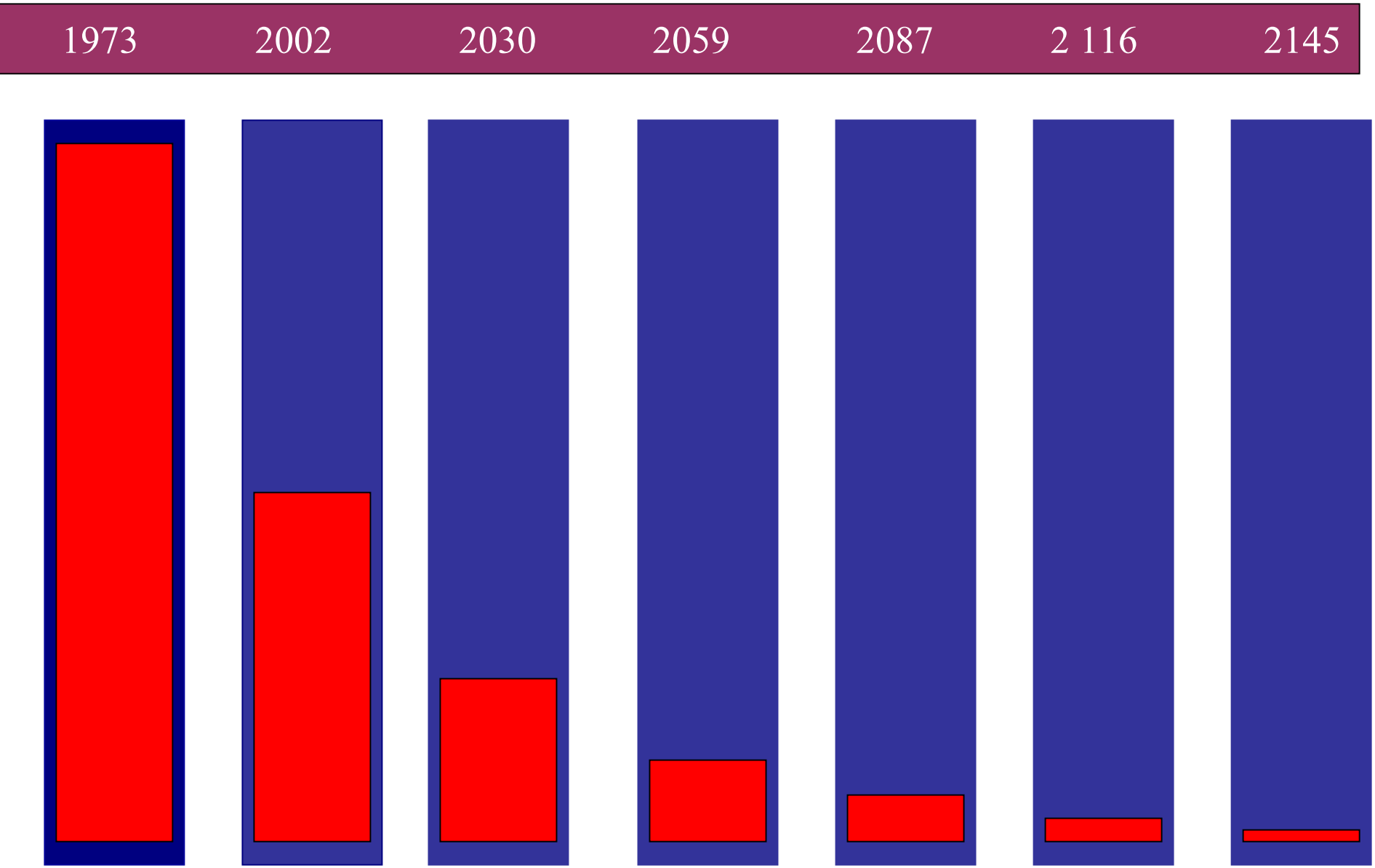
Geographic Integration

Linking Data to Assumptions

Design Limitations in End State Definition

Integrating Costs, Alternatives, and Uses in Transparent End State Definition

How does it matter that the hazard decays?: Cesium[13]



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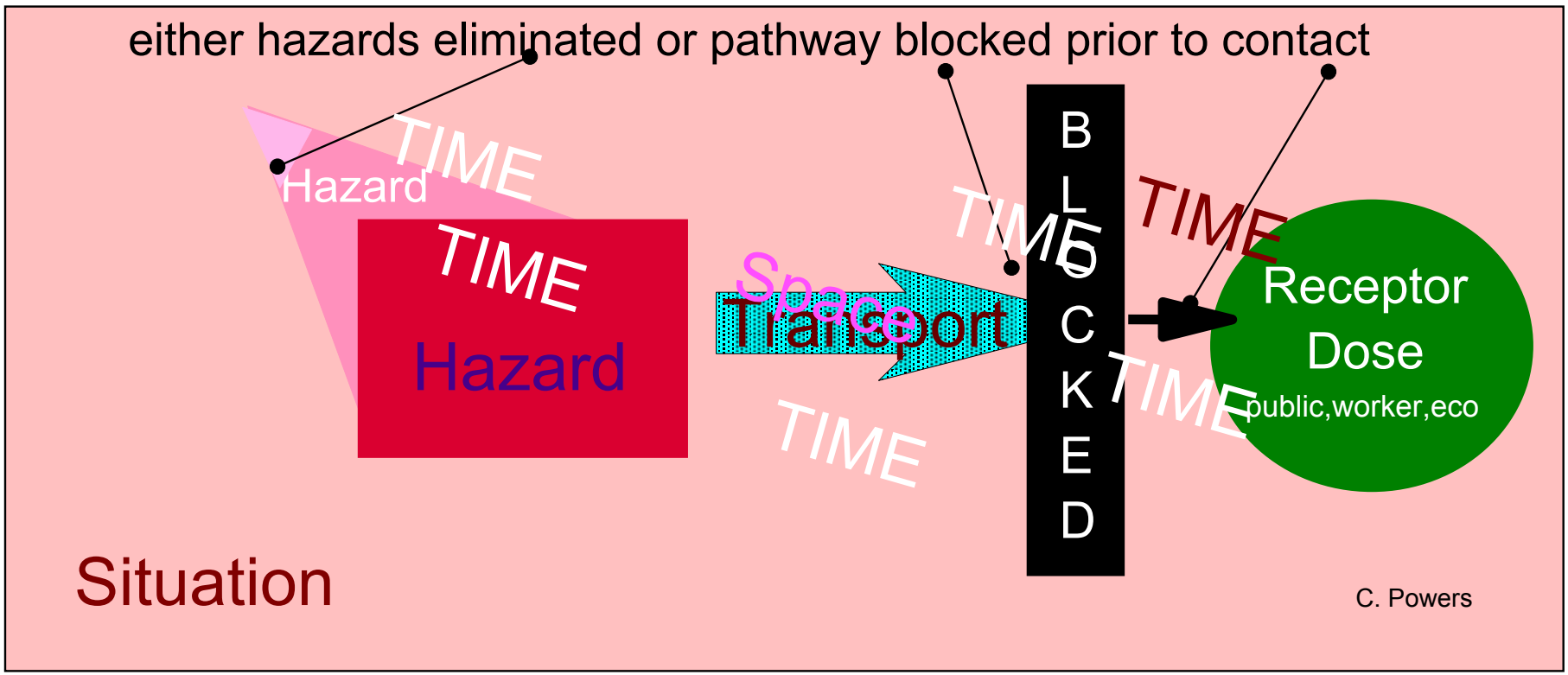
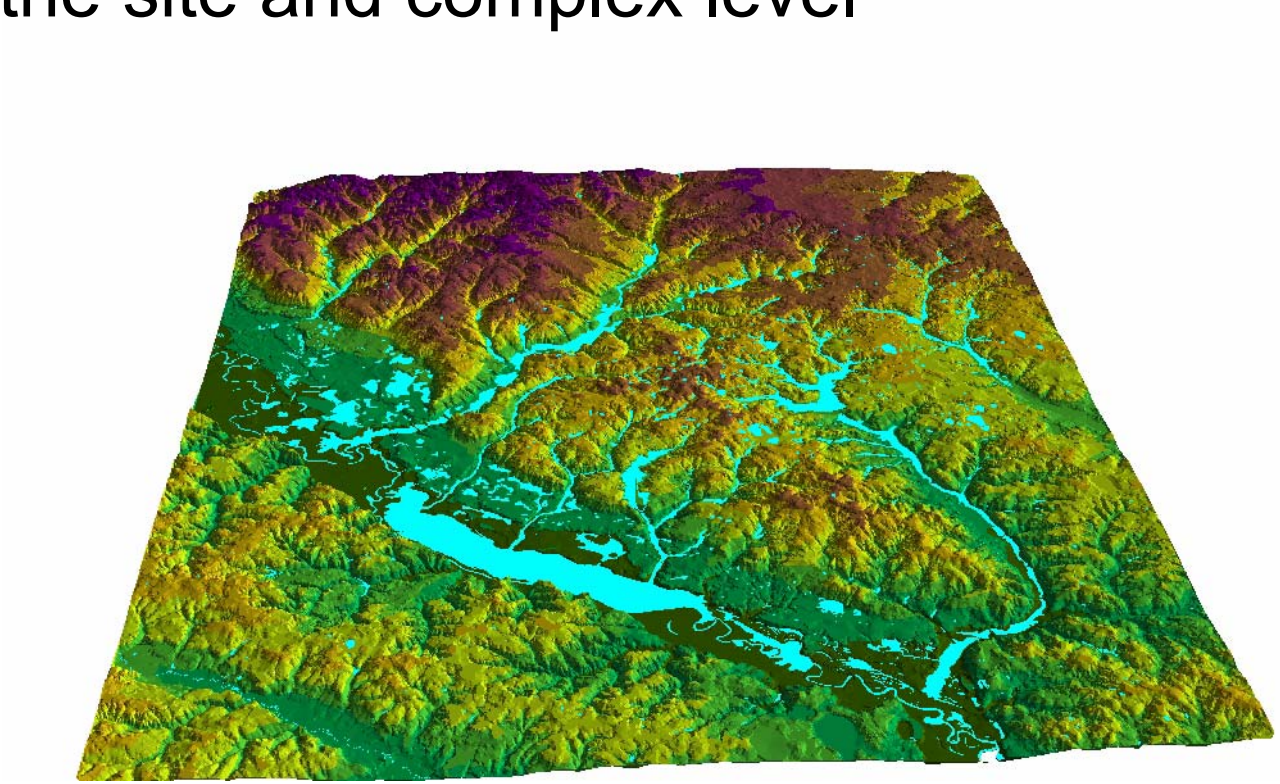
time and space are both the enemy and the friend of protective, cost-effective cleanup at DOE sites: because radionuclides decay over time; space is a buffer, but land use a challenge



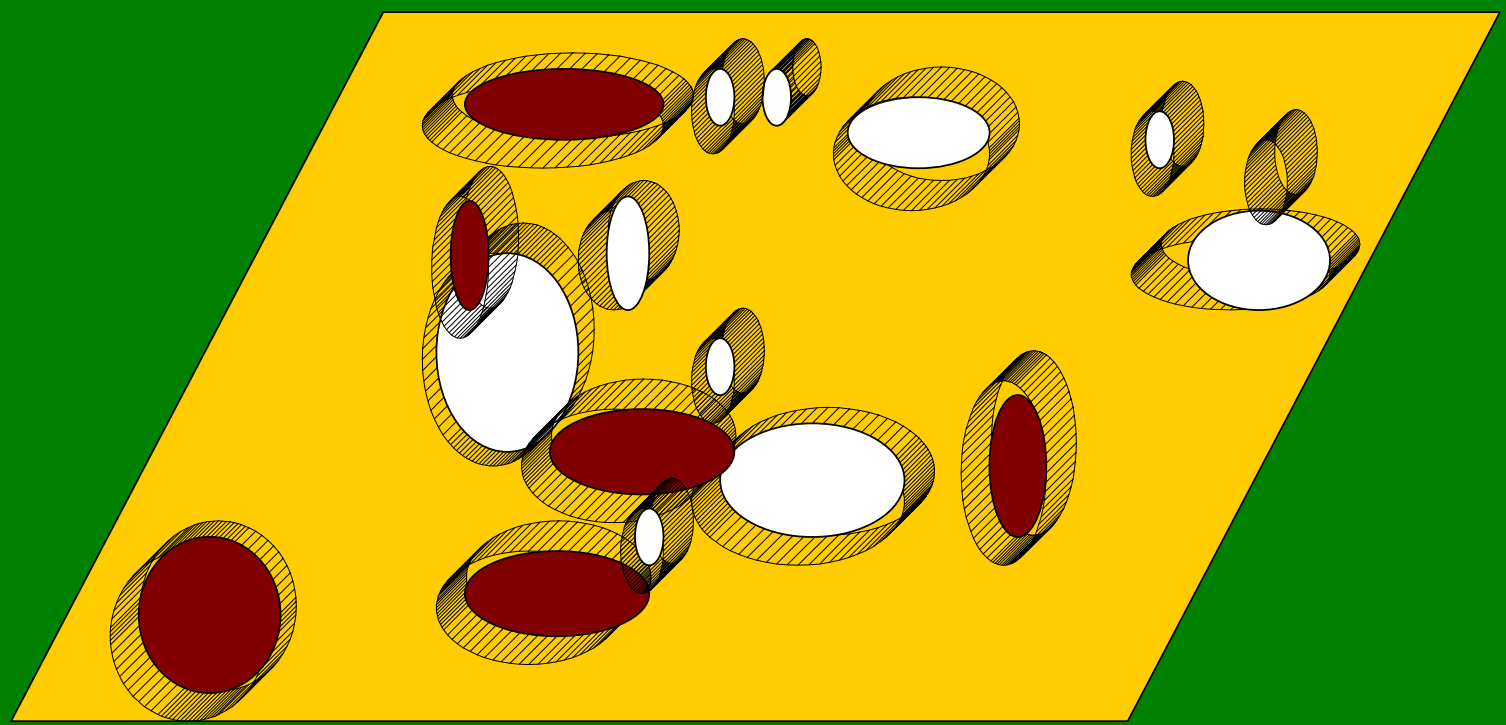
Needed:
Geographic Integration

At the site and complex level



Fernald

Mound



Assessing the Whole Slice and not the Holes

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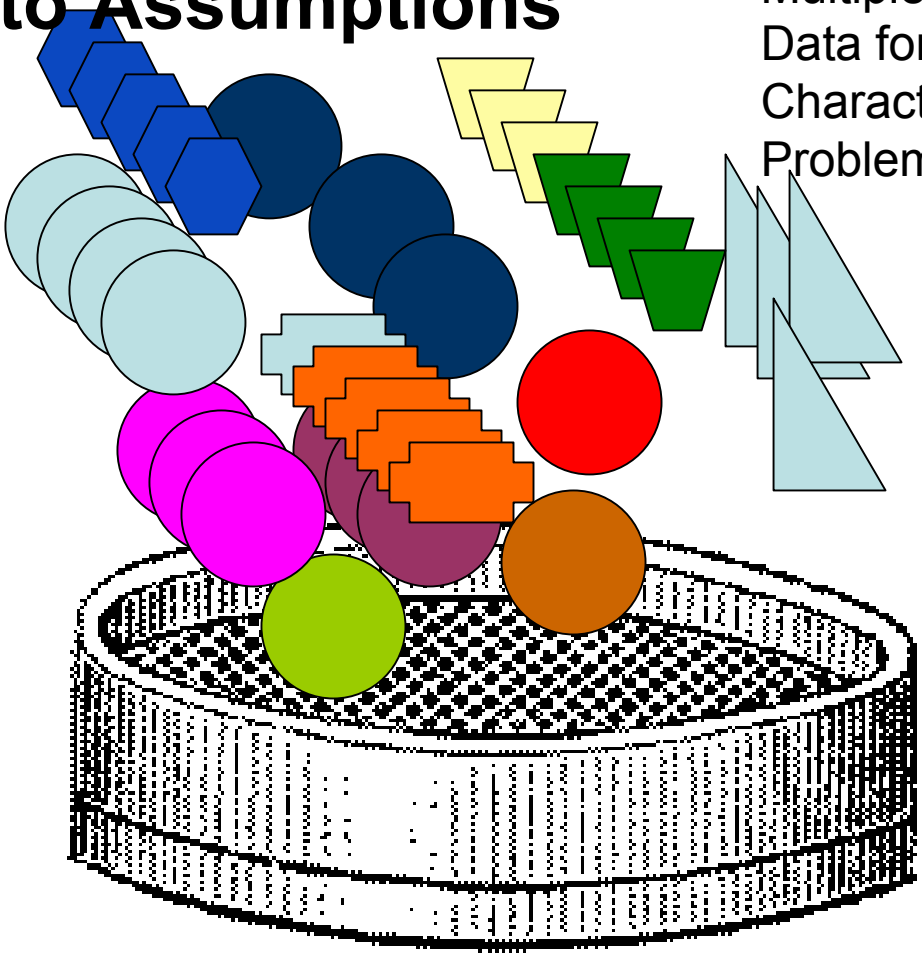
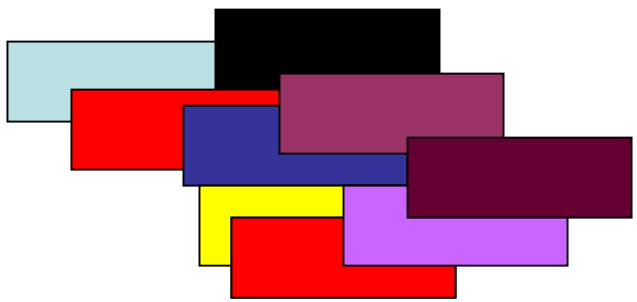
116-C-1 Process Effluent Trench
(Backfilled)

Linking Data to Assumptions

Multiple Types of Data for Risk-Based Characterization Of Site Problems under Diverse Statutes



How to Strain the Data into A Form Which Informs the Risk-Based End State



How could we End up with Building Blocks of Data for Risk-Based End State Characterization To Guide Remediation/Stewardship

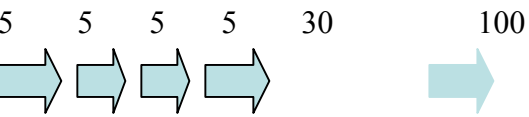
Developed by Charles W. Powers

Design Limitations in End State Definition

Do the timelines
For review or design life
From either
Regulatory System
Achieve the task
And accept design
limitations?

Timelines:

PA's and CA's



CERCLA and RCRA and some State Waste Laws

Changes in the Way Regulations
Relate or are Implemented Together

Developed by Charles W. Powers

Land use and regulatory time

Timelines:

PA's and CA's

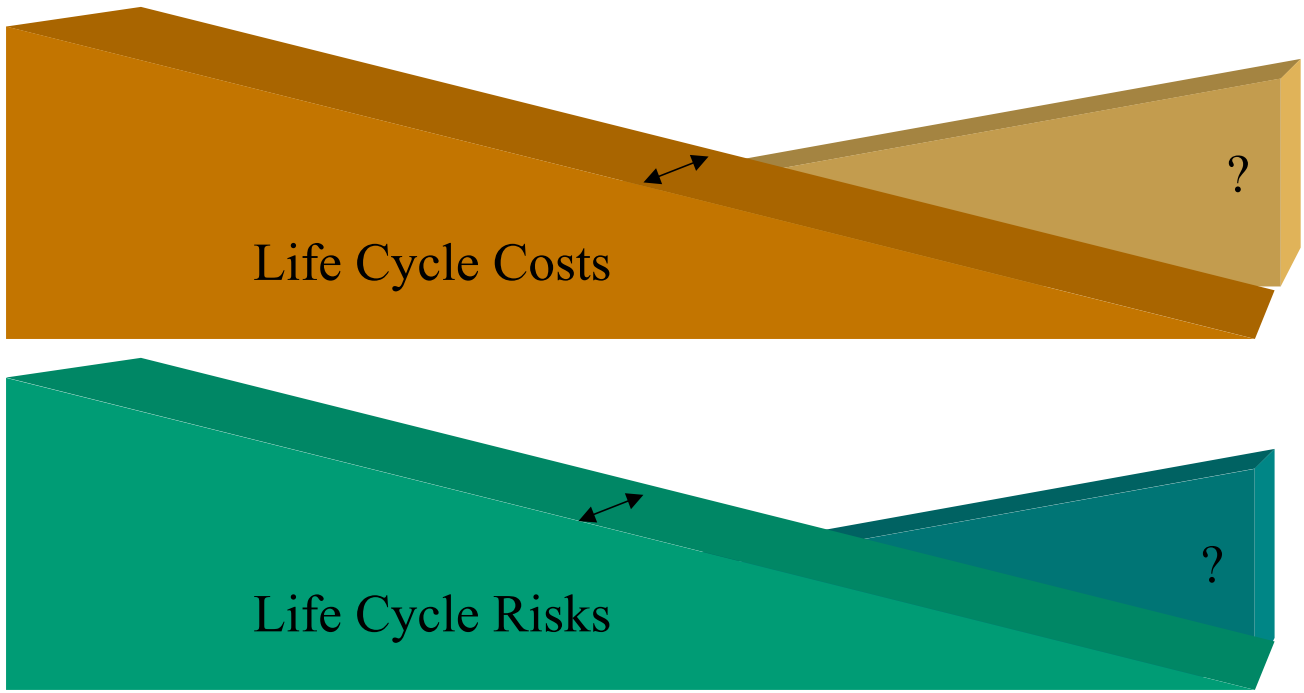
1,000

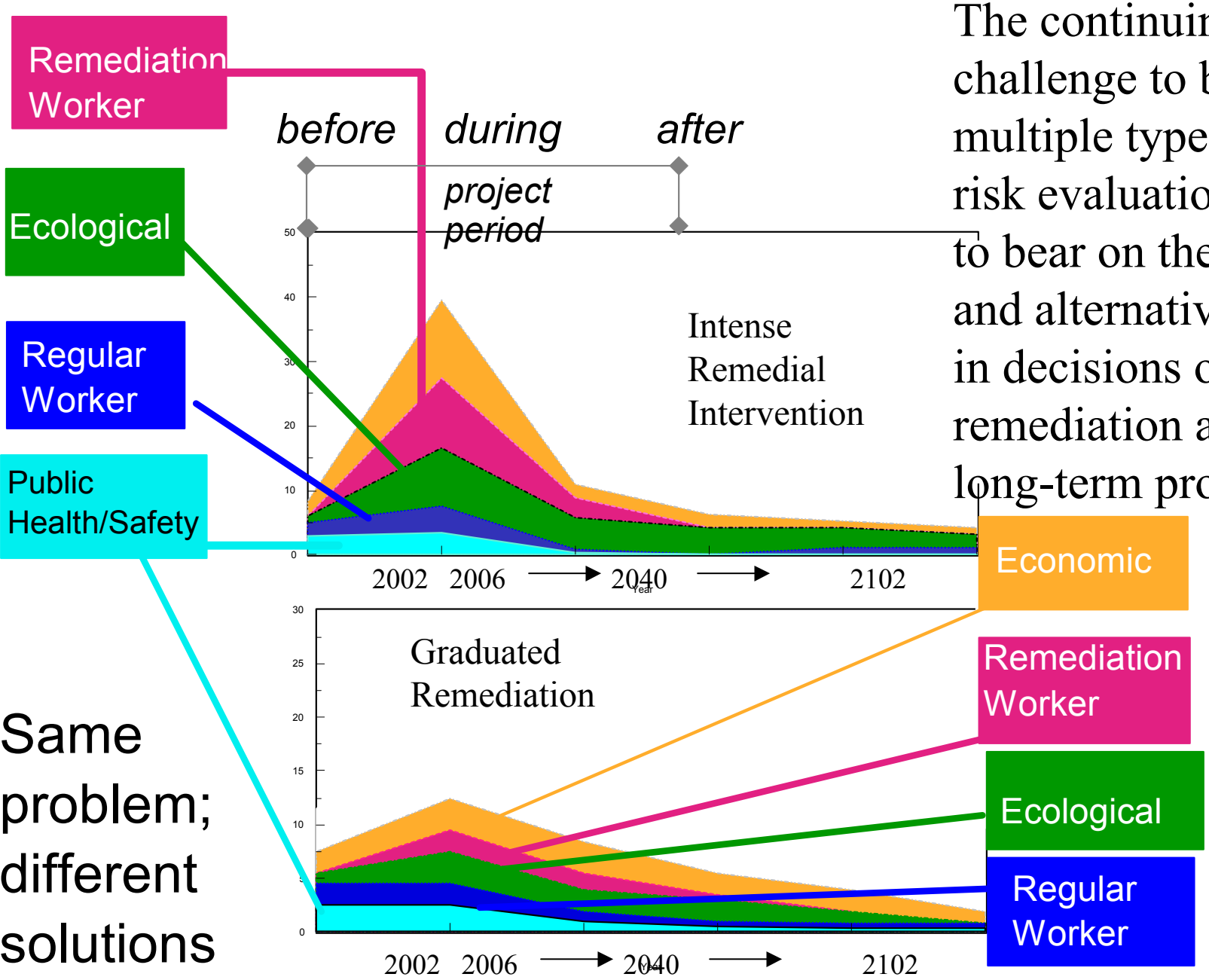
5 5 5 5 30 100

CERCLA and RCRA and some State Waste Laws

1950 2002 2102 ?

Integrating Costs, Alternatives, and Uses in Transparent End State Definition



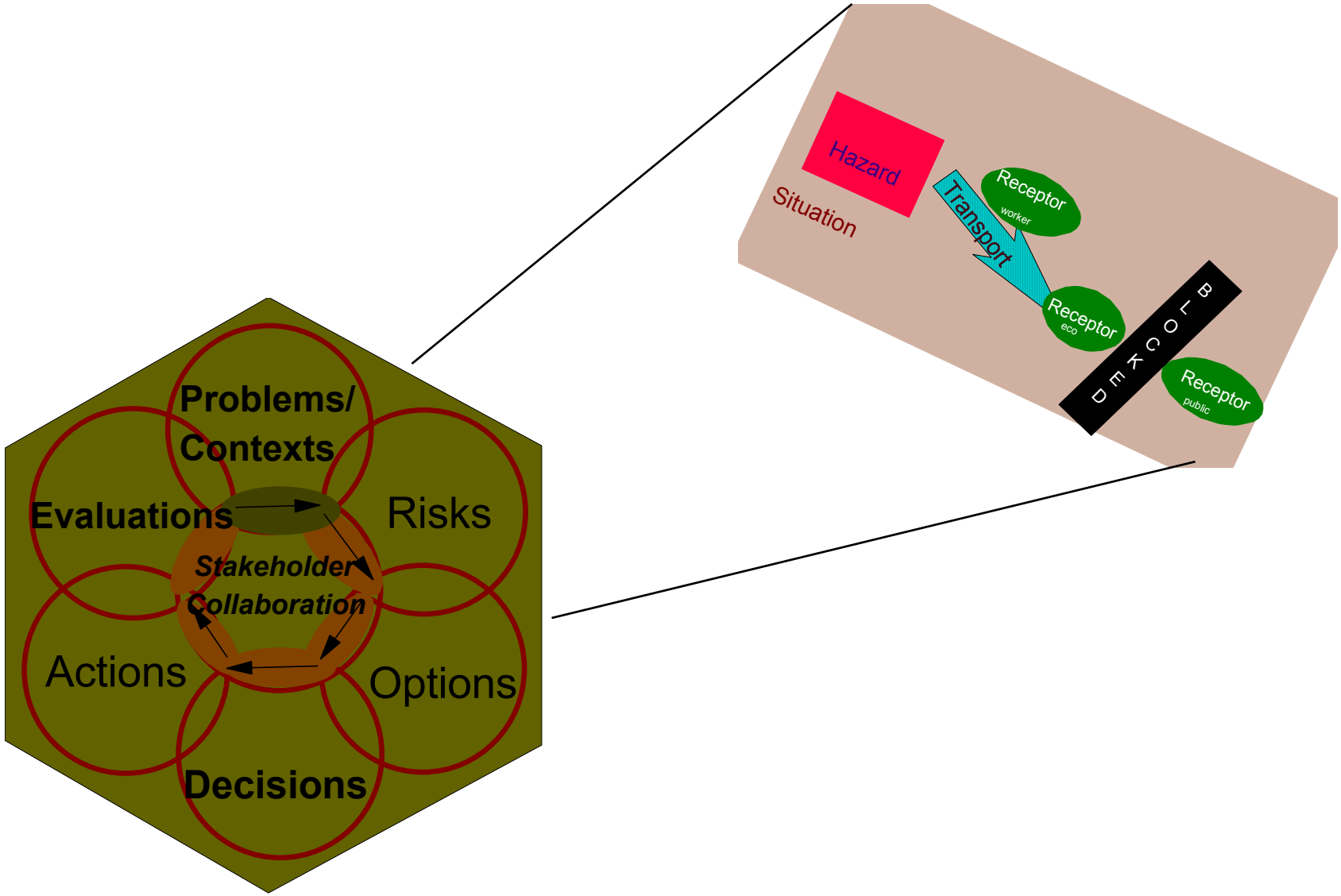


The continuing challenge to bring multiple types of risk evaluation to bear on the sequence and alternatives used in decisions on remediation and long-term protection

Same problem; different solutions

Developed by Charles W. Powers

Stakeholder collaboration is fundamental to evaluating risk in context



Listening to Community Leaders About Land Use and Stewardship

Karen Lowrie, Ph.D.

Lynn Waishwell, Ph.D.

TIE Workshop

Nov. 13, 2001

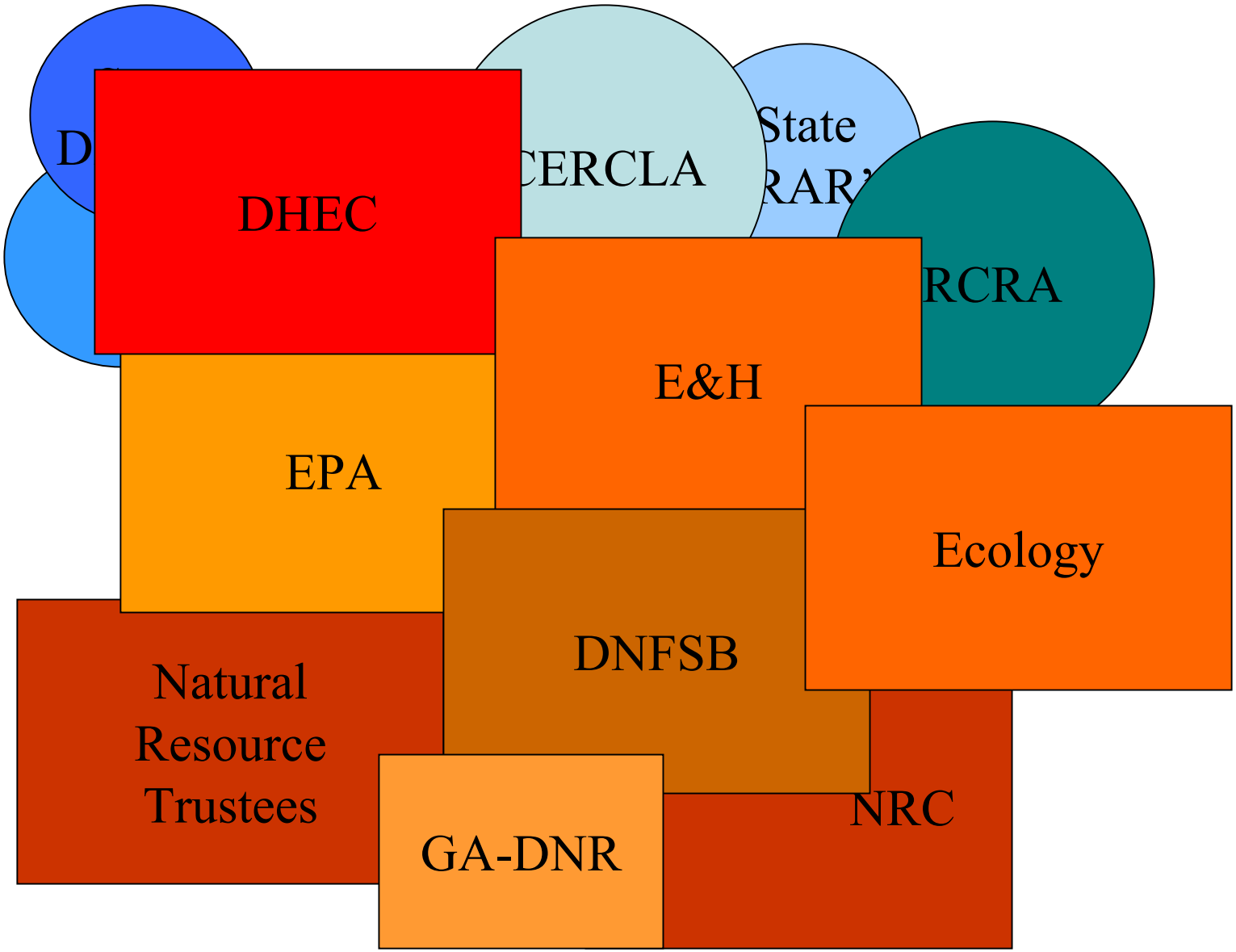
116-C-1 Waste-site Information

Developed by CRESP Researcher, Christie Drew

- Name: 116-C-1 Process Effluent Trench
- Location: 100-BC Area (GIS coordinates)
- Type: Process Effluent Trench learn more
- Status: Complete (see CVP 98-0006)
- Excavation Diagram
- Dimensions:
  - Site Depth Designation: Intermediate
  - Rectangular: 167 m x 32 m x 5.2 m (548 ft x 105 ft x 17 ft)
  - Volume: 31,957 CM (41,799 LCY)
- Contaminants of concern:
  - Radionuclides: ^{137}CS, ^{152}EU, $^{239/240}PU$, ^{241}AM, ^{60}CO, ^{154}EU, ^{155}Eu, ^{238}Pu, ^{90}Sr, ^{238}U,
  - Inorganics: Cr(total), Cr^{+6} (Hex), Hg, Pb, Sb

- Decision Information
  - 100 Area Soil cleanup ROD
  - TPA Milestones
- Related (Analogous) sites list
- Make a comment
- Sources

Sources: DOE, 1999, Cleanup Verification Package (CVP-98-0006) and DOE 1998, Remedial Design Report/Remedial Action Work Plan for the 100 Area. (DOE RL-96-17)



Developed by Charles W. Powers

Are there?

And how does all this relate to, for example The NCP?

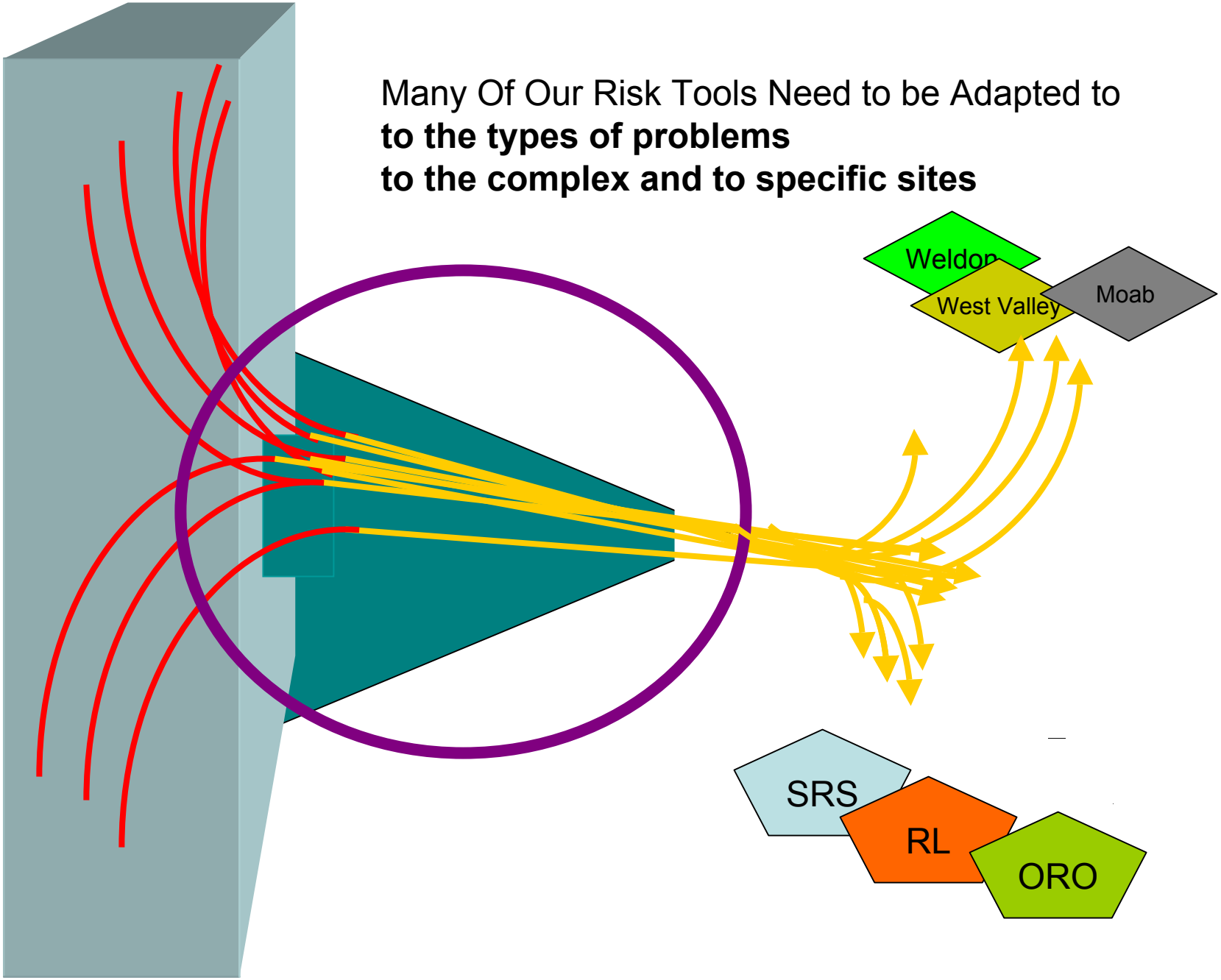
Specific Changes in the Regulations Themselves Needed Especially at DOE

Changes in the Way Regulations Relate or are Implemented Together

Application of Approaches Needed at DOE Sites and Already Used Elsewhere

Regulations Fashioned for the Unique Problems of DOE Sites

Many Of Our Risk Tools Need to be Adapted to
to the types of problems
to the complex and to specific sites



Developed by Charles W. Powers

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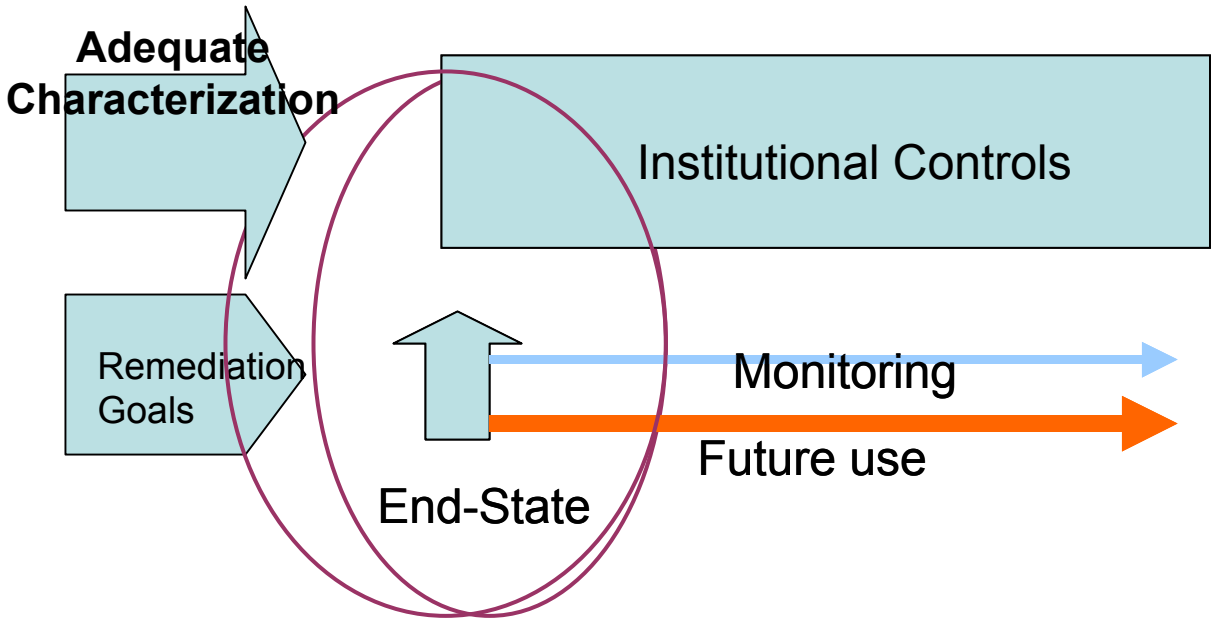
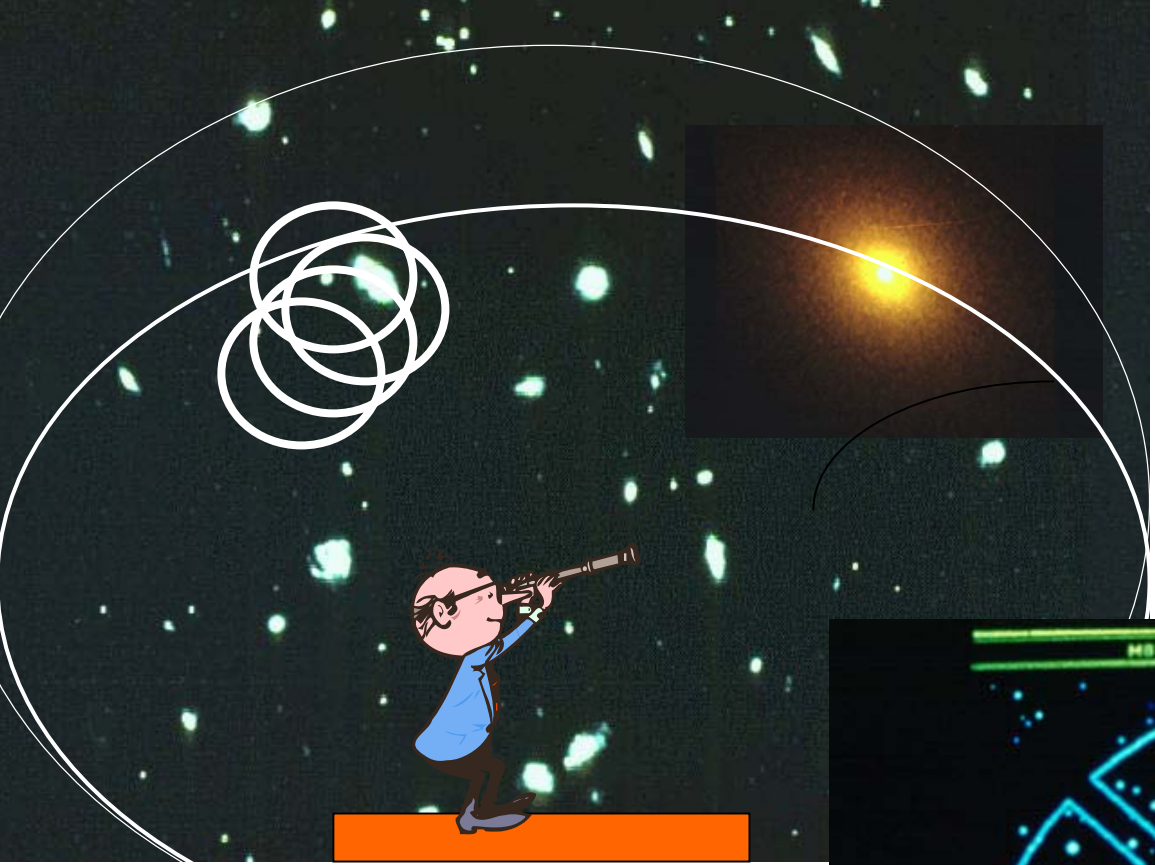




Could risk emerge
From its mottled
Past and become

A Copernican
Revolution to turn
Everything on its
Head for DOE
Site cleanup?

Developed by Charles W. Powers

What is CRESP

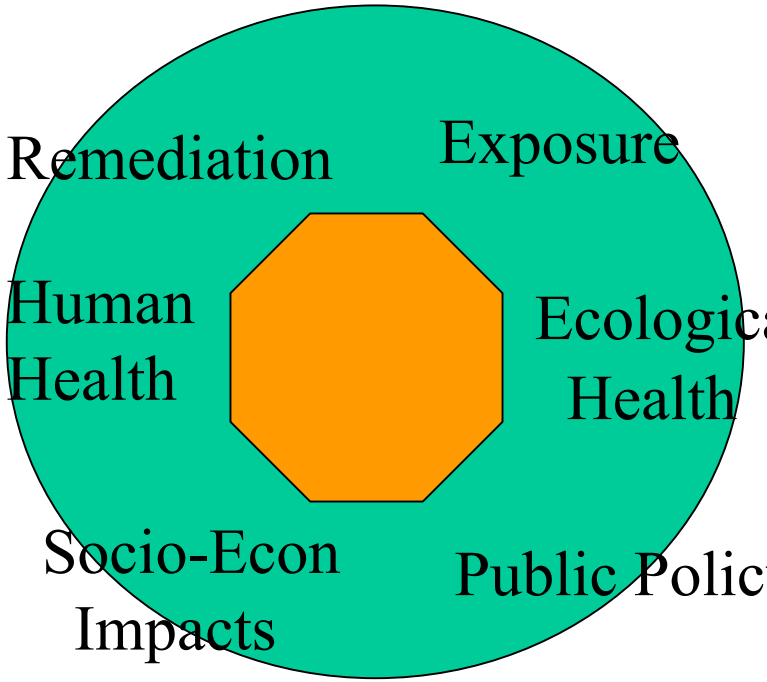
A New Approach to Consortium Management

A Management Board Largely Made Up of Leaders of Centers of Excellence

David Kosson
Vanderbilt

Elaine Faustman
UW

Michael Greenberg
Rutgers



Paul Lioy/
Panos Georgopolous
UMDNJ

Joanna Burger
Rutgers

Thomas Leschine
UW

Charles W. Powers PI IRM-UMDNJ
Bernard Goldstein U of Pittsburgh

Peer Review Committee

Arthur Upton
UMDNJ-U of A

Operational Review

Barry Friedlander-
UMDNJ/IRM

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