

**Module 06**  
**Corrective Action and Facilitating Land**  
**Revitalization**



**RCRA Corrective Action Training  
Program: Getting to YES!**  
*Strategies for Meeting the 2020 Vision*



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**Notes:**Purpose of Slide

- This is the title slide for Module 6, Corrective Action (CA) and Facilitating Revitalization.

Key Points

- This is a holder slide. No specific key points.

References

- None.



# Module 6

## Corrective Action and Facilitating Land Revitalization

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### Notes:

#### Purpose of Slide

- Review the content and purpose of this module.

#### Key Points

- As stated earlier in this course, Land Revitalization is a priority focus area for EPA.
- This module overviews some of the goals, activities, approaches, resources, tools, and measures available for Land Revitalization.
- The specific goals of this module include the following:
  - Convey EPA's goal that Resource Conservation and Recovery Act (RCRA) corrective action (CA) sites be cleaned up to accommodate safe reuse.
  - Provide information on approaches that may facilitate RCRA site reuse.
  - Present real world examples through a video of success stories.
- The title of this module reflects a two-way street. CA may facilitate land revitalization; in addition, revitalization may help to drive CA.

#### References

- None.



## Module Overview

- ❖ Land Revitalization – an Agency Priority
- ❖ Resource Conservation and Recovery Act (RCRA) Goals and Initiatives for Land Revitalization
- ❖ Policies, Guidance, Resources, and Approaches
- ❖ RCRA Corrective Action (CA) Land Revitalization Measures
- ❖ RCRA CA Land Revitalization Examples



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### Notes:

#### Purpose of Slide

- Overview the content of the module.

#### Key Points

- EPA began to emphasize land revitalization in the 1990s, with the Brownfields Program. In 1997, the RCRA Brownfields and Prevention Initiative was launched. Now land revitalization is an Agency priority and is being implemented by all of EPA's cleanup programs and on the state and local level.
- We will start by reviewing EPA's Land Revitalization Priorities and the RCRA Land Revitalization Goals. We will consider how revitalization and CA progress goals are complementary. As a starting point, we will share some information on the status of current and planned uses at RCRA facilities. This provides a foundation of understanding for moving forward. We will also identify some of the potential obstacles to land revitalization.
- We will then review resources and approaches to support Land Revitalization, including those that provide incentives for, or support to, efforts to reuse and redevelop RCRA CA sites. This will include consideration of some key approaches and concepts that support revitalization at RCRA CA sites. A number of things must come together for a RCRA CA site to be revitalized; however, there are a few critical aspects for success, including: early consideration of end uses, leveraging reuse interests, communication, partnering, sharing of information on funding resources, using sustainable approaches, and ecological revitalization. While revitalization is a current emphasis, revitalization at RCRA sites is not new and is routine in RCRA program; hundreds of sites have been addressed in this manner.
- After reviewing these concepts and approaches, we will identify and review how progress in land revitalization will be measured. A cross-program group has developed guidance on land revitalization measures and specific guidance and measures have been developed for the RCRA CA program.
- We will share examples of successful Land Revitalization efforts to illustrate how existing tools, resources, and guidance can be applied in creative ways to spur cleanup and land revitalization. We also will show a video developed by EPA to share land revitalization success stories that were achieved at three RCRA CA facilities.

#### References

- None.



## EPA Land Revitalization Initiative

### ❖ Administrator's Action Plan

*"Restore contaminated properties...to environmental and economic vitality."*

### ❖ OSWER Action Plan

*"Encourage appropriate reuse of Brownfields, Underground Storage Tank fields, Superfund sites, RCRA facilities, Base Realignment and Closure (BRAC) sites, and other federal properties."*

### ❖ EPA's 2006-2011 Strategic Plan, Goal 3

*"EPA's cleanup programs have set a national goal for returning formerly contaminated sites to long-term, sustainable, and productive use."*

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### Notes:

#### Purpose of Slide

- Review Agency plans and goals aligning with land revitalization.

#### Key Points

- Cleaning up contaminated properties and returning them to safe and productive use is an Agency priority.
- Recognizing the importance and necessity of restoring contaminated properties to environmental and economical vitality, EPA Administrator Stephen L. Johnson highlights land revitalization as a priority in his Action Plan.
- In its 2006-2011 Strategic Plan, EPA has established Goal 3: Land Preservation and Restoration to "preserve and restore the land by using innovative waste management practices and cleaning up contaminated properties to reduce risks posed by releases of harmful substances."
- EPA is actively encouraging all cleanup programs to ensure properties are remediated in a way that supports reasonably anticipated uses. Within the Office of Solid Waste and Emergency Response (OSWER), all cleanup programs and offices are working on Land Revitalization: the Office of Brownfields and Land Revitalization, the Superfund Program, Underground Storage Tanks, Federal Facilities Restoration and Reuse Office (FFRRO), and the RCRA CA Program.
- EPA recognizes that cleanup and revitalization are mutually supportive goals. Often revitalization/reuse interests can drive a cleanup. Therefore, land revitalization is a critical part of achieving the 2020 Vision for CA.

#### References

- EPA. EPA Administrator Action Plan. Accessed On-line at: <http://www.epa.gov/adminweb/administrator/actionplan.pdf>
- EPA. 2006. EPA Strategic Plan, 2006-1001. Goal 3. Accessed On-line at: <http://www.epa.gov/ocfo/plan.htm>.
- EPA. Undated. EPA OSWER Action Plan. Accessed On-line at: <http://www.epa.gov/swerrims/actionplan/index.htm>.

**EXAMPLE**

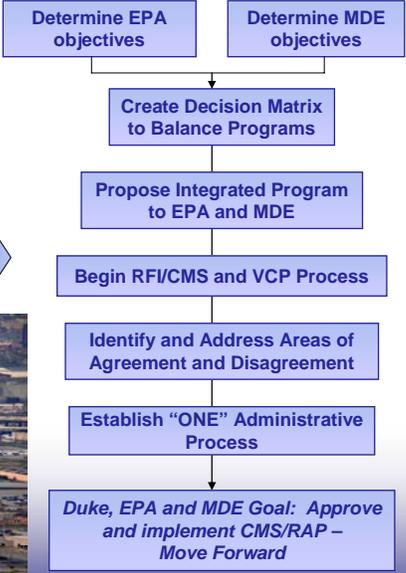
## GM Duke

- ❖ Former Assembly Plant in Baltimore, MD
- ❖ Closure announced in 2005, requiring:
  - Termination of hazardous waste storage permit (MDE)
  - Meeting CA obligations (EPA)
- ❖ Duke Realty awarded development (\$140 million investment commitment)
- ❖ CA under facility lead agreement (EPA)
- ❖ EPA and MDE requirements integrated



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graph TD
    A[Determine EPA objectives] --> C[Create Decision Matrix to Balance Programs]
    B[Determine MDE objectives] --> C
    C --> D[Propose Integrated Program to EPA and MDE]
    D --> E[Begin RFI/CMS and VCP Process]
    E --> F[Identify and Address Areas of Agreement and Disagreement]
    F --> G[Establish "ONE" Administrative Process]
    G --> H["Duke, EPA and MDE Goal: Approve and implement CMS/RAP - Move Forward"]
  
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### Notes:

#### Purpose of Slide

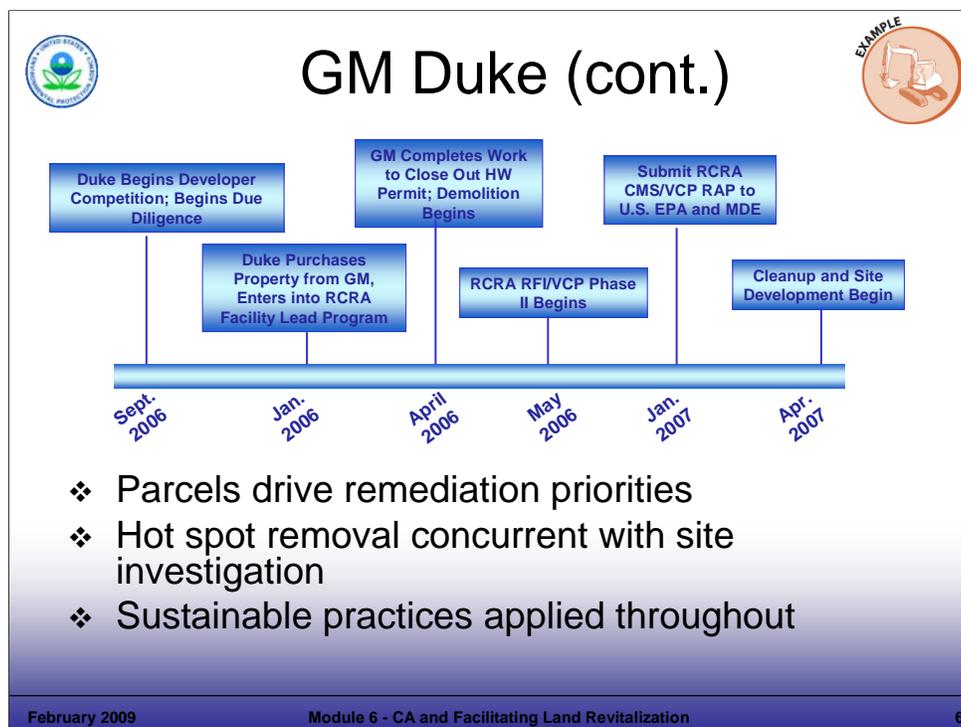
- Present an example of successful revitalization at a RCRA-regulated facility.

#### Key Points

- This photograph shows the GM Assembly Plant which operated in Baltimore for 68 years, with closure plans announced in 2005. The facility occupied 182 acres in SE Baltimore, with over 3.5 million square feet under roof. Before use as an assembly plant, sections of the property were used as a fort, and other industrial uses.
- The facility had both a hazardous waste storage permit issued by the Maryland Department of Environment (MDE) and had CA obligations that would be overseen by EPA Region 3 (as MD was not authorized for CA).
- To facilitate redevelopment, GM requested proposals from 20 developers including redevelopment and environmental planning requirements. Duke Realty (Duke) and its consultants won the project, which included a commitment to invest over \$140 million to achieve closure and support redevelopment.
- GM led closure of the hazardous waste permit. GM initiated a Facility Lead Agreement with Region 3, which Duke then took over. The EPA, MDE, GM, and Duke worked collaboratively to achieve an approach that integrated CA and State Voluntary Cleanup Program (VCP) requirements, supporting the dual goals of meeting RCRA CA obligations and ensuring state remediation requirements were addressed. The property was divided into four planned use areas, with appropriate protective measures identified for each area. Parcels were prioritized for remediation to support redevelopment (with less contaminated parcels addressed first to allow their redevelopment).
- Public participation efforts were significant as several homes border the facility; the community has been supportive of redevelopment and Duke has taken extra steps to minimize area disruptions such as truck traffic and dust. In some cases, the redevelopment also is affording area homes a better view of the harbor.
- Sustainable approaches were integrated into the revitalization process (see next slide).

#### References

- EPA. EPA Region 03 Revitalization Web Site. Accessed Online at: <http://www.epa.gov/region03/revitalization/newsletter/winter07/newsletter.pdf>.
- EPA. 2008. Presentation by Bob Greaves: Opening the Flood Gates. Presented at 2008 Brownfields Conference, Detroit, MI. May.
- MDE. 2007. MDE Web Site Article. GM Plant Site Revitalized. March. Accessed On-line at: <http://www.mde.state.md.us/ResearchCenter/Publications/General/eMDE/vol2no11/GMredevelopment.asp>.



## Notes:

### Purpose of Slide

- Continue an example of successful revitalization at a RCRA-regulated facility.

### Key Points

- This slide shows the rapid timeline achieved by the parties supporting the remediation and redevelopment. Duke and its contractors worked closely with MDE and EPA, as well as with appropriate stakeholders, to develop plans and achieve concurrence.
- Through careful planning, regulatory analysis, and appropriate input – one set of standards and requirements that met both EPA CA requirements and MDE VCP standards was achieved. Implementing this planning up-front ensured fewer problems would be identified during the process in terms of remediation standards and requirements.
- Method to streamline the process included prioritizing parcels for remediation to support redevelopment plans and implementing hot spot removal concurrent with ongoing site investigation in other areas.
- Sustainable approaches were integrated into the revitalization process, with results including deconstruction of 3.5 million square feet of buildings, with 96% of the building material recycled. Recycling of other materials included 98,000 tons.
- Benefits to the community of the new business park included: (1) 3,500 new jobs; (2) \$140 million of new investment; (3) \$61 million in property taxes; and (4) cleanup and reuse of 182 acres of land for industrial and commercial purposes (including a warehouse and distribution center and 240,000 square feet of office space).

### References

- EPA. EPA Region 03 Revitalization Web Site. Accessed Online at: <http://www.epa.gov/region03/revitalization/newsletter/winter07/newsletter.pdf>.
- EPA. 2008. Presentation by Bob Greaves: Opening the Flood Gates. Presented at 2008 Brownfields Conference, Detroit, MI. May.
- MDE. 2007. MDE Web Site Article. GM Plant Site Revitalized. March. Accessed On-line at: <http://www.mde.state.md.us/ResearchCenter/Publications/General/eMDE/vol2no11/GMredevelopment.asp>.



## RCRA Land Revitalization Goals

- ❖ Cleanup close to 3,746 RCRA CA sites by 2020 (RCRA CA 2020 Universe)
- ❖ Leverage reuse interests and resources to achieve RCRA CA cleanup goals
- ❖ Measure progress towards the safe reuse of sites
- ❖ Move facilities from idle properties to productive assets for the community

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### Notes:

#### Purpose of Slide

- Present and explain RCRA Land Revitalization Goals; these support progress towards the 2020 Vision for CA.

#### Key Points

- As discussed in Module 2, the RCRA 2020 Vision for CA presents a vision that by 2020, RCRA CA sites are largely addressed in a manner that is safe for current and reasonably anticipated future uses. Because remedy decisions incorporate current and future use considerations, cleanup decisions tie to revitalization interests and goals; therefore, revitalization interests can help drive progress towards the 2020 Vision.
- Because revitalization interests can bring resources and momentum towards cleanup, reuse interests and resources should be leveraged to help achieve the RCRA 2020 Vision.
- Moving forward, cleanup progress will be reported using both the number of "sites" and "acres" of land that have been addressed and are safe for current and anticipated future uses (acres of land is a new measurement that complements the former focus on "facilities" or "sites"). We will discuss specific RCRA CA Land Revitalization Indicators and Performance Measures later in this module.
- A related goal is to ensure that RCRA properties are not left idle due to concerns about contamination; instead, these idle or underutilized sites should be addressed so that they can be revitalized to become positive resources for the community.

#### References

- EPA. Corrective Action Website. RCRA 2020 CA Goals and Program Results. Accessed On-line at: <http://www.epa.gov/correctiveaction/facility.htm>.
- EPA. 2007. Guidance for Documenting and Reporting RCRA Subtitle C Corrective Action Land Revitalization Indicators and Performance Measures. February 21.



## RCRA Sites Present Opportunities for Revitalization

- ❖ Location
- ❖ Size
- ❖ Available utility and transportation infrastructure
- ❖ Existing environmental data
- ❖ Many facilities will continue operating, with some portions going to new uses

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### Notes:

#### Purpose of Slide

- Discuss why RCRA CA sites can provide a good fit for revitalization.

#### Key Points

- Location – RCRA CA sites often are located in areas that are urban. Other facilities are located in more rural areas. As the focus on reuse of property increases, these sites may be ideally located for particular uses.
- Size – Many RCRA CA sites are large properties and developers can often do more with larger sites. For example, larger sites provide room for major developments (housing or commercial complexes) and also provide an opportunity for parceling to support a variety of end uses.
- Utilities and Transportation – Because RCRA facilities generally already have utility and transportation infrastructure – reuse can build on the existing infrastructure at these facilities.
- Environmental Data – Because many RCRA facilities have been evaluated for CA, or for prioritization and evaluation of environmental indicators (EIs) status, environmental data often already exist for these facilities. This data can provide a strong starting point for evaluating potential future uses and cleanup needs.
- Operating Facilities – Over half of our RCRA sites plan to continue operating and therefore, will not be changed to a new use. However, at some of these larger sites, some parcels may be freed up (leased or sold) for new uses. Operating facilities can work to address cleanup obligations and achieve the “construction complete” CA milestone or the new Land Revitalization “Ready for Anticipated Use – RAU,” which we will address later in this module. Module 12 provides more information on the construction complete milestone.
- Looking at potential reuse can be good for the economy and also can conserve green space. Fewer acres of previously used land are required for redevelopment when compared to development on new land. A George Washington University Study cited in a Region 3 Land Use and Reuse Assessment Report found that “for every acre of Brownfields property redeveloped, a minimum of 4.5 acres would have been required had the same project been located in a greenfield area.”

#### References

- EPA. 2005. National CA Conference in Denver, CO. Session on “Capitalizing on Revitalization as a Catalyst for Cleanup.” Diana Duva, CT DEP – Slide on “RCRA and Land Revitalization – Why RCRA?” Discussion moderated by Sara Rasmussen, EPA Office of Resource Conservation and Recovery. Powerpoint. May 4.
- EPA. 2006. Hazardous Waste Cleanup Sites Land Use and Reuse Assessment. EPA Region 3. May. Accessed On-Line at: <http://www.epa.gov/region03/revitalization/reuse.htm>.



## RCRA Land Revitalization Activities

- ❖ Increase knowledge and expertise for Land Revitalization
- ❖ Implement creative approaches and tools
- ❖ Partner/outreach/technology transfer with the RCRA community, stakeholders
- ❖ Partner with OSWER's other cleanup programs
- ❖ Support RCRA Reuse and Brownfields Prevention Workgroup activities
- ❖ Implement RCRA Land Revitalization Indicators and Performance Measures

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### Notes:

Purpose of Slide: Provide specific examples of RCRA CA activities related to Land Revitalization.

### Key Points

- RCRA's Draft Revitalization Strategy includes a clear goal to increase knowledge and expertise to support Land Revitalization. This will be achieved by a number of activities, including:
  - Outreach and Partnering Efforts - For example, in 2006, EPA Region 1 hosted the national RCRA CA conference in Providence, RI. The theme of this conference was revitalization.
  - Creative Approaches and Tools – A range of approaches and tools are being developed and shared to support revitalization efforts. For example, these include: (1) websites, (2) direct technical assistance, and (3) documentation of successful results (case studies, the video, course examples).
  - RCRA Brownfields Prevention Workgroup - This group was formed in the late 1990s to identify issues, develop tools, and support cross-region communication and technology transfer. This active workgroup has representatives from all 10 Regions and a number of states. The workgroup supports the RCRA program's activities to develop and pilot test approaches, share examples, and spread information to the RCRA community about revitalization tools. Other outreach efforts include the RCRA Brownfields Website, which includes: program descriptions, official documents, and links for a variety of topics related to RCRA Brownfields topics. It also identifies some of the initiatives, resources, and recent RCRA guidance and reforms that may be applicable at potential RCRA Brownfields facilities.
  - The RCRA program is participating in EPA's cross-program land revitalization effort and will measure land reuse as one parameter of success as it moves forward. EPA has been establishing common performance measures and we will discuss these efforts later in this module.
  - RCRA Land Revitalization Indicators and Performance Measures were issued as part of this effort for the CA Program (February 2007). These measures will help to track both the number of sites and acres that are ready for anticipated uses.

### References

- EPA. RCRA Brownfields Prevention Initiative Website. Accessed On-line on at: <http://www.epa.gov/rcrabrownfields/index.html>.
- EPA. 2006. Measuring Revitalization of Contaminated Properties in America's Communities: Past Accomplishments and Future Opportunities. Interim Final. EPA OSWER Land Revitalization Staff Office. EPA-500-R-06-002. September.
- EPA. 2006. Interim Guidance on OSWER Cross-Program Revitalization Measures. October 20.
- EPA. 2007. Guidance for Documenting and Reporting RCRA Subtitle C CA Land Revitalization Indicators and Performance Measures. February 21.



## What We Know About Use Status of RCRA Sites

- ❖ Several Regions and states are documenting the use status of RCRA sites
  - Regions 3, 5, and 9
  - Others Regions launching activities
  - States such as Florida are also documenting uses
- ❖ A few conclusions
  - Well over half of RCRA CA facilities still in “continued use”
  - Large number of RCRA CA facilities will discontinue operations and go to reuse

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### Notes:

#### Purpose of Slide

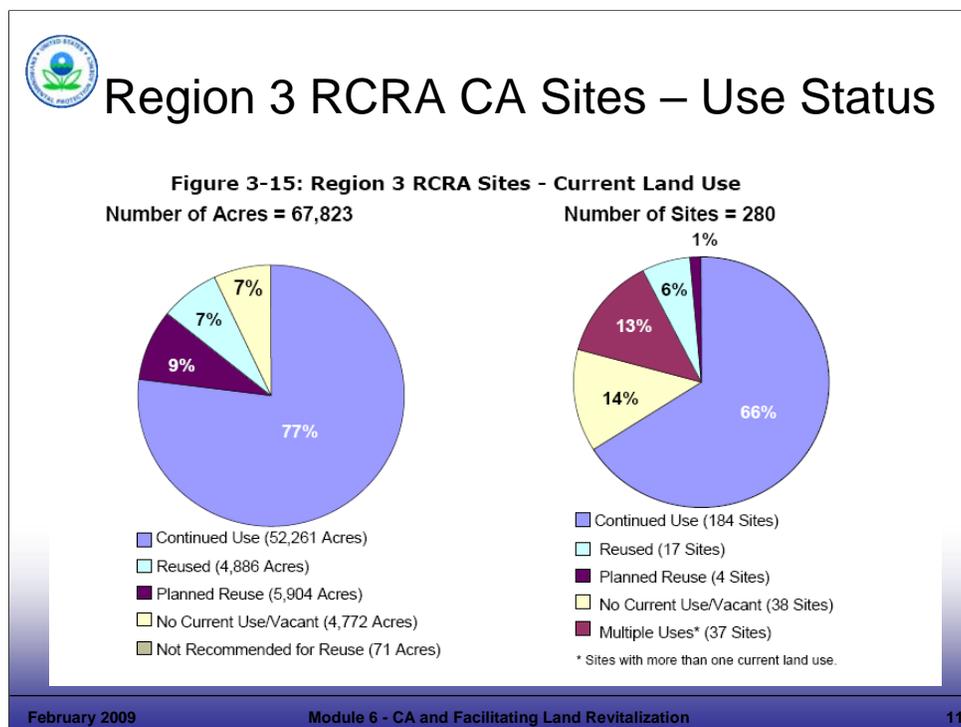
- Introduce efforts to catalogue current and reasonably anticipated uses of RCRA CA and other types of contaminated or underutilized properties.

#### Key Points

- Various EPA Regions have collected information regarding the use of RCRA Sites in their regions. We will review an example of these efforts in the next two slides. The example is taken from EPA Region 3, which has issued a report documenting its findings. Region 3 researched current and planned land use across all of its cleanup programs, including RCRA CA.
- Research to date shows that well over half of RCRA CA sites are still in continued use; the remainder will discontinue operation and go into reuse in some other form.

#### References

- EPA. 2006. Hazardous Waste Cleanup Sites Land Use and Reuse Assessment. EPA Region 3. May. Accessed On-Line at: <http://www.epa.gov/region03/revitalization/reuse.htm>.
- EPA. 2006. National Corrective Action Conference, Providence, RI. “Innovations in Measuring Revitalization Challenges and Successes.” Presented by Guy Tomassoni, OSWER Land Revitalization Office. June.



## Notes:

### Purpose of Slide

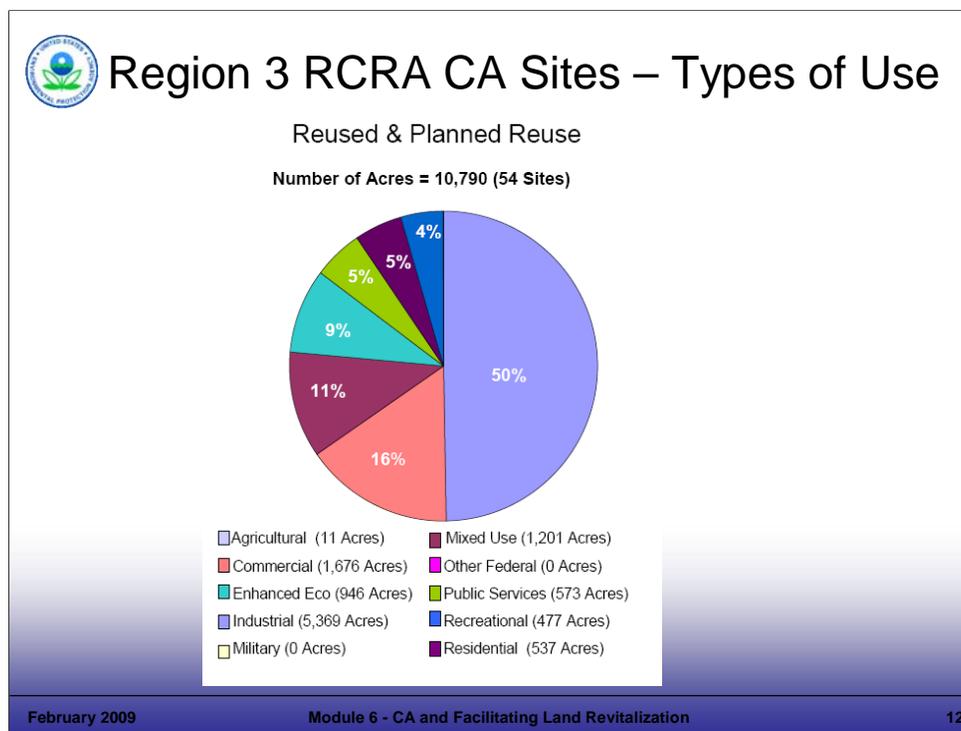
- Provide a perspective on how RCRA CA sites are currently used.

**Key Points:** EPA Region 3 conducted a Study of Land Use and Reuse at Superfund, Federal Facility, and RCRA CA sites as part of a regional pilot effort that looked at site use across cleanup programs (pages 3 and 14 of Region 3 Report). Deb Goldblum of EPA Region 3 is the primary contact for this work.

- Over 500 RCRA CA, Superfund National Priorities List (NPL), and Federal Facility sites with about 230,000 acres were evaluated (this is 10 times the total land mass of Manhattan Island in NY).
- The charts on this slide were developed for that study and show total ACRES and SITES (facilities) that fall within each category of use for RCRA CA Sites in the Region. This universe includes 280 RCRA CA High Priority sites, comprising 67,823 acres of site land. RCRA CA sites accounted for 29% of all acres of land within the Superfund NPL, Federal Facility, and RCRA CA Site Universe in this Region.
- Pie Chart on Left – This pie chart shows the number of ACRES of current land use by category for RCRA CA high priority sites, including: (1) Continued Use (52,261 acres/77%); (2) Planned Reuse (5,094 Acres/9%); (3) Reused (4,886 acres/7%); (4) No Current Use/Vacant (4,772 Acres/7%); and (5) Not Recommended for Reuse (71 Acres/Non-significant percent). All of the categories, except the last one, present active or potential Land Revitalization opportunities.
- Pie Chart on Right – This pie chart shows the number of SITES and current land use by category, including: (1) Continued Use (184 sites/66%); (2) Reused (17 Sites/6%); (3) Planned Reuse (4 Sites/1%); (5) No Current Use/Vacant (38 Sites/14%); and (6) Multiple Uses (37 Sites/13%). All of the categories encompass active or potential Land Revitalization opportunities. Multiple uses can occur at sites that have undergone parceling, which we will talk about later in this module.
- Note: The majority of RCRA site acreage in the U.S. is from Federal Facilities (9,600,000 acres federal facility, 600,500 acres non-federal facility). For more information on acreage and the RCRA universe, see the OSW FY07 RCRA Land Revitalization Measures Status Report.

### References

- EPA. 2006. Hazardous Waste Cleanup Sites Land Use and Reuse Assessment. EPA Region 3. May. Accessed On-Line at: <http://www.epa.gov/region03/revitalization/reuse.htm>.
- EPA. 2006. National Corrective Action Conference, Providence, RI. "Innovations in Measuring Revitalization Challenges and Successes." Presented by Guy Tomassoni, OSWER Land Revitalization Office. June.
- EPA. 2007. Implementing RCRA Land Revitalization Measures. Presented by Sara Rasmussen, Corrective Actions Program Branch Office of Resource Conservation and Recovery, EPA. November 6 (Clu-In Session). Accessed On-Line at: <http://www.clu-in.org/conf/tio/rcralr/>



## Notes:

### Purpose of Slide

- To gain a perspective on how RCRA CA sites are being used after cleanup and to compare reuse of property to new development.

### Key Points

- For the High Priority RCRA CA sites evaluated on the previous slide, EPA Region 3 selected a subset that were designated as Reused or Planned Reuse (not including Continued Use). The Region then identified the types of land uses that were occurring or planned for those sites. The pie chart on this slide provides information on specific types of use for the facilities studied.
- This slide shows the types of use for Reuse and Planned Reuse sites in EPA Region 3. The Reused and Planned Reuse sites subset included a total of 54 sites out of the 280 High Priority sites; which comprises 10,790 acres of land.
- EPA Region 3 estimated the ACRES for each site that falls into the following types of uses: (1) Agricultural (11 acres), (2) Commercial (1,676 acres), (3) Enhanced Ecological (946 acres), (4) Mixed Use (1,201 acres), (5) Industrial (5,369 acres), (6) Public Services (573 acres), (7) Military (0 acres), (8) Other Federal (0 acres), (9) Recreational (477 acres), and (10) Residential (537 acres). The percentages are shown on the pie chart.
- These types of studies are important because they provide a good picture of where we are and provide a foundation for where we are headed. This type of information informs programs of what types of uses RCRA sites are going into and what type of use might be reasonably expected.

### References

- EPA. 2006. Hazardous Waste Cleanup Sites Land Use and Reuse Assessment. EPA Region 3. May. Accessed On-Line at: <http://www.epa.gov/region03/revitalization/reuse.htm>.



## Potential Barriers to Revitalization

- ❖ Length of time for cleanup
- ❖ Cost of cleanup/financial obstacles
- ❖ Lack of certainty
- ❖ Concerns about liability

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### Notes:

#### Purpose of Slide

- Set the stage for the next slides, which focus on resources, tools, approaches, and principles to achieving revitalization – making it happen.

#### Key Points

- The largest barriers to developers in reusing contaminated properties are tied to cost (which is sometimes manifested in time) and risk.
  - Length of Time for Cleanup – The risk of delay in a property getting ready for use. Time is money; developers often work with borrowed funding.
  - Cost of Cleanup – If developers cannot achieve a profit margin, they will pass on a property.
  - Lack of Certainty – Often, there may be real or perceived uncertainty regarding the environmental status of a property – this presents a risk of higher costs or future costs. Developers need to know the range of potential cleanup costs to make a business decision regarding redevelopment.
  - Concerns about Liability – Concerns about liability create uncertainty. The potential for additional cleanup presents a risk of future costs. Complete cleanups with minimal long term stewardship requirements reduce risk and potential future costs.
- EPA recognizes that actual and perceived barriers must be addressed. To support a better understanding of stakeholder perspectives on barriers, the Office of Brownfields and Land Revitalization hosted a forum in October 2007 for representatives of industry, EPA regions, states and cities to discuss specific examples of how such barriers have been successfully overcome.

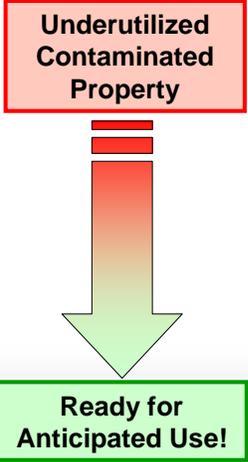
#### References

- None.



## Overcoming Potential Obstacles to Revitalization

- ❖ Identify resources
- ❖ Leverage reuse interests
- ❖ Apply flexible and innovative approaches
- ❖ Identify anticipated future uses early
- ❖ Focus on the exit strategy
- ❖ Partner and communicate well
- ❖ Help overcome financial obstacles
- ❖ Integrate sustainable approaches
- ❖ Focus on long-term stewardship
- ❖ Measure and share successes



**Underutilized Contaminated Property**

**Ready for Anticipated Use!**

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### Notes:

#### Purpose of Slide

- Review obstacles to revitalization and guidance, resources, and approaches that support revitalization.

#### Key Points

- We mentioned some barriers to revitalization on the last slide.
- This section of Module 6 identifies resources and approaches to support revitalization.
- The speaker will mention and elaborate on some of the bullets above; for example, the importance of partnering and communication.
- Identify that some of these are touched on in this module as they relate to revitalization and also are addressed in other Modules (for example, the Exit Strategy is discussed in detail in Module 4). Others are presented on the following slides.
- The end goal is to move properties from underutilized to productive use that is appropriate and protective for anticipated future uses.

#### References

- None.



## Identify Resources for Revitalization

- ❖ Financial
  - EPA Brownfields grants and loans
  - HUD and other federal grant and loans
  - State and local funds
- ❖ Technical
  - Brownfields and Land Revitalization Technology Support Center
  - CLU-IN Resources
  - SMARTe



<http://www.smarte.org/smarte/>



<http://www.brownfieldstsc.org>



<http://www.clu-in.org>

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### Notes:

Purpose of Slide: Review some resources and approaches that support revitalization.

#### Key Points

- Grant Programs – EPA's Brownfields Grant program may be available for some RCRA CA facilities that might not otherwise be cleaned up (but can not be used to fund the obligations of o/o's for RCRA CA). Information on grants and the types of RCRA sites that might be eligible for grants can be found at <http://www.epa.gov/brownfields>. In addition, other federal agency grants support revitalization (e.g., Housing and Urban Development Brownfields Economic Development Initiative (BEDI) grants). Most states also offer Brownfields site assessment/cleanup grants; check with your state for more information. Also, the Brownfields Office recently posted a useful report on financing Brownfields. It can be found at: [http://www.epa.gov/brownfields/partners/vf\\_fin\\_state.htm](http://www.epa.gov/brownfields/partners/vf_fin_state.htm).
- The Brownfields and Land Revitalization Technology Support Center – This center provides information and support to sites that are undergoing investigation, remediation, and potential revitalization. The Website includes information about the use of innovative site investigation and cleanup technologies and strategies. Innovative technologies and strategies such as the Triad approach support redevelopment goals by lowering costs and decreasing project time frames.
- CLU-In – This web-based educational organization provides archives of several web-based seminars on revitalization topics, as well as web pages on ecological restoration and other aspects of land revitalization. CLU-IN is supported by EPA and is located at: <http://www.clu-in.org>.
- SMARTe – This is another on-line resource. EPA and the German Federal Ministry for Education and Research initiated a cooperative effort to share information and evaluate new solutions for the redevelopment of contaminated sites. This Website helps users identify, apply, and integrate tools and technologies to facilitate the revitalization of sites in the U.S. The Website will be updated as new tools, technologies, and approaches become available for revitalizing previously used lands. This Website also provides information on funding sources and shares community involvement tips.

#### References

- EPA. Brownfields and Land Revitalization Website. Accessed On-line, at: <http://www.epa.gov/brownfields/>.
- Department of Housing and Urban Development. Brownfields Economic Development Initiative Website. Accessed On-line, at: <http://www.hud.gov/offices/cpd/economicdevelopment/programs/bedi/index.cfm>.
- Brownfields and Land Revitalization Technology Support Center (BTSC). BTSC Website (Supported by EPA, Argonne National Laboratory, and the U.S. Army Corps of Engineers). Accessed On-line, at: <http://www.brownfieldstsc.org/>.
- EPA. 2007. SMARTe 2007 Web Site; On-line Revitalization Tool. Accessed On-line at: <http://www.smarte.org/smarte/home/index.xml>.



## Leverage Reuse Interests

- ❖ Can bring resources towards cleanup
- ❖ Can result in accelerated cleanup
- ❖ Can help avoid properties being left idle due to RCRA concerns
- ❖ Requires cooperation with reuse interests to address their needs (when reasonable)
  - Identify developer needs and accommodate them (for example, schedule needs)
  - Provide site status documentation for use by lenders
  - Help identify and provide information on possible resources for the site

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### Notes:

#### Purpose of Slide

- Stress that reuse interests should be leveraged through cooperative approaches to avoid delays or lack of progress.

#### Key Points

- Leveraging mutual interests or building on interest to redevelop a property can help expedite cleanup at some sites. Redevelopment interests for a site may provide resources and momentum for a site cleanup.
- Some sites that might remain idle due to RCRA CA concerns can be addressed if a reuse interest is identified, encouraged, and leveraged.
- Cooperation with stakeholders, when reasonable, can include:
  - Identifying developer needs and accommodating these where feasible (schedules, requests for documentation, etc.). Where feasible, a strong emphasis should be put on setting and adhering to schedules that work for the developer. Some Regions have found success in adhering to agreed-upon schedules that are important to developers.
  - As discussed previously, site documentation can be important to help developers understand the status and risk associated with a site; this documentation also can assist a developer in obtaining loans. Lenders will want to have a good understanding of site conditions and risks.
  - Some potential developers or interested parties may benefit from funding resources that are available (see slide on working at financially struggling sites).

#### References

- None.



## Apply Flexible and Creative Approaches

- ❖ Use of alternate authorities (for example, state Voluntary cleanup programs)
- ❖ Facility-lead agreements
- ❖ Parceling

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### Notes:

#### Purpose of Slide

- Discuss flexible and creative approaches that support reuse.

#### Key Points

- Use of Alternate Authorities – This was discussed in Module 3 and can include the application of state voluntary cleanup programs (VCPs) or other cleanup authorities. The Project Manager should consider available authorities and identify which may be best to support remediation and revitalization efforts at a particular site. States often may be best able to lead this consideration and determine the best program to use; input from other site parties (EPA, facility, etc.) also is important. In all cases, the authority used must achieve a cleanup equivalent to RCRA CA requirements; for states lacking RCRA CA authority, other options are likely available (for example, VCPs, Superfund programs, and Brownfields programs).
- Facility-Lead Agreements – This approach, which streamlines the process by developing an agreement on cleanup activities between the RCRA program and the regulated facility, is being used successfully in some situations.
- Parceling – Parceling is a viable option for some sites and can speed the site cleanup process; the next slide provides more information on parceling.

#### References

- EPA. 2004. "Getting it Done: RCRA Liability Tools." Includes topic of Parceling. Presented by Susan Bromm. Director of Office of Superfund Remediation and Enforcement (OSRE) at Brownfields Conference. December.
- EPA. 2002. Memorandum to RCRA Senior Policy Advisors from Robert Springer, "Clarifying My Views on RCRA Parceling." December 20.



## Parceling

- ❖ Facility divided into parcels based on different end uses
  - Allows alternate cleanup criteria based on varying anticipated uses
  - Allows different timelines to be used
- ❖ Parcels can be transferred or leased using various approaches – outcomes
  - Must ensure protection of human health and the environment
  - Should allow cleanup and productive reuse to progress

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### Notes:

Purpose of Slide: Review parceling in greater detail.

#### Key Points

- Parceling divides a site into portions to support cleanup to appropriate levels given each portion's anticipated end use. It also facilitates revitalization efforts by allowing some portions of a site to proceed quickly to reuse.
- Different portions of a site can be remediated to different degrees and on different timelines based on alternate future land uses.
- Parcels can be transferred or leased using a variety of approaches, as follows:
  - Clean parcels or parcels that do not require further cleanup, can be removed from an order or permit.
  - If a parcel requires additional cleanup activities parceling can be more difficult to achieve – approaches include: (1) the parcel can be defined as "off-site" contamination to the remaining property – with the original owner still required to conduct cleanup; and (2) the individuals involved can enter into agreements regarding who will cleanup remaining contamination. When someone other than the new owner will address remediation at the property, the new owner should provide legal access for the remediation activities. Whatever approach is used, CA obligations must be met.
  - Parceling is a viable option for some sites and can speed the site cleanup process. It allows redevelopment of some addressed or non-contaminated yet idle property sections – returning them to beneficial use for the community.
- Parceling at RCRA-permitted facilities can require a permit modification. That modification can state that the original owner is liable for cleanup of any newly discovered contamination. If expecting to undertake cleanup or maintenance activities, the regulator should require the old owner to also have an access agreement or otherwise address RCRA Section 3004 (v) requirements. Parceling at Interim Status facilities may involve reprioritization of cleanup goals to facilitate transfer; if there is a reuse interest for a parcel, remediation of that portion of the facility may be expedited to support reuse. Some legal issues could also require resolution.
- Information on the Agency's parceling efforts related to RCRA include: (1) Final Guidance on Completion of CA Activities at RCRA Facilities; (2) discussion on EPA's RCRA Reuse and Brownfields Prevention Website; and (3) examples posted on EPA's CA Website at <http://www.epa.gov/osw/hazard/correctiveaction/bfields.htm>.

#### References

- EPA. 2002. Memorandum to RCRA Senior Policy Advisors from Robert Springer, "Clarifying My Views on RCRA Parceling." December 20.
- Federal Register. 2003. Volume 68, Number 37. Final Guidance on Completion of Corrective Action Activities at RCRA Facilities. February 25.



## Identify Anticipated Uses Early in the Process

- ❖ Helps to
  - Define expectations for cleanup
  - Identify various parts of a site that may have different future uses
- ❖ Partner with local stakeholders to ensure you are realistic in identifying future use - this is key!
- ❖ Future uses and the available types and potential effectiveness of ICs help to guide remedy selection decisions

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### Notes:

#### Purpose of Slide

- Emphasize that looking at end uses early in the planning process can save time and resources; its also helps to identify potential problems so that they can be planned for and avoided.

#### Key Points

- Identify anticipated uses early in the planning process. This supports development of the Exit Strategy. Early planning can assist with, or address:
  - Defining expectations for cleanup.
  - Informing the remedy selection process, especially when parts of a site may have different future use scenarios (which can impact cleanup scenarios). Reuse assessments can evaluate available data early and guide further planning efforts.
- Identify and partner with local stakeholders. This is important because:
  - Community acceptance of site redevelopment should be factored into decisions.
  - Partnering can assist with early agreement on future uses and reduce future delays.
  - Partnering is critical and will be discussed further in this module.
- Future use considerations are important to selecting remedies. Cleanup strategies can be designed more efficiently when future use plans are available (for example, at a commercial development, a parking lot might be placed over an area of concern).
- This slide includes concepts we introduced in Module 4, Exit Strategy and will revisit throughout the course.

#### References

- None.



## Document/Implement Exit Strategies

- ❖ Documentation of site status
  - Ready for Anticipated Use (RAU) Determination
  - Comfort letters, no further action assurance
- ❖ Other documentation to assist developers
  - Prospective Purchaser Agreements (State or Federal)
- ❖ CA Completion Determination
  - With controls (Institutional and/or Engineering Controls)
  - Without controls

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### Notes:

Purpose of Slide: Review the government's role in supporting revitalization and in documenting that cleanup decisions also are protective of human health and the environment, in accordance with EPA policies and guidelines. Review available tools.

#### Key Points

- The Instructor should introduce Agency documentation related to RCRA CA Sites:
- Under RCRA CA, a national determination that is used to document that a site is safe for use is the new RCRA Land Revitalization Measure we will discuss later in this Module ( RAU).
- In addition to the RAU measure, comfort letters and no further action assurances from Federal or State Agencies can document the status of cleanup at a site and assist in moving revitalization forward. Comfort letters help to appease concerns about potential liability under RCRA and CERCLA. When a state is the lead at a RCRA facility, the comfort letter normally comes from the state. The letters may convey varying degrees of comfort by communicating EPA or State perceptions of the environmental status of the property and intentions regarding future cleanup activities. The letters, when issued by EPA, may include Agency policy statements regarding the exercise of EPA's enforcement discretion as it relates to specific site circumstances or activities of a party. As of September 2000, EPA Regional staff had issued more than 500 comfort/status letters. No further action assurances document that the Agency has reviewed available information and concluded that based on current data, no further action is necessary at a site. This can help a redeveloper assess if a site is a good prospect for redevelopment.
- Other documentation may also support redevelopment, for example, Prospective Purchaser Agreements (PPA). A PPA is a covenant not to sue that is issued by the Federal government to the prospective purchaser for existing, pre-purchase contamination. States also issue PPAs under state laws. The PPA can require the purchaser to perform cleanup work relating to existing contamination at the site. Federal PPAs must be prepared with Department of Justice input and can take a significant amount of time and resources to complete, although EPA is trying to streamline the process.
- The RCRA CA Completion Guidance provides information on making CA Completion "with controls" or "without controls" determinations, as we will discuss in Module 12. Several Regions are making completion determinations both for entire facilities and for parcels of a facility.

#### References

- EPA. 2007. Guidance for Documenting and Reporting RCRA Subtitle C Corrective Action Land Revitalization Indicators and Performance Measures. February 21.
- EPA. 1986. Policy on Issuance of Comfort/Status Letters. November 8.
- EPA. 2000. EPA's PPAs and Comfort/Status Letters: How Effective Are They? Findings, Benefits, and Suggested Improvements Final Report. Office of Site Remediation Enforcement Publication # 330R00002. September 29.
- EPA. 1989. Guidance on Settlements with Prospective Purchasers of Contaminated Property. OSWER Directive No. 9835.9 and 54 F.R. 34235. August 18. Accessed On-line at: <http://www.epa.gov/brownfields/html-doc/purchase.htm>.
- Federal Register. 2003. Volume 68, Number 37. Final Guidance on Completion of Corrective Action Activities at RCRA Facilities. February 25. Accessed online at: [http://www.epa.gov/correctiveaction/resource/guidance/gen\\_ca/compfedr.pdf](http://www.epa.gov/correctiveaction/resource/guidance/gen_ca/compfedr.pdf).



## Partnership and Good Communication

- ❖ Create a common vision of the revitalization project
- ❖ Successful partnering requires
  - Commitment, respect, and trust
  - Free exchange of information
  - Clearly defined goals and expectations of success
- ❖ Good communication includes:
  - Listening and responding – communicate with stakeholders to identify reasonable and realistic uses of the site
  - Clearly stating cleanup expectations up front

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### Notes:

#### Purpose of Slide

- Emphasize the importance of communication in the land revitalization process. Stress that working in partnership with stakeholders is considered one of the most important ingredients to a successful Brownfields or RCRA CA Revitalization project.

#### Key Points

- Partnering and good communication create a common vision that can guide a revitalization effort. Agreeing on a vision and working together to achieve it can support progress. Partnering is important across all phases of the project and it can: (1) help streamline the process; (2) help avoid project upsets; and (3) improve the chances of revitalization and cleanup success.
- Communication is a key role that RCRA staff can support in terms of revitalization.
- RCRA program staff should communicate with site owners and stakeholders to identify reasonable and realistic future uses for the site. RCRA site cleanup staff should provide as much site information as possible to developers and stakeholders up front. This allows new parties to clearly understand the cleanup needs of the site and reduces uncertainty and risk.
- RCRA staff also should listen and respond to developer information needs, as appropriate. Information may be requested regarding funding resources, integration of cleanup with a state VCP, how to obtain comfort letters, etc.
- Finally, EPA or State personnel should clearly state cleanup expectations. To prevent any misunderstandings, RCRA staff should be straight forward about the cleanup expectations for the site. The developers and site owner should have these requirements clearly laid out for them so that they can make decisions and move forward.
- There are two EPA programs that can provide assistance to communities in understanding the complexities of CA sites. Technical Outreach Services for Communities (TOSC) uses university educational and technical resources to help community groups understand the technical issues involving the hazardous waste sites in their midst (<http://www.toscprom.org/>). The Community Action for a Renewed Environment (CARE) is a community-based, community-driven, multimedia demonstration program. It provides grants to help communities understand and reduce the risk of exposure to toxic chemicals (<http://www.epa.gov/CARE>).

#### References

- None.



## Work with Financially Struggling Sites



- ❖ Understand financial situation at site
- ❖ Share information regarding funding sources, particularly for struggling sites and communities
  - EPA Brownfields Grants and other federal funds
  - State Brownfields, cleanup and redevelopment financing
  - Local funding – for example, economic development agencies
  - Recent EPA report on financing for Brownfields sites: ([http://www.epa.gov/brownfields/partners/bf\\_fin\\_state.htm](http://www.epa.gov/brownfields/partners/bf_fin_state.htm))
- ❖ Creative partnering



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### Notes:

#### Purpose of Slide

- RCRA owner/operators (o/o's) are required to demonstrate financial assurance to address CA obligations. However, EPA acknowledge that financial hurdles must be overcome at some sites and this slide reviews how EPA and State personnel can assist by sharing information on resources. Financial assurance requirements for o/o's are discussed in Module 3.

#### Key Points

- Understand the financial situation of the site; in some cases, the potential developer needs to obtain funding.
- As discussed previously, some communities and sites may be eligible for Federal funding including: (1) EPA Brownfields grants and other Federal grants/funds; (2) State Brownfields, cleanup, and redevelopment financial support; and (3) local funding. The recently released report on Brownfield Funding should be a useful resource (referenced earlier). The handout for this module includes a list of tax incentive opportunities compiled by representatives of OBCR.
- Help the owner look for partnering opportunities. A great example of this is the Century Brass site in New Milford, CT. This 72 acre site was formerly occupied by a copper and brass alloy tubing manufacturer. Past practices resulted in hazardous metal hydroxide sludge being disposed in two unlined surface impoundments, which required clean closure. PCBs also were identified and threatened human health and the river.
- The City took over this RCRA CA site through a foreclosure in 1999. The property then moved toward redevelopment with assistance from the CT DEP, EPA Brownfields, and EPA TSCA Programs. In 2001, New Milford was provided with a \$1 million loan for cleanup. In 2002, the City was awarded a \$150,000 grant to continue Brownfield redevelopment and cleanup.
- Costs to remediate the site were greater than initially estimated (as of July 2004, \$2.6 million had been spent and additional contamination was identified and required another \$500,000 to address). However, the site is now cleaned up and listed for sale on the town's web site. This site is the only available industrially zoned property in town, is served by sewer and water, and is near to a national gas pipeline, rail line, and major highway. This makes it a promising property for future use. In March 2008, the town received an offer of \$4.5 million for the site, with plans to use it for a venture that will produce an alternative fuel.

#### References

- Litchfield County Times Web site. 2008. Article by Nancy Barnes. Firm Is Seeking New Milford Site To Make Ethanol. March 13.
- EPA. 2007. List of Tax Incentive Web sites. Provided by David Lloyd of OBCR. August 8, 2007.
- EPA. 2002. Press Release. EPA Awards Brownfields Redevelopment Money to Two CT Communities. May 20.
- EPA. 2001. Press Release. EPA Gives CT Towns Seven Grants Worth \$3.4 Million. April 20.
- New York Times. 1986. In Westchester and CT, 3 Large Old Brass Mill Sites Up for Sale. March 9.
- American Metal Market. 2004. CT Town Faces Rising Costs to Clean Site of Old Brass Mill. July 8.



## Sustainable Approaches in the Land Revitalization Process

**Sustainable Revitalization** is a holistic approach to the cleanup and revitalization of a property. It considers a broad array of environmental factors and community impacts during all phases (demolition, waste remediation, design and construction, reuse), in order to maximize the environmental, social, and economic benefits associated with a project. Adopting green approaches is a key aspect of sustainable revitalization.

Deconstruction, Demolition, and Removal	Cleanup, Remediation, and Waste Mgmt.	Design and Construction for Reuse	Sustainable Use and Long-Term Stewardship
<ul style="list-style-type: none"> <li>• Reuse/recycle deconstruction and demolition materials</li> <li>• Reuse materials on site whenever possible</li> <li>• Consider future site use and reuse existing infrastructure</li> <li>• Use clean diesel and low sulfur fuels in equipment and noise controls for power generation</li> <li>• Retain native vegetation and soils, wherever possible</li> </ul>	<ul style="list-style-type: none"> <li>• Power machinery and equipment using clean fuels</li> <li>• Use renewable energy sources, such as solar, wind, and methane to power remediation activities</li> <li>• Improve energy efficiency of chosen remediation strategies, as appropriate</li> <li>• Consider remediation approaches that reduce resource use and impact on air, water, adjacent lands, and public health</li> <li>• Incorporate remediation activities that sequester carbon, where applicable, such as planting native grasses and using soil amendments</li> </ul>	<ul style="list-style-type: none"> <li>• Use Energy Star, LEED, and GreenScapes principles in both new and existing buildings</li> <li>• Reduce environmental impact by reusing existing structures and recycling industrial materials</li> <li>• Use natural systems to manage stormwater, like green roofs, landscaped swales, and wetlands</li> <li>• Incorporate Smart Growth principles that promote more balanced land uses, walkable neighborhoods, and open space</li> <li>• Create ecological enhancements to promote biodiversity and provide wildlife habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce use of toxic materials in manufacturing, maintenance, and use of buildings and land</li> <li>• Minimize waste generation, manage waste properly, and recycle materials used/generated</li> <li>• Maintain engineering and institutional controls on site</li> <li>• Reduce water use by incorporating water efficient systems and use native vegetation to limit irrigation</li> <li>• Promote energy efficiency and use of renewable energy</li> <li>• Take appropriate steps to prevent (re)contamination</li> </ul>



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### Notes:

#### Purpose of Slide

- Provide examples of sustainable approaches and resources.

#### Key Points

- This graphic demonstrates that there are opportunities to promote sustainability throughout the land revitalization process. The key to implementing any sustainable approach is to begin planning early in the process.
- Deconstruction, Demolition, and Removal – In this phase, you can reuse and recycle several components of buildings, such as bricks, concrete, and wood. Often, building and infrastructure components may be of value (e.g., steel that can be recycled).
- Cleanup, Remediation, and Waste Management – While cleaning up a site, consider remediation approaches that would reduce resource use and impacts on the environment. For example, you could power a pump & treat system with renewable energy or use clean fuels to power machinery and equipment on the site.
- Design and Construction for Reuse – Reuse available infrastructure, reuse existing buildings, and develop ecological enhancements. NOTE: Ecological revitalization is discussed further in later slides.
- Sustainable Use and Long-Term Stewardship – Finally, you can encourage and effect sustainable use and long-term stewardship. For example, you can work with stakeholders to minimize waste generation, manage waste properly, and recycle materials onsite.

#### References

- EPA. EPA Sustainability Website. Accessed On-line at: <http://www.epa.gov/sustainability/>.
- EPA. EPA ER3 Website. Accessed On-line at: <http://www.epa.gov/compliance/cleanup/revitalize/er3/>.



## Sustainable Approaches in the Land Revitalization Process

- ❖ Reuse/recycling of demolition and deconstruction wastes
- ❖ Green landscaping
- ❖ Green building
- ❖ Smart growth concepts
- ❖ Ecological revitalization
- ❖ Environmentally Responsible Redevelopment and Reuse (ER3)

<http://www.epa.gov/compliance/cleanup/revitalization/er3/>



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### Notes:

Purpose of Slide: Provide examples of sustainable approaches and resources:

#### Key Points

- Reuse/Recycling of Demolition and Deconstruction Wastes – Various components of buildings are valuable and can be reused. For example, bricks are often reused for residential or other purposes. For older buildings, architectural features and trim may be valuable. Some revitalization projects have been able to sell used machinery and equipment on the internet for parts, avoiding disposal costs. Always make sure that any reuse/recycling is done in a safe and environmentally sound manner. Information on recycling demolition wastes and other materials can be found at: <http://www.epa.gov/epaoswer/non-hw/debris-new/index.htm>.
- Green Landscaping – This includes the consideration of features that may require less chemicals and water to thrive. For example, native species and the local climate should be considered. EPA has an active Greenscapes program for companies: <http://www.epa.gov/greenscapes>. Also there is a new Website on sustainable sites – ideas for sustainable approaches can be found there: <http://www.sustainablesites.org/>
- Green Building – This area is becoming recognized as a long-term way to save money when operating facilities, whether industrial or commercial. Rising energy costs have spurred interest in this area. Green design can save energy through the use of energy efficient layouts, equipment, and alternate energy sources. Water reuse is another practice that is popular, particularly in arid areas. There are a number of resources on green building design. EPA provides information at: <http://www.epa.gov/greenbuilding>.
- Smart Growth – Smart growth is development that serves the economy, the community, and the environment. It shifts the development debate from the traditional “growth/no growth” question to evaluating “how and where new development can be accommodated.” Smart growth focuses on economic growth that is conducted more efficiently (for example, in a manner that supports energy savings, reduced pollution, etc.) than traditional development. Revitalization of RCRA CA facilities can constitute smart growth because these sites are often located in developed areas that will not require the development of new roads and infrastructure, etc. Information regarding EPA’s Smart Growth program is available at - <http://www.epa.gov/smartgrowth/>.
- Ecological Revitalization is discussed on the next slide.
- Environmentally Responsible Redevelopment and Reuse (ER3) – The Office of Enforcement and Compliance Assurance (OECA) has developed the ER3 effort, which is designed to use enforcement and other Agency-wide incentives to promote sustainable redevelopment of contaminated sites. For example, ER3 can provide enforcement assurances (such as comfort letters, no further action letters, PPAs, streamlined orders, etc.) in exchange for a site owner/developer implementing “green” or sustainable measures (such as green building, smart growth, etc.). For more information on ER3 - <http://www.epa.gov/compliance/cleanup/revitalization/er3/>.

#### References

- Web sites listed above.



## Ecological Revitalization

- ❖ Integrates ecological enhancement and reuse when possible
- ❖ Does not have to jeopardize remediation goals and objectives
- ❖ Uses partnerships and resources (for example, Wildlife Habitat Council and Interstate Technology and Regulatory Council, Clu-in)
- ❖ Tools are available to help

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### Notes:

#### Purpose of Slide

- Discuss ecological reuse practices in relation to revitalization of RCRA CA sites.

#### Key Points

- There are a number of ecological enhancements that can be incorporated into development designs that benefit the environment. For example, providing rain gardens and vegetative buffer zones can reduce run-off and also control contamination of nearby surface waters.
- For some sites or portions of a site, returning the property to a vital habitat may be the primary "new use."
- There are a number of resources available to aid in restoring land to provide useful local habitat (for instance, through the use of native plants to help ensure a native habitat).
- In 2006, the Interstate Technology and Regulatory Council (ITRC) finalized a guidance on "Planning and Promoting Ecological Land Reuse of Remediated Sites." This was developed in collaboration with a number of organizations, including the Wildlife Habitat Council and EPA. The ITRC has provided internet training on this guidance, which has been archived and can be viewed at <http://www.clu-in.org/live/archive.xml>. Clu-in also has created a "resource" page for ecological restoration, which will serve as a useful tool.
- The Wildlife Habitat Council has held workshops in EPA Regions 2, 3, 4, 5, 6, and 10 on ecological reuse. Information about these workshops can be found at: <http://www.wildlifehc.org/events/restoringgreenspace.cfm>. A range of similar tools are available to assist your efforts.

#### References

- EPA. 2006. Presented at National CA Conference in Providence, RI: Planning and Promoting of Ecological Re-Use of Remediated Sites. ITRC Technical/Regulatory Guideline Planning and Promoting of Ecological Re-Use of Remediated Sites. June 21.
- ITRC. Web Site. Accessed On-line at: <http://www.itrcweb.org/>.
  - "Making the Case for Ecological Enhancements" (January 2004).
  - "Planning and Promoting Ecological Re-Use of Remediated Sites" (July 2006).

**EXAMPLE**

## Kenosha Harbor Park, WI





Site in 1990 and as redeveloped

- ❖ Former AMC Plant
- ❖ Voluntary cleanup under WI regulations
- ❖ City led financial and development aspects
- ❖ Urban Land Institute supported smart growth planning

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### Notes:

Purpose of Slide: Illustrate land revitalization of a former industrial site, integrating smart growth principles.

### Key Points:

- In Wisconsin, an approach to revitalization is to allow all cleanups to follow one set of regulations (NR 700 – State Comprehensive Cleanup Regulations). Wisconsin also has a Memorandum of Agreement with EPA, regarding cleanup of properties under various authorities. The goal is to be protective of human health and the environment, with flexible remedial options to achieve that endpoint. The one cleanup program approach combines: protection of all state groundwater, a risk-based approach to soil contamination, ICs to limit exposure, and one program to allow for quicker and less expensive cleanups.
- The Kenosha Harbor Lakefront Redevelopment is a former Chrysler/AMC Plant. The site includes over 40 acres on Lake Michigan, impacted by historical manufacturing since the 1900s (AMC, Simmons Mattress). The property was vacant from 1986 on and impacted by petroleum and chlorinated carbon; the site also includes historic fill. Environmental issues included 17 underground storage tanks, impacted loading docks, waste, and product storage areas, foundry sand and dredge fill areas, rail lines and an incinerator. Cleanup was implemented under a voluntary cleanup program.
- The City led the way on market analysis and planning, securing financing, liability protections, and identification of developers.
- The Urban Land Institute assisted sustainable redevelopment, including the integration of Smart Growth concepts. Goals included revitalization of the area, buildings on existing infrastructure, and encouraging a mix of public and commercial uses. Smart Growth concepts include: housing with a park and open space and easy access to the area. The site links to the area by bike trail, streets, a street car line, and boat. The bike trail is part of a larger system connecting the south and north sections of the city with a regional trail system linking to Chicago, Milwaukee, and beyond. The street car stops allow riders to access the area, Kenosha's downtown, and connect with commuter train to Chicago.

### References:

- Wisconsin Department of Natural Resources (WDNR). (Michael Prager). Year not Cited. National Governor's Association Meeting: Coastal Brownfields – Wisconsin's Brownfields Initiative. Presented September 10-12.
- EPA (Sara Rasmussen). 2008. Green Approaches in the Land Revitalization Process. Presentation to Association of State and Territorial Waste Management Officials. July 31.
- WDNR. 2006. Letter from Scott Hassett of WDNR to Mary Gade, Regional Administrator (Region 5), Attaching Memorandum of Agreement for Wisconsin's One Cleanup Program. December 6.



## Long-Term Stewardship

- ❖ Institutional Controls (ICs)
  - EPA guidance
  - State uniform environmental covenants act (UECA)
  - Criteria of RAU
- ❖ ICs discussed further in later modules

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### Notes:

Purpose of Slide: Present general information on long-term stewardship and institutional controls (ICs).

#### Key Points

- Remedies must be implemented in a manner that is protective in the long term.
- EPA defines ICs as non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for human exposure to contamination and protect the integrity of the remedy. Such controls provide information and/or restrictions that help modify or guide human behavior at properties where hazardous waste contamination prevents unlimited use and unrestricted exposure.
- ICs can provide vital safeguards for property that has not been remediated to levels safe for unrestricted use.
- ICs may be used by themselves or in conjunction with engineering controls to ensure that exposure to remaining contamination is prevented in the future.
- Twenty states and territories have adopted a Uniform Environmental Covenants Act (UECA); UECA is a model law that helps to provide clear rules for the States and federal agencies to create, enforce, and modify a valid real estate document – an “environmental covenant” - to restrict the use of contaminated real estate.
- The EPA Land Revitalization Measure, Ready for Anticipated Use (RAU), includes as part of its criteria, that ICs that were identified as necessary in the remedy selection documents must be in place to achieve a positive RAU determination.
- To assist with IC issues, each EPA Region has designated a Regional IC Legal Coordinator (see first reference below). EPA also has a Long-Term Stewardship task force.

#### References

- EPA. List of EPA Region IC Legal Coordinators. Available to EPA employees at: <http://intranet.epa.gov/oeca/osre/workgroup/ic.html>.
- EPA. Superfund Program Website with IC Information. Accessed On-line at: <http://www.epa.gov/superfund/policy/ic/index.htm>.
- EPA. 2007. Ensuring Reliable and Effective ICs at RCRA facilities. June 14. Accessed On-line at: <http://www.epa.gov/reg3wcmd/ca/pdf/EnsuringReliableIC.pdf>
- EPA. 2000. Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups. (EPA 540-F-00-005, OSWER 9355.0-74FS-P). September 29.
- EPA. 2005. Long Term Stewardship Task Force Report. Ensuring Environmental Site Cleanups Remain Protective Over Time: Challenges and Opportunities Facing EPA's Cleanup Programs. EPA 500-R-05-001. September.
- Environmental Law Commission Web Site. Accessed On-line at: <http://www.environmentalcovenants.org>.



## RCRA Land Revitalization Indicators and Performance Measures

- ❖ Two cross-program measures that focus on documenting:
  - Protective for People under Current Conditions (PFP)
  - Land Ready for Anticipated Uses (RAU)
- ❖ Tool to support implementation
  - RCRA Guidance issued in February 2007
  - Two forms



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### Notes:

Purpose of Slide: Overview the specific RCRA measures that will track progress in protecting human health and land ready for anticipated uses.

#### Key Points

- Building on cross-program efforts, the RCRA program issued a guidance to assist in tracking RCRA CA land revitalization progress in February 2007; this guidance operates together with the October 2006 Guidance on OSWER Cross-Program Revitalization Measures.
- RCRA CA Indicators included in the guidance include: (1) universe indicator, (2) status of use indicator (optional), and (3) type of use indicator (optional). For 2008, the universe includes the 2008 baseline (1,968 facilities). For 2009 and beyond, the universe will include the 2020 CA Universe.
- Measure 1: Protective for People under Current Conditions (PFP): This measure is based on the Human Exposure Controlled Environmental Indicator (HE EI) (CA 725). All or portions of a facility may be reported as PFP (for example, facilities that have achieved CA 725 facility-wide, would have all acres counted as meeting PFP). Guidance is also provided to assess and record partial facility achievement of PFP.
- Measure 2: Ready for Anticipated Use (RAU): This measure is based on the criteria for meeting cleanup goals that are protective for safe reuse of the land and having ICs in place to ensure that the land is not used in an unsafe manner. The RCRA program has developed a methodology for collecting data and assessing which RCRA sites and acreages meet this measure. Initial reporting on this measure will begin in 2008. ICs and recent guidance on ICs are presented in later modules.
- The two measures – PFP and RAU – address both the number of sites and the number of acres.
- Instructors will be familiar with the guidance and EPA implementation considerations when delivering the course. Suggested materials for a handout include: (1) Type of Use/Status of Use Form, (2) RAU Form, and (3) Decision Tree – RCRA RAU Measure (page 11 of guidance).

#### References

- EPA. 2006. Measuring Revitalization of Contaminated Properties in America's Communities: Past Accomplishments and Future Opportunities. Interim Final. EPA OSWER Land Revitalization Staff Office. EPA-500-R-06-002. September.
- EPA. 2006. Interim Guidance on OSWER Cross-Program Revitalization Measures. October 20.
- EPA. 2007. Guidance for Documenting and Reporting RCRA Subtitle C Corrective Action Land Revitalization Indicators and Performance Measures. February 21.



## Review of Useful Resources

<b>EPA RCRA Reuse and Brownfields Prevention</b>
<a href="http://www.epa.gov/swerosps/rcrabf/">http://www.epa.gov/swerosps/rcrabf/</a>
<b>EPA RCRA CA</b>
<a href="http://www.epa.gov/correctiveaction/">http://www.epa.gov/correctiveaction/</a>
<b>EPA Land Revitalization</b>
<a href="http://www.epa.gov/oswer/landrevitalization/index.htm">http://www.epa.gov/oswer/landrevitalization/index.htm</a>
<b>EPA Brownfields</b>
<a href="http://www.epa.gov/brownfields.htm">http://www.epa.gov/brownfields.htm</a>
<b>EPA Sustainability</b>
<a href="http://www.epa.gov/sustainability">http://www.epa.gov/sustainability</a>
<b>CLU-IN</b>
<a href="http://www.clu-in.org">http://www.clu-in.org</a>
<b>EPA Long Term Stewardship</b>
<a href="http://www.epa.gov/landrevitalization/ltstf_report/index.htm">http://www.epa.gov/landrevitalization/ltstf_report/index.htm</a>
<b>Green Remediation</b>
<a href="http://www.clu-in.org/greenremediation">http://www.clu-in.org/greenremediation</a>

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### Notes:

#### Purpose of Slide

- Review some of the useful resources for revitalization.

#### Key Points

- Review some of the useful resources identified for revitalization information.

#### References

- None.



## Summary

- ❖ Incorporate anticipated land reuse options as early as possible.
- ❖ Use available tools and resources to support land revitalization and cleanup.
- ❖ Keys to success include:
  - Communication
  - Partnering
  - Creativity

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### Notes:

#### Purpose of Slide

- Review the take home messages from the module.

#### Key Points

- Many facilities may provide opportunities for revitalization; however, the regulator can only do so much.
- At some sites, opportunities will not be ideal for revitalization (for example, no reuse potential, no developer); focus your efforts on those sites with promise. Identify promising sites as early as possible.

#### References

- None.



The slide features a central graphic with two vertical film strips on either side of a central purple circle containing a white video camera icon. To the left of the film strips is a yellow speaker icon. Above the speaker is the EPA logo. Below the graphic, the text 'Video: Our Land, Our Legacy' is displayed in a large, black, sans-serif font. At the bottom of the slide, a blue gradient bar contains the text 'February 2009', 'Module 6 - CA and Facilitating Land Revitalization', and '31'.

## Notes:

### Purpose of Slide

- Illustrate the successful implementation of RCRA Land Revitalization through a video.

### Key Points

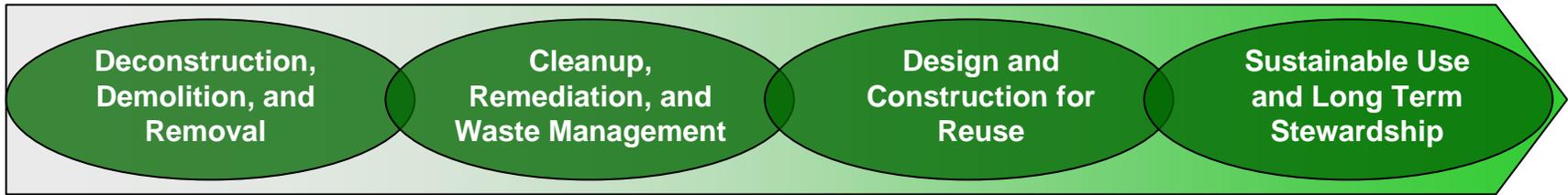
- Introduce the video, which provides three real-world examples that illustrate successful revitalization that also helps to drive environmental cleanup and progress towards the 2020 Vision for CA.

### References

- EPA. 2007. Our Land, Our Legacy – The Resource Conservation and Recovery Act. EPA 530-C-07-003. January.

# Green Approaches in the Land Revitalization Process

*When planning for cleanup and reuse of a property, involve the public to ensure specific needs and all the impacts to the community are clearly understood and addressed. Opportunities to conserve resources, reduce impacts to the community, and reduce impacts on human health and the environment include, but are not limited to:*



- Reuse/recycle deconstruction and demolition materials
- Reuse materials on site whenever possible
- Consider future site use and reuse existing infrastructure
- Use clean diesel and low sulfur fuels in equipment and noise controls for power generation
- Retain native vegetation and soils, wherever possible

- Power machinery and equipment using clean fuels
- Use renewable energy sources, such as solar, wind, and methane to power remediation activities
- Improve energy efficiency of chosen remediation strategies, as appropriate
- Consider remediation approaches that reduce resource use and impact on air, water, adjacent lands, and public health
- Incorporate remediation activities that sequester carbon, where applicable, such as planting native grasses and using soil amendments

- Use Energy Star, LEED, and GreenScapes principles in both new and existing buildings
- Reduce environmental impact by reusing existing structures and recycling industrial materials
- Use natural systems to manage stormwater, like green roofs, landscaped swales, and wetlands
- Incorporate Smart Growth principles, such as incorporating mixed land uses, walkable neighborhoods, and open space
- Create ecological enhancements to promote biodiversity and provide wildlife habitat

- Reduce use of toxic materials in manufacturing, maintenance, and use of buildings and land
- Minimize waste generation, manage waste properly, and recycle materials used/generated
- Monitor engineering and institutional controls on site
- Reduce water use by incorporating water efficient systems and use native vegetation to limit irrigation
- Promote energy efficiency and use of renewable energy
- Take appropriate steps to prevent (re)contamination

## Strategic Objectives Support

### EPA ADMINISTRATOR'S ACTION PLAN

- ...[F]oster technological innovations to support the clean development of domestic energy resources (oil, gas, nuclear, coal, wind, and solar)
- Restore contaminated properties, including brownfields, to environmental and economic vitality
- Promote stewardship through increased resource conservation, including waste minimization and recycling
- Expand the use of biofuels and promote diesel emissions reductions through retrofit and other technologies

### OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE (OSWER) ACTION PLAN

- Encourage the appropriate reuse and revitalization of brownfields, USTfields, Superfund sites, RCRA facilities, BRAC sites, and other federal properties
- Promote the reduction, reuse, and recycling of both municipal and industrial wastes

**MODULE 6 HANDOUT**  
**TAX INCENTIVES AND REVITALIZATION:**  
*WEB SITE REFERENCES*



**Historic Rehabilitation Tax Credits**

[http://www.nationaltrust.org/rehab\\_tax\\_credits/](http://www.nationaltrust.org/rehab_tax_credits/) and  
<http://www.nationaltrust.org/funding/> -- Tax incentives and funding pages from the National Trust for Historic Preservation  
[www.ntcicfunds.com](http://www.ntcicfunds.com) -- for information about equity investments in projects that combine historic rehab tax credits with New Markets tax credits and other credit enhancements

**Low Income Housing Tax Credits**

<http://www.nahro.org/home/resource/credit.html> -- information on how the tax credit works from the National Assn of Housing and Redevelopment Officials

**New Markets Tax Credits**

[www.cdfifund.gov](http://www.cdfifund.gov) -- official information on New Markets Tax Credits, from Dept of Treasury office overseeing the credits  
[http://www.lisc.org/section/goals/economic/new\\_markets](http://www.lisc.org/section/goals/economic/new_markets) -- basic information on New Markets Tax Credits, from the New Markets Support Company, an affiliate of the Local Initiatives Support Corp, a key non-profit development organization

**Energy efficiency tax incentives (from Energy Policy Act of 2005) revitalization)**

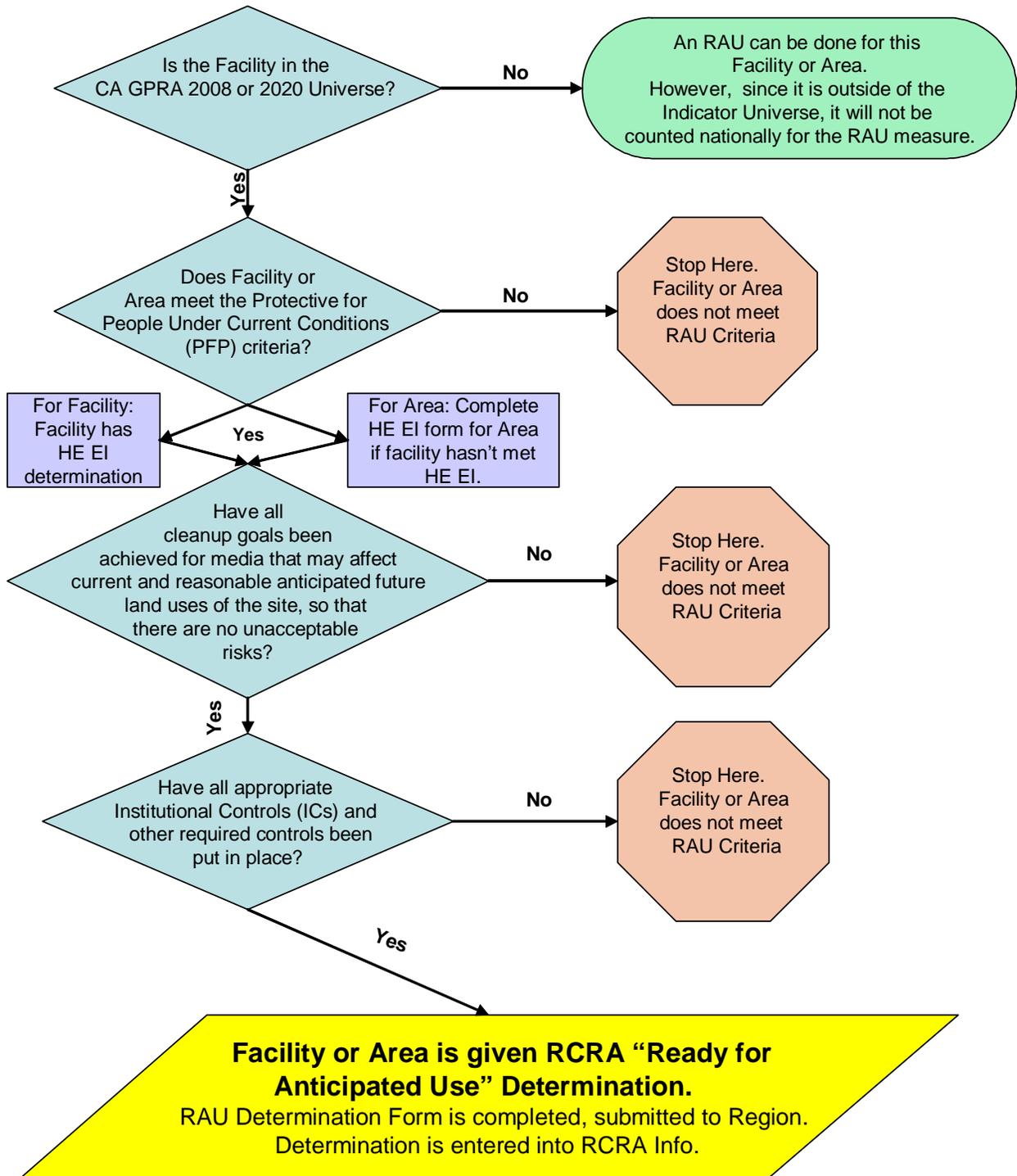
<http://www.energy.gov/taxbreaks.htm> -- information on the various Energy Policy Act of 2005 tax incentives, from DOE, applicable to new construction or commercial renovation

**Brownfield Expensing Tax Incentive**

[www.epa.gov/brownfields/bftaxinc.htm](http://www.epa.gov/brownfields/bftaxinc.htm) -- basic information on the brownfields tax incentive and how it works

*Web sites tested and updated January 19, 2009.*

# Decision Tree - RCRA “Ready for Anticipated Use” Measure



# RCRA READY FOR ANTICIPATED USE (RAU) DOCUMENTATION FORM



United States  
**ENVIRONMENTAL PROTECTION AGENCY**  
Washington, DC 20460

**PART A – GENERAL FACILITY INFORMATION**

<b>1. Facility Name</b>		<b>2. EPA ID</b>	
<b>3. Street Address</b>			
<b>4. City</b>	<b>5. State</b>	<b>6. Zip Code</b>	
<b>7. Project Manager</b>		<b>8. Organization</b>	

**PART B – READY FOR ANTICIPATED USE DETERMINATION**

**9. This RAU Determination is for:**

Facility-wide Designation, or

Area Designation - Defined in RCRA INFO as \_\_\_\_\_  
Number of Acres in Area \_\_\_\_\_

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**10. Protective for People under Current Conditions Requirements**

A Current Human Exposure Under Control Environmental Indicator determination has been made.  
Date of Determination \_\_\_\_\_

---

**11. Cleanup Goals for Media That Affect Land Use Have Been Achieved**

No cleanup goals are necessary for media that may affect current and reasonable anticipated future **land** uses.

All final cleanup goals in the remedy selection document or other decision document(s), that may affect current and reasonably anticipated future **land** uses have been achieved. (See RCRA Land Revitalization guidance for more specific information.), or

Event code achieved or document (s) supporting this determination:

Clean up Activities Terminated (RCRAInfo CA999) or Construction Complete (CA550), or

Document and date (e.g., comfort letter, no further action letter, interim measures report, RFI report) indicating that clean up goals have been achieved or that no clean up is necessary for media relevant to current and reasonably anticipated **land** uses. Construction Complete

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**12. Needed Institutional Controls are Implemented**

- All acres covered by this RAU form meet the requirement for unrestricted use for all media and no institutional controls are necessary, or
- Site has achieved a cleanup complete (CA999) or cleanup complete with controls determination, or
- All institutional controls or other administrative controls (e.g. orders, permit, written agreement) required in the remedy decision document or other decision document(s) have been put in place.

List contaminated media and use restrictions:

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---

Identify Institutional Controls implemented at the facility (each of these should be entered into RCRAInfo, CA772 event code):

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**PART C – SIGNATURE**

NOTE: The outcome of this Property Reuse Evaluation does not have any legally binding effect and does not expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits of any party. EPA assumes no responsibility for reuse activities and/or any potential harm that might result from reuse activities. EPA retains any and all rights and authorities it has, including but not limited to legal, equitable, or administrative rights. EPA specifically retains any and all rights and authorities it has to conduct, direct, oversee, and/or require environmental response actions in connection with the facility, including but not limited to instances when new or additional information has been discovered regarding the contamination or conditions at the facility that indicates that the response and/or the conditions at the facility are no longer protective of human health or the environment.

13. Project Manager	14. Signature	15. Date
16. Supervisor	17. Signature	18. Date

**PART D – REMOVAL OF ACRES FROM READY FOR ANTICIPATED USE DETERMINATION**

**19. Retraction of RAU Determination**

- RAU Determination retracted for entire facility, or
- RAU Determination retracted for area. Area Name \_\_\_\_\_, # \_\_\_\_\_ of acres

Reason: \_\_\_\_\_  
\_\_\_\_\_

20. Project Manager	21. Signature	22. Date
23. Supervisor	24. Signature	25. Date

# RCRA Land Revitalization Indicators: Type of Use, Status of Use

		United States <b>ENVIRONMENTAL PROTECTION AGENCY</b> Washington, DC 20460	
1. Date:			
2. Facility Name		3. EPA ID	
4. Project Manager		5. Organization	
List the number of acres for that fit each category			
<u>Reused:</u> Total acres _____	<u>Planned Reuse:</u> Total acres _____	<u>Unused:</u> Total acres _____	<u>Continued Use:</u> Total acres _____
<u>Types of Use</u> ___ <i>Commercial &amp; Public Service</i> ___ Commercial. ___ Public Service ___ <i>Green Space</i> ___ Agricultural Use ___ Recreational ___ Ecological ___ <i>Industrial</i> ___ Industrial Use. ___ <i>Military and Other Federal</i> ___ Military Use ___ Other Federal Use ___ <i>Mixed</i> ___ Mixed Use ___ <i>Residential</i> ___ Residential Use	<u>Types of Use</u> ___ <i>Commercial &amp; Public Service</i> ___ Commercial. ___ Public Service ___ <i>Green Space</i> ___ Agricultural Use ___ Recreational ___ Ecological ___ <i>Industrial</i> ___ Industrial Use. ___ <i>Military and Other Federal</i> ___ Military Use ___ Other Federal Use ___ <i>Mixed</i> ___ Mixed Use ___ <i>Residential</i> ___ Residential Use	<u>Types of Use</u> ___ <i>Commercial &amp; Public Service</i> ___ Commercial. ___ Public Service ___ <i>Green Space</i> ___ Agricultural Use ___ Recreational ___ Ecological ___ <i>Industrial</i> ___ Industrial Use. ___ <i>Military and Other Federal</i> ___ Military Use ___ Other Federal Use ___ <i>Mixed</i> ___ Mixed Use ___ <i>Residential</i> ___ Residential Use	<u>Types of Use</u> ___ <i>Commercial &amp; Public Service</i> ___ Commercial. ___ Public Service ___ <i>Green Space</i> ___ Agricultural Use ___ Recreational ___ Ecological ___ <i>Industrial</i> ___ Industrial Use. ___ <i>Military and Other Federal</i> ___ Military Use ___ Other Federal Use ___ <i>Mixed</i> ___ Mixed Use ___ <i>Residential</i> ___ Residential Use

Unit Conversions: 1 square foot = 0.000023 acre; 1 square meter = 0.0002471 acre

## **Current Land Use**

***Continued Use*** - A site or portion of a site which is currently being used in the same general manner as it was when the site became contaminated. For example, continued use would be an appropriate description for a property where industrial operations resulted in the contamination and the property is still used as an operating industrial facility. The RCRA Program will count all acres of an active RCRA industrial facility as Continued Use, except for parcels specifically designated as Reused or Planned Reuse.

***Reused*** - A site or portion of a site where a new use, or uses, is occurring such that there has been a change in the type of use (e.g. industrial to commercial) or the property was vacant and now supports a specific use. This means that the developed site, or portion of the site, is "open" or actually being used by customers, visitors, employees, residents, etc.

***Planned Reuse*** - A site or portion of a site where a plan for new use is in place. This could include conceptual plans, a contract with a developer, secured financing, approval by the local government, or the initiation of site redevelopment.

***Unused*** - A site or portion of a site that is currently vacant or not being used in any identifiable manner. This could be because site investigation and cleanup are on-going, operations ceased or owner is in bankruptcy, or cleanup is complete but the site remains vacant.

## **Types of Use**

### ***Commercial and Public Service***

- Commercial Use – Commercial use refers to use for retail shops, grocery stores, offices, restaurants and other businesses.
- Public Service Use – Public service use refers use by a local or state government agency or a non-profit group to serve citizens' needs. This can include transportation services such as rail lines and bus depots, libraries and schools, government offices, public infrastructure such as roads, bridges, utilities or other services for the general public.

### ***Green Space***

- Agricultural Use – Agricultural uses refers to use for agricultural purposes, such as farmland for growing crops and pasture for livestock. It also can encompass other activities, such as orchards, agricultural research and development, and irrigating existing farmland.
- Recreational Use – Recreational use refers to use for recreational activities, such as sports facilities, golf courses, ball fields, open space for hiking and picnicking, and other opportunities for indoor or outdoor leisure activities.
- Ecological Use – Ecological use refers to areas where proactive measures, including a conservation easement, have been implemented to create, restore, protect or enhance a habitat for terrestrial and/or aquatic plants and animals, such as wildlife sanctuaries, nature preserves, meadows, and wetlands.

### ***Industrial***

- Industrial Use – Industrial use refers to traditional light and heavy industrial uses, such as processing and manufacturing products from raw materials, as well as fabrication, assembly, treatment, and packaging of finished products. Examples of industrial uses include factories, power plants, warehouses, waste disposal sites, landfill operations, and salvage yards.

### ***Military and Other Federal***

- Military Use – Military use refers to use for training, operations, research and development, weapons testing, range activities, logistical support, and/or provision of services to support military or national security purposes.
- Other Federal Use – Other federal use refers to use to support the Federal government in federal agency operations, training, research, and/or provision of services for purposes other than national security or military.

### ***Mixed***

- Mixed Use – Mixed use refers to areas at which uses cannot be differentiated on the basis of acres. For example, a condominium with retail shops on the ground floor and residential use on the upper floors would fall into this category. When using Mixed Use, the individual types of uses should be identified, if possible.

### ***Residential***

- Residential Use – Residential use refers to use for residential purposes, including single-family homes, town homes, apartment complexes and condominiums, and child/elder care facilities.