SectorStrategies

State Toolkit for Developing

Beneficial Reuse Programs for Foundry Sand

EPA United States Environmental Protection Agency

Contributions

Many stakeholders were involved in the development of this manual, which we believe makes this a more valuable resource. The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) was EPA s partner in this project. Their members provided ideas for structure and content for the report, and they offered valuable suggestions for improving earlier drafts. In particular, Paul Koziar of the Wisconsin Department of Natural Resources and Ron Hassinger with Pennsylvania Department of Environmental Protection provided assistance and input that were especially helpful. Elizabeth Olenbush of Foundry Industry Recycling Starts Today (FIRST) and Amy Blankenbiller of the American Foundry Society provided input on sources for content and acted as liaison between EPA and the foundry industry. This document was developed under the auspices of EPA s Resource Conservation Challenge and EPA s Sector Strategies Program and demonstrates EPA s ability to collaborate among offices, regions, and other stakeholders to develop resources for states. In particular, the EPA Region 5 Pollution Prevention and Program Initiative Section provided invaluable vision, guidance, and review.

For further information regarding this Toolkit and EPA s partnership with the metal casting sector, please contact Jeff Kohn (202 566 1407, Kohn.Jeffrey@epamail.epa.gov) at the U.S. EPA.

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1 | Introduction to the Toolkit

Background

Every year foundries generate between nine and 13 million tons of sand that is unfit for continued use in the mold-making process or is excess sand that facilities did not need. Industry sources estimate that only 10 percent of this sand is currently beneficially reused outside of the foundries.[1] The remainder is discarded in municipal or industrial landfills or stockpiled on site. However, almost all foundry sand is nonhazardous and is suitable for use in a number of applications, assuming the sand meets tests for risks.[2]

The greatest volumes of foundry sand are currently used in geotechnical applications such as road bases, structural fills, embankments, general fills and landfills. The quality of the sand can make it an excellent aggregate for manufactured products such as Portland cement, flowable fill, asphalts, and concrete products. In more limited instances, foundry sand is being used in manufactured soils and other agricultural applications.[3]

As of 2002, eighteen states had programs that regulated beneficial reuse activities for foundry sand.[4] Existing state programs consist of a variety of methods to review, approve, and monitor reuse activities. As you develop a beneficial reuse program, you should be aware of economic and program barriers that could develop as a result of the program choices you make. These barriers may affect the success of your program. This toolkit addresses program barriers, but does not address economic barriers to beneficial reuse.

Almost all foundry sand is nonhazardous and is suitable for use in a number of applications, assuming the sand meets tests for risks.

Purpose of the Toolkit

The toolkit is designed expressly as an assistance tool for states. The goal is to help you improve an existing beneficial reuse program or develop a beneficial reuse program that fits your state's needs. In many cases, foundries are interested in beneficially reusing their sand rather than disposing of it in landfills. As a result, states are receiving more requests from foundries to consider various beneficial reuse activities. If your state is receiving an increased number of requests, you may want to consider improving the efficiency of your decision-making process while ensuring the environmental and health safety of the proposed reuse activities.

This toolkit builds upon EPA's *Beneficial Reuse of Foundry Sand: A Review of State Practices and Regulations*. The toolkit provides program options and concrete examples of a variety of approaches used in states to efficiently conduct beneficial

[1] Foundry sand estimates are from Dr. Paul J. Tikalsky of Pennsylvania State University, collated from FIRST (Foundry Industry Recycling Starts Today) data.

[2] For additional information on foundry sand and beneficial reuse options, please refer to the FIRST website (http://www.foundryrecycling.org/index.html) and the Federal Highway Administration's website (http://www.fhwa.dot.gov/pavement/pub_details.cfm?id=175). Links current as of July 2006.

[3] FIRST website, <http://www.foundryrecycling.org/org/whatis.html>. July 2006.

[4] U.S. Environmental Protection Agency. *Beneficial Reuse of Foundry Sand: A Review of State Practices and Regulations*. December 2002.

reuse determinations. Since resource availability is a primary concern for many states, the toolkit addresses the state agency and industry burdens associated with program options. In addition, the toolkit discusses how program design options may affect the level of program participation.

If you would like to review data on the feasibility of reusing foundry sand, please refer to Foundry Industry Recycling Starts Today (FIRST), a non-profit consortium focused on market development of sustainable options for recycling and beneficial reuse of foundry industry by-products. The FIRST website provides links to a collection of technical, environmental and economic data from industry, university, and government (United States Department of Agriculture) sources on foundry sand reuse (http://www.foundryrecycling.org/text/techlibrary.html).

It is important to balance component preferences against the impact that program design has on resource commitments at the state and industry levels.

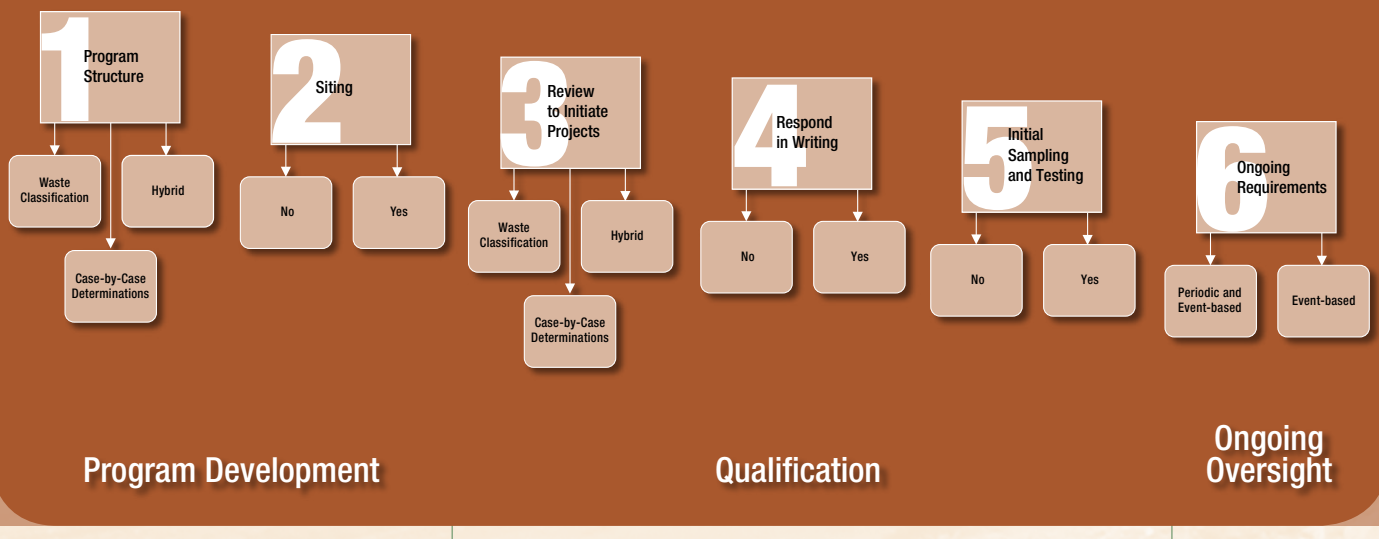
Overview of the Toolkit

As you work through the toolkit, you should consider what your state agency's capacity is, given the burdens that each program option presents. Each decision reflects your program preferences, such as level of approval, review, oversight, and environmental protection. It is important to balance these preferences against the impact that program design has on resource commitments at the state and industry levels. This will help you to plan and design a program that fits your state's ability and preferences. Careful program development can lead to a beneficial reuse program that both promotes reuse of foundry sands and ensures environmental protection in your state.

The next section of the toolkit ("*Before You Start: Identify Your Priorities and Program Preferences*") leads you through a series of questions to determine what type of program you want to design while also broadly showing the impact of each decision with regard to your agency's available resources, both for initial program development and ongoing program maintenance. This section begins with the "Roadmap for Creating a Foundry Sands Beneficial Reuse Program." This diagram and the following detailed questions help guide you through the questions in the outline. The Roadmap illustrates the program development process, including the decisions you need to make to design a program for your state. For example, the Roadmap identifies program options that are designed to require significant ongoing budget and employee resources. Such program options may not be appropriate for states with year-to-year budget challenges.

The remaining sections of the toolkit correspond to the three Stages (Program Development, Qualification, and Ongoing Oversight) and each of the Steps in the Roadmap. The Steps in the Roadmap and the toolkit text lead you through the program options that are typically found in beneficial reuse programs for foundry sand. These program option descriptions are supplemented with examples from states that use the approaches described. In addition, the toolkit provides sample regulatory language, case studies, and links to state program information. These resources are current as of July 2006 and may be superceded at any time.

2 | BeforeYou Start: Identify Your Priorities and Program Preferences



The questions in this section will assist you in thinking about and formulating the overall approach of your beneficial reuse program. Your responses will identify priorities with regard to foundry sand beneficial reuse program components. Once you answer some basic questions, you can develop a program outline, and then fill in the details. With this information, you will be able to identify your preferred program design, given the choices presented in the toolkit.

There are two initial questions that you will need to answer. These questions relate to the type of material that will qualify for reuse under the program.

Following these initial questions, you will need to answer additional questions that will help you design your program's framework. The **Roadmap for Creating a Foundry Sands Beneficial Reuse Program** illustrates these program design questions.

Whether you design your program applicability based on broad waste classifications or based on specific materials, you should identify some or all of the materials that your program will address and the types of reuse activities you intend to allow.

Identifying Materials that will Qualify for the Program

Whether you design your program applicability based on broad waste classifications or based on specific materials, you should identify some or all of the materials that your program will address and the types of reuse activities you intend to allow.

What types of foundry sands will be addressed by your beneficial reuse program?

- Are you focusing on foundry sands from operations such as iron, steel, and aluminum, which represent more than 90 percent of foundry sands and the most studied for reuse applications?
- Are there operations in your state from less common foundry operations that should also be covered by the program? The remaining foundries may use:
  - Copper
  - Brass
  - Bronze
  - Beryllium
  - Cobalt
  - Zinc
  - Lead
  - Tin
  - Nickel
  - Magnesium
  - Titanium

What types of reuse activities do you want to allow?

- Bound (stabilized): use sands in manufactured products, such as:

- Portland cement
- Asphalt
- Concrete products

- Confined (contained, not stabilized): use sands in geotechnical applications, such as:
  - Road bases
  - Structural fills
  - Embankments (may be unconfined in some cases)
  - General fills (may be unconfined in some cases)
  - Landfills
- Unconfined (not contained or stabilized): use sands in agricultural products, such as:
  - Amendments
  - Compost
  - Manufactured soil
  - Top dressing

The Roadmap does not necessarily present steps in the order that must be taken; rather it is a way to think about each component of your foundry sands program.

Roadmap for Creating a Foundry Sands Beneficial Reuse Program

The remaining questions in this section relate to the "Roadmap for Creating a Foundry Sands Beneficial Reuse Program." The numbered headings correspond to the numbered boxes in the Roadmap. The Roadmap does not necessarily present steps in the order that must be taken; rather it is a way to think about each component of your foundry sands program. The following definitions should aid you in understanding the Roadmap:

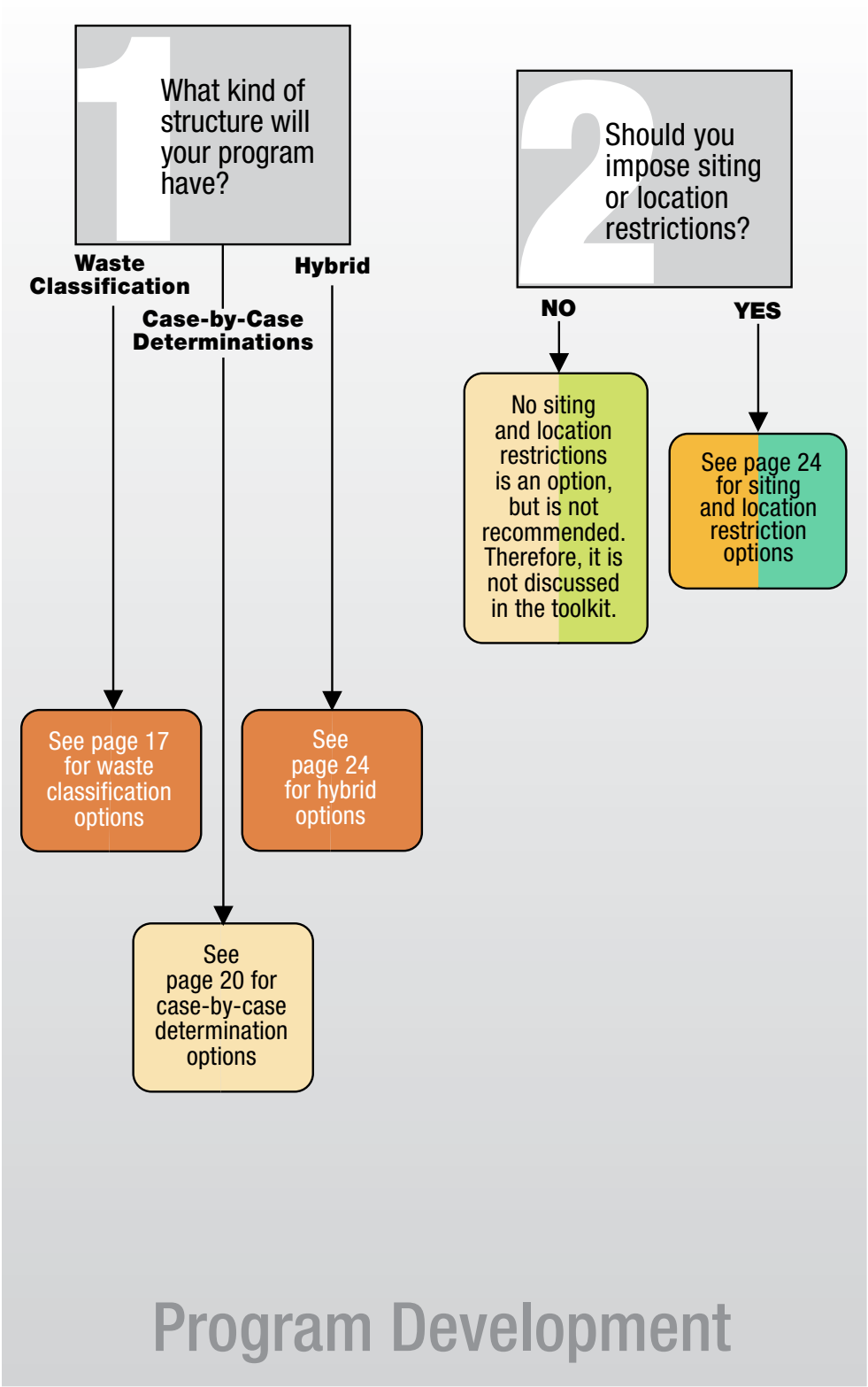
Approval – A state agency's endorsement of proposed beneficial reuse activities. This state endorsement may be in written format, although some states endorse proposed activities without a formal written response to generators or end-users.

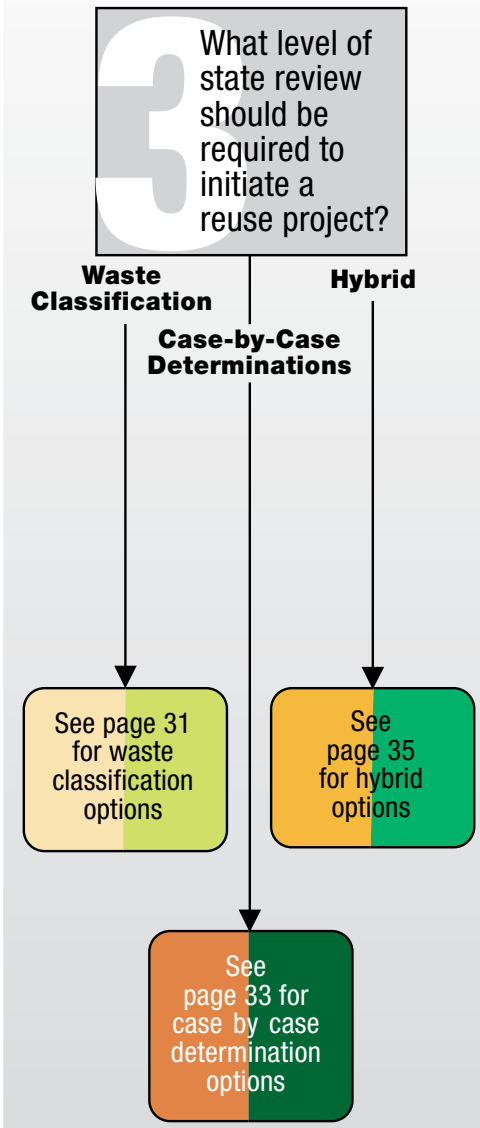
Case-by-case determinations – With this program design option, states review proposed reuse activities on an individual basis.

Waste classification – With this program design option, states establish categories that are defined by ranges of contaminant thresholds for specific reuses and/or waste types. In general, by-products with low concentrations of constituents of concern are less restricted in their reuse activities. Conversely, by-products with higher concentrations are more restricted. These categories standardize the review process for proposed reuse activities, and streamline the approval process.

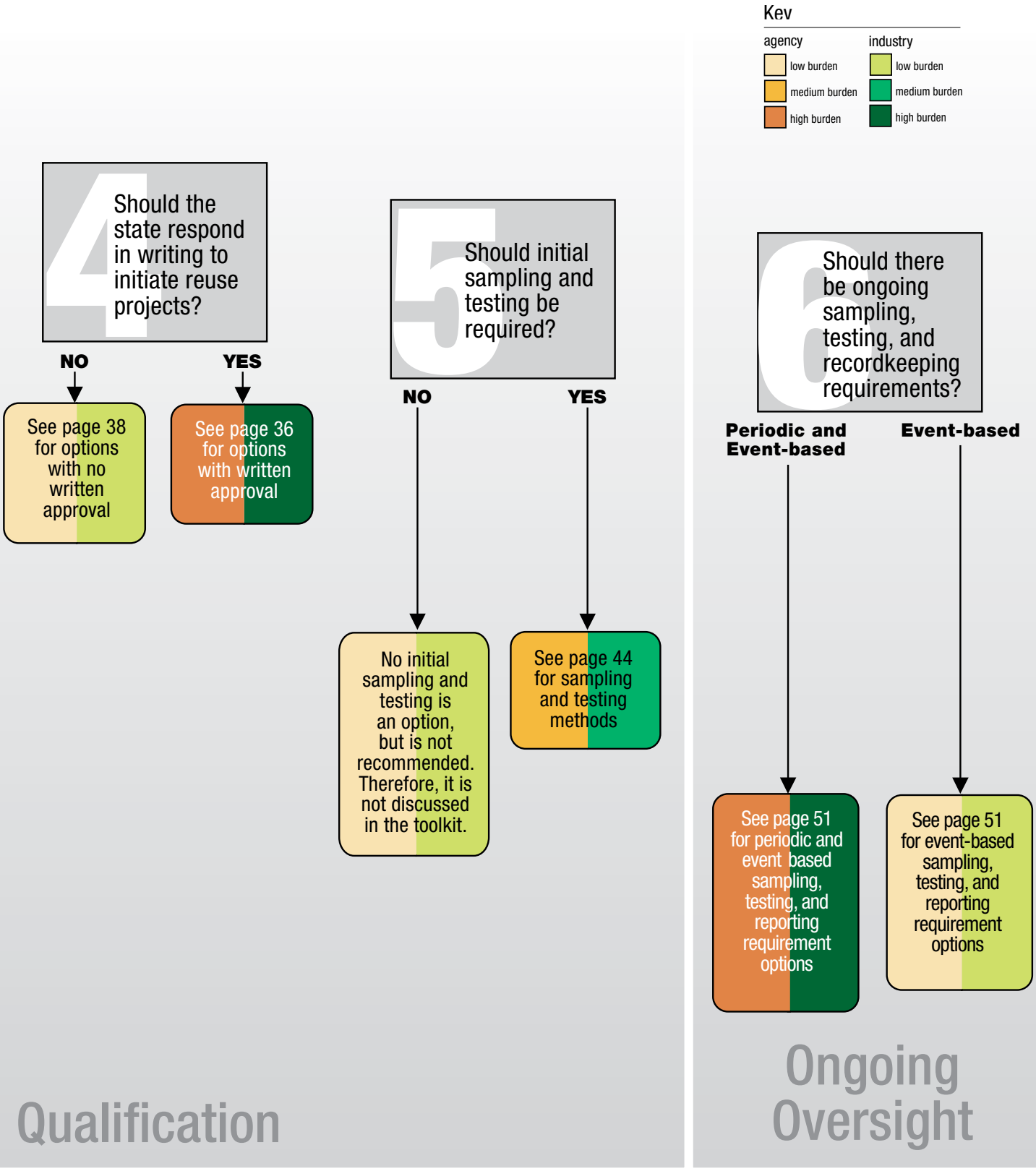
Event-based testing – This program design option establishes the frequency of sampling and testing to confirm that the foundry sand's composition has not changed. In this case, generators or end-users must test the sand when

Roadmap for Creating a Foundry





Sands Beneficial Reuse Program



a specific incident occurs, such as a change in the foundry process generating the waste sand.

Program Development – Structure

Can you group reuse activities according to the level of agency scrutiny required?

- If reuse activities can be grouped together, but different groups require different levels of scrutiny, you should use waste classifications.
- If you believe that all reuse activities should be scrutinized the same way, then you should choose case-by-case determinations.
- If you know of some groupings that you can create, but they don't include all reuse activities, you could create a hybrid model.

To fully consider the overall burden implications of each program structure, you should review and carefully consider the discussions in Steps 1 and 3 together to select the appropriate choice given your agency resources now and in the future.

Can you identify foundry sand beneficial reuse activities that could be approved with an application and testing data from a generator or end-user without a review of individual projects?

- If yes, then you may want to consider waste classifications for those reuse activities.
- If no, then you may want to consider case-by-case determinations.
- If there are certain projects that could be streamlined, but others that require further scrutiny, you may consider a hybrid approach. Case-by-case reviews may be conducted for projects that do not conform to the waste classifications and their allowable reuses.

How much funding will you have for program development versus ongoing project reviews?

- If you have good funding for program development, but poor funding for ongoing maintenance, then you may want to consider waste classifications.
- If you have poor funding for program development, but good funding for ongoing maintenance, then you may want to consider general regulations that require case-by-case reviews, or you may consider a hybrid approach.

Program Development – Siting or Location Restrictions

What types of siting standards do you want to establish for beneficial reuse activities?

- If establishing siting restrictions are established for all reuse activities, consider that you must commit resources up-front to identify program elements such as:

- Environmental resources to be protected (potable wells, groundwater, surface water, wetlands, floodplains, soil type, critical habitat, residential areas, aquifers, etc.).
- Type(s) of reuse restriction (bans, minimum distances, hydrology or hydrogeology, etc.). (High up-front agency resources, low burden to industry for justification, low ongoing agency burden for review)

- If you believe environmental protection standards should be project specific, then you should consider case-by-case reviews. (Low up-front resources, high burden to industry for justification, high ongoing agency burden for review)

How willing is the state to commit the resources necessary to review proposed foundry sand beneficial reuse activities?

3 Qualification – Level of State Review

Agency Burden: How willing is the state to commit the resources necessary to review proposed foundry sand beneficial reuse activities?

- Agency does not review the initial sampling and testing results, and instead requires industry to keep records of this information (no agency burden).
- Agency reviews initial sampling and testing results to ensure that levels are below pre-established constituent levels (low agency burden).
- Agency reviews initial sampling and testing results on case-by-case basis for environmental impacts (medium agency burden).
- Agency reviews initial sampling and testing results and additional information regarding environmental impacts (i.e., potential for groundwater contamination, off-site releases, air pollution, etc.) (high agency burden).

4 Qualification – Written Approval

Agency Burden: How willing is the state to commit the resources necessary to submit written approval for foundry sand beneficial reuse activities?

- Agency does not submit written approval to generators or end-users (no agency burden).
- Agency submits written approval to generators or end-users for some, but not all, beneficial reuse activities (i.e., depending on volume of material proposed for reuse) (low agency burden).
- Agency submits written approval to generators or end-users for all beneficial reuse activities (high agency burden).

Qualification – Initial Sampling and Testing

Industry Burden: How much responsibility do you want to place with industry to prove that their reuse activities do not harm human health and the environment?

How often do you want assurance regarding the composition of the waste being reused?

- Industry conducts initial sampling and testing and is required to maintain records (low industry burden).
- Industry conducts initial sampling and testing and reports results to the agency (medium industry burden).
- Industry conducts initial sampling and testing, reports results to the agency, and provides additional information regarding environmental impacts (i.e., potential for groundwater contamination, off-site releases, air pollution, etc.) (high industry burden).

Do you want to establish sampling and testing method requirements or require applicants to design and justify their own requirements?

- If you establish sampling and testing method requirements, then you will need to commit resources up-front to establish the following program elements:
  - Identify the required testing method, if you plan to specify.
  - Identify the constituents for which testing will be conducted.
  - Identify the thresholds that must be met. (High up-front agency resources, low burden to industry for justification, low ongoing agency burden for review)
- If you require applicants to design and justify their own requirements, then you should consider other initial sampling and testing options:
  - Allow industry to select the testing method.
  - Allow industry to identify the constituents for which testing will be conducted.
  - Allow industry to identify the thresholds that must be met. (Low up-front resources, high burden to industry for justification, high ongoing agency burden for review)

Ongoing Oversight – Sampling, Testing and Recordkeeping

How often do you want assurance regarding the composition of the waste being reused?

- Industry conducts periodic and event-based sampling and testing (e.g., sampling and testing on an annual basis and when a process producing the foundry sand changes), but does not report the results to the agency unless a significant change occurs (low industry burden).

- Industry conducts event-based sampling and testing and reports the results to the agency (low industry burden).
- Industry conducts periodic and event-based sampling and testing and reports the results to the agency (medium industry burden).
- In addition to periodic and event-based sampling and testing and reporting, industry reports additional information regarding the reuse activities (e.g., amount of foundry sand reused and challenges encountered) (high industry burden).

Are the foundry sand byproducts in your state relatively consistent in their constituents and concentrations?

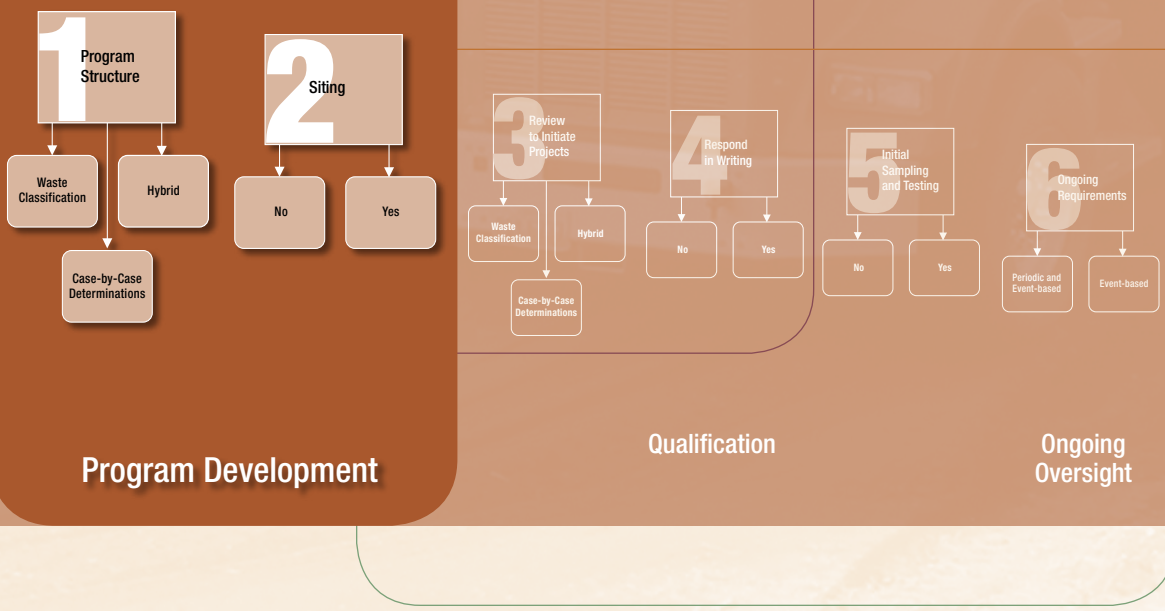
- If consistent, then consider less frequent testing.
- If inconsistent, then consider more frequent testing.
- If unknown, then consider more frequent testing until the consistency can be determined.

What level of state resources are you willing to commit for ongoing reviews of foundry sand beneficial reuse projects?

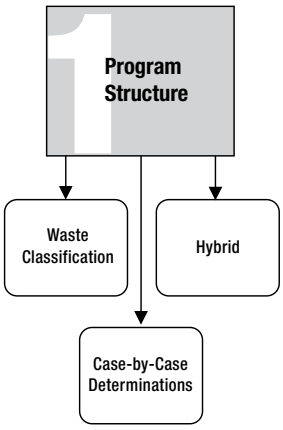
- Agency does not review periodic sampling and testing results or environmental impacts (i.e., groundwater contamination, off-site releases, air pollution, etc.) (no agency burden).
- Agency reviews sampling and testing results and environmental impacts when a process producing the foundry sand changes (low agency burden).
- Agency reviews industry's periodic sampling and testing results only (medium agency burden).
- Agency reviews industry's periodic sampling and testing results and environmental impacts (high agency burden).

What level of state resources are you willing to commit for ongoing reviews of foundry sand beneficial reuse projects?

3 | Program Development



When creating a new beneficial reuse program, or redesigning an existing program, you must consider two basic program development components. The first component is addressed in Step 1 of the Roadmap: Program Structure. Step 2 of the Roadmap covers the second component, Siting or Location Restrictions.



STEP 1 OF THE ROADMAP: Program Structure

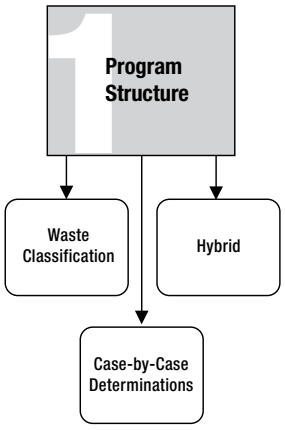
Step 1 of the Roadmap identifies the types of program structures that you may consider: waste classification, case-by-case determinations, and a hybrid structure. However, Step 1 does not stand alone, and the decision you make in Step 1 has significant resource implications for your state in the short- and long-term. While Step 1 discusses the short-term burden associated with initial setup of a program structure, Step 3 explains the ongoing burden for each program option in the coming years as your agency reviews and approves applications for reuse projects. To fully consider the overall burden implications of each program structure, you should review and carefully consider the discussions in Steps 1 and 3 together to select the appropriate choice given your agency resources now and in the future.

Waste Classification

You may want to develop a beneficial reuse program that establishes standards that vary by waste classification categories. This type of program requires more resources for program development, but less for ongoing maintenance without sacrificing environmental protection. Waste classification categories are defined by a range of constituent concentration thresholds which are matched with specific reuses. By establishing this structure, you may tailor the nature and stringency of restrictions to the risks associated with the foundry sand. For example, many states place fewer restrictions on using foundry sands for manufacturing certain products (e.g., cement, asphalt, concrete) that have a very low potential for causing adverse environmental impacts, while greater restrictions are imposed for foundry sands used in agricultural soils which could potentially pose a higher environmental risk. You may also impose restrictions on reuse activities depending on the constituents of concern in the foundry sand.

There are trade-offs you must confront when deciding whether to establish a waste classification system for the beneficial reuse of foundry sand. You will need to commit resources during program and regulatory development to establish the waste classification structure of the program. However, once the structure is implemented, it can streamline the process for reviewing and approving reuse activities. States that develop a waste classification system will have less flexibility than a case-by-case system to tailor restrictions based on the specific merits of the projects. To maintain appropriate risk levels in a waste classification scheme, you will need to establish constituent levels that are stringent enough to ensure environmental safety of all the possible reuse activities. A hybrid structure would require a case-by-case review if parameters in the classification program are exceeded.

Waste classification requires more resources for program development, but less for ongoing maintenance without sacrificing environmental protection.



States use different labels for each category of by-product in their waste classification scheme. These labels are assigned to constituent concentration thresholds. For example, in Illinois, the waste classification categories and corresponding maximum allowable leaching concentration thresholds for arsenic (used as an example) are as follows:

- Beneficially usable - 0.05 mg/L
- Potentially usable - 0.1 mg/L
- Low risk - 0.25 mg/L
- Chemical waste - > 0.25 mg/L

To qualify for any beneficial reuse activity, foundry sands must be categorized as "beneficially usable." However, foundry sand that falls within the three other classes must be landfilled, unless the generator files a "Petition for an Adjusted Standard."

Alternatively, states may use a simple numbering system to classify by-products that qualify for beneficial reuse. For example, in Indiana, the waste classification categories and corresponding maximum allowable leaching concentration thresholds for arsenic (used as an example) are as follows:

- Type I - 5.0 mg/L
- Type II - 1.3 mg/L
- Type III - 0.50 mg/L
- Type IV - 0.05 mg/L

Foundry sands that fall within Types III and IV have a variety of reuse options, as specified under Indiana Statute IC 13-19-3-7. Type I or Type II sands may be approved for some use on a case-by-case basis. Any type of foundry sand may be eligible for use as alternative daily cover at a municipal solid waste landfill.

Balancing Burden and Risk

The upfront burden associated with waste classification categories is high for agencies because staff will need to develop the system used to categorize waste. However, over time, this burden is reduced because the reviews of beneficial reuse activities do not require much staff time because determinations can easily be made given the waste's composition and the established categorization system.

In terms of determining risk, waste classification categories may not allow for the same level of scrutiny as case-by-case determinations because decisions are generally made with less information (i.e., waste composition data). Since there is less agency and industry burden in terms of project reviews, there may be less information available to determine risk. Therefore, you may want to consider this tradeoff when establishing the waste classification categories or allowable reuses.

Pros

WASTE CLASSIFICATION CATEGORIES

Can efficiently address a variety of foundry sand generators and multiple beneficial reuse activities, allowing you to tailor reuse to risks.

Standards are tailored to potential risks which may result in lower industry costs because generators or end-users may have less uncertainty when applying for reuse.

Links to States with Waste Classification Categories

Current as of July 2006.

Illinois Environmental Protection Agency (IEPA)—Waste Management Programs

http://www.epa.state.il.us/land/waste-mgmt/

Program Information:

- http://www.ipcb.state.il.us/documents/dsweb/Get/Document-12195/ *(See §817.105 and §817.106)*

Indiana Department of Environmental Management (IDEM)—Office of Land Quality

http://www.in.gov/idem/programs/land/

Program Information:

- http://www.ai.org/legislative/ic/code/title13/ar19/ch3.html#IC13-19-3-7
- http://www.in.gov/legislative/iac/T03290/A00100.PDF *(See 329 IAC 10-9)*
- http://www.in.gov/apps/idem/media/publications/ *(Type foundry sand in the keyword box)*

Texas Commission on Environmental Quality

http://www.tceq.state.tx.us/

Program Information:

- http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=335 *(See §335.1 (definitions of Class 1, 2, and 3 wastes), §335.505, §335.506, and §335.507)*

Wisconsin Department of Natural Resources—Waste Management Program

http://www.dnr.state.wi.us/org/aw/wm/solid/beneficial/index.html

Program Information:

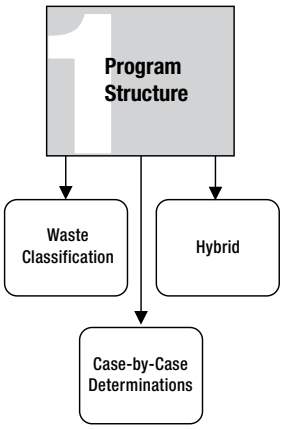
- http://www.legis.state.wi.us/rsb/code/nr/nr538.pdf *(See NR 538.08)*

Sample Regulatory Language

The Illinois Administrative Code provides an example of how waste classifications are incorporated into regulations.

Example excerpted from 35 Illinois Administrative Code Part 817, Requirements for New Steel and Foundry Sand Industry Wastes Landfills, Section 817.105

"a) Wastes . . . shall be classified on the basis of leaching potential as determined by the procedure at Section 817.103.

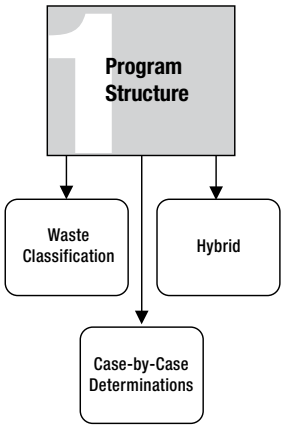


Cons

WASTE CLASSIFICATION CATEGORIES

You must dedicate FTEs and budget up front to develop the constituent lists, acceptable concentration levels for each category, and allowable reuses for each category. This will be a resource intensive process for the agency or their contractor.

You risk unintentionally allowing a beneficial reuse in a category that should not be allowed. To compensate, timely reporting requirements are recommended.



b) Wastes . . . shall fall into one of four classifications:
1) Beneficially usable waste;
2) Potentially usable waste;
3) Low risk waste; or
4) Chemical waste.

c) Maximum allowable leaching concentration (MALC) for the beneficially usable, potentially usable and low risk classes are presented in the table at Section 817.106. Wastes exceeding the MALCs for the low risk class shall be regulated as chemical wastes under 35 Ill. Adm. Code 811.Subpart C."

Current as of July 2006.

Your regulations may also include a table with the waste classification limits for each category and for each constituent. You should consider establishing constituents and cut-off levels based on your state's own assessments. Generally, states will include a table in their regulations with the constituents and maximum concentrations. (See Step 4 of the Roadmap and Toolkit for more details about how to develop sampling and testing requirements). Two rows from Illinois' table are presented below.

TABLE 1
Constituent Limits Excerpted from Illinois Waste Classification Regulations

Parameter	Beneficially Usable Wastes	Potentially Usable Wastes	Low Risk Wastes
Arsenic	0.05	0.1	0.25
Barium	2.0	2.0	5.0

Excerpted from 35 Illinois Administrative Code Part 817, *Requirements for New Steel and Foundry Sand Industry Wastes Landfills,* Section 817.106. *Current as of July 2006.*

Case-by-Case Determinations

Case-by-case determinations require careful review of beneficial reuse projects before they are initiated, and usually require significant ongoing agency resources to maintain the program in an efficient manner. Under this type of program, each end-user or generator submits an application to the agency describing the intended beneficial reuse and composition of the foundry sand. The state agency then examines whether or not the application meets the basic requirements and rejects or approves it.

To develop a program with case-by-case reviews, you would create a basic set of standards that all foundry sands must meet to be eligible for beneficial reuse. This type of program requires limited agency resources during program development. However, application review and approval may require a large outlay of agency expertise and time to review each application individually.

Pros

CASE-BY-CASE REVIEW

Requires limited agency resources to develop the regulations and program up front.

Likely to be less resource intensive in terms of ongoing project monitoring because agency personnel would become familiar with each reuse project, and uncertainties during the reuse period would likely be minimal.

A case-by-case approach to review and approve beneficial reuse activities may be appropriate for states that have few or no active foundries and who infrequently encounter requests for beneficial use approvals.

General Permit Option

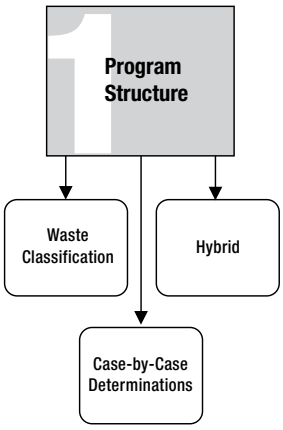
To address the potentially lengthy amount of time it could take to review numerous, similar beneficial reuse applications, some states have implemented "general permitting" programs. A general permitting scheme has some characteristics in common with case-by-case reviews. Similar to the case-by-case reviews, states receive applications from generators and end-users for specific reuse activities. The difference is that multiple qualified applicants are allowed to engage in that particular reuse once the general permit is issued.

The advantage of general permits is that you can allow multiple applicants to engage in specific beneficial reuse activities within one general permit, thus limiting the number of applications for review. A general permit can be specific to a byproduct or reuse activity. For example, one general permit might cover green sands from iron foundries only for use only in road embankments. Alternatively, a general permit may cover multiple foundry sand byproducts from multiple facilities. For example, any green (clay bonded) sands from iron, steel, or aluminum foundries could be used in road embankments.

Balancing Burden and Risk

The upfront burden associated with case-by-case reviews is low for agencies relative to waste classification categories. Staff need to develop regulations establishing the program, which is less burdensome than developing both a regulatory scheme and waste classification system. Over the course of program development and implementation, there will be greater burden than with a waste classification program because the case-by-case reviews of beneficial reuse activities require significant staff time.

In terms of determining risk, case-by-case determinations allow for a high level of scrutiny because decisions are generally made with detailed information, as required. Since there is higher agency and industry burden in terms of project reviews, there is generally more information available to help a state determine risk. Given these constraints on resources, if you choose to develop a general permitting program, you should consider developing regulations that are broad enough to accommodate a wide range of beneficial reuses while still being protective of human health and the environment.



Cons

CASE-BY-CASE REVIEW

Could restrict beneficial reuses to a small list that does not reflect the range of beneficial reuses that could keep foundry sands out of landfills.

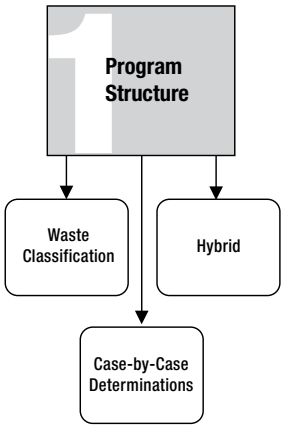
Links to States with Case-by-Case Determinations

Current as of July 2006.

Louisiana Department of Environmental Quality
http://www.deq.state.la.us/

Program Information

- http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v07.pdf *(See Chapter 11)*



Maine Department of Environmental Protection
http://www.maine.gov/dep/index.shtml

Program Information

- http://www.maine.gov/sos/cec/rules/06/096/096c418.doc *(See Section 7)*

Michigan Department of Environmental Quality—Waste
http://www.michigan.gov/deq/0,1607,7-135-3312---,00.html

Program Information

- http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=29904101&Dpt=EQ&RngHigh= *(See R 299.4114 – 4117 and R 299.4122)*

New York Department of Environmental Conservation—New York State Solid Waste Management Program
http://www.dec.state.ny.us/website/dshm/sldwaste/index.htm

Program Informaiton

- http://www.dec.state.ny.us/website/regs/subpart360_01.html *[See Section 360-1.15(d)]*

Pennsylvania Department of Environmental Protection—Municipal and Residual Waste

http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1238&Q=463452&landrecwasteNav=|31070|

Program Information

- http://www.pacode.com/secure/data/025/chapter287/025_0287.pdf *(Section 287.7)*

West Virginia—Office of Waste Management
http://www.dep.state.wv.us/item.cfm?ssid=10

New York's regulations contain language that is not specific to foundry sands. Instead, the State uses generic language for the reuse of any solid waste in a manufacturing process.

Sample Regulatory Language

New York's regulations contain language that is not specific to foundry sands. Instead, the State uses generic language for the reuse of any solid waste in a manufacturing process. The following example provides excerpted regulatory language from New York.

Example excerpted from 6 NYCRR Part 360 *Solid Waste Management Facilities*, Title 6 of the Official Compilation of Codes, Rules, and Regulations, Section 360-1.15

"(d) Case-specific beneficial use determinations.

(1) The generator or proposed user of a solid waste may petition the department, in writing, for a determination that the solid waste under

review in the petition may be beneficially used in a manufacturing process to make a product or as an effective substitute for a commercial product. Unless otherwise directed by the department, the department may not consider any such petition unless it provides the following:

[Specific requirements omitted for brevity.]

(2) The department will determine in writing, on a case-by-case basis, whether the proposal constitutes a beneficial use based on a showing that all of the following criteria have been met:

[Specific criteria omitted for brevity.]

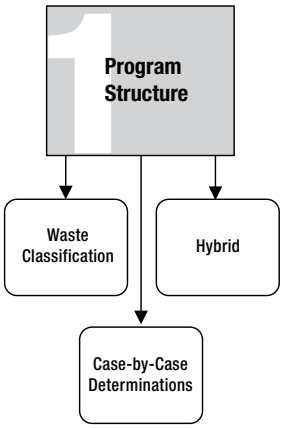
(3) The department will either approve the petition, disapprove it, or allow the proposed use of the solid waste under review subject to such conditions as the department may impose. When granting a beneficial use determination, the department shall determine, on a case-by-case basis, the precise point at which the solid waste under review ceases to be solid waste. Unless otherwise determined for the particular solid waste under review, that point occurs when it is used in a manufacturing process to make a product or used as an effective substitute for a commercial product or used as a fuel for energy recovery. As part of its petition, the petitioner may request that such point occur elsewhere. In such a request, the petitioner must include a demonstration that there is little potential for improper disposal of the material or little potential for the handling, transportation, or storage of the solid waste under review to have an adverse impact upon the public health, safety or welfare, the environment or natural resources."

Current as of July 2006.

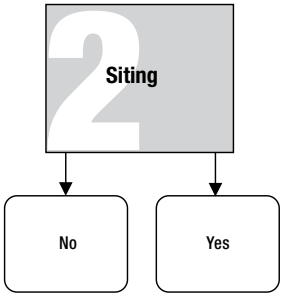
Pennsylvania's regulations provide an example of language used to establish a general permitting program for the beneficial reuse of foundry sand.

Example excerpted from Chapter 287 of the Pennsylvania Code, *Residual Waste Management - General Provisions*, Section 287.7

"(a) Beneficial use. As a term or condition of a general permit for the beneficial use of residual waste, the Department will make a determination that the waste which is beneficially used under the permit ceases to be a waste if it is used in accordance with the terms and conditions of the permit and does not harm or present a threat of harm to public health, safety, welfare or the environment.



A hybrid program structure allows you to establish waste classification categories for beneficial reuse activities while allowing generators and end-users to apply for other reuses that do not fall within the waste classification categories.



(b) Processing.

(1) As a term or condition of an individual or general permit for the processing of residual waste, the Department may make a determination that, subsequent to the processing activity, the processed waste ceases to be a waste even if it does not meet the requirements for a co-product.

(2) The Department will only make this determination if the applicant demonstrates the following to the Department's satisfaction:

(i) The waste will be used as an ingredient in a manufacturing or production process or as a substitute for a commercial product.

(ii) At a minimum, use of the waste will not:

(A) Harm or present a threat of harm to the health, safety or welfare of the people or environment of this Commonwealth through exposure to constituents of the waste.

(B) Present a greater harm or threat of harm than the use of the product or ingredient which the waste is replacing.

(iii) The physical character and chemical composition of the residual waste contributes to the usefulness of the product, and nothing in the physical character or chemical composition of the waste interferes with the usefulness of the product."

Current as of July 2006.

Pros

SITING RESTRICTIONS

Achieve higher level of environmental protection.

Reduce risk to sensitive populations or ecosystems through reuse of foundry sands in those adjacent areas.

Can increase awareness of other environmental standards that may apply to beneficial reuse and thereby improve overall regulatory compliance and environmental protection.

Streamlines approval by avoiding a situation where industry proposes reuse activities in locations that may later be rejected by the state upon review.

Hybrid Structure

Another available program option combines the structures of waste classification categories and case-by-case reviews. A hybrid program structure allows you to establish waste classification categories for beneficial reuse activities, while allowing generators and end-users to apply for other reuses that do not fall within the waste classification categories.

Therefore, you can establish a program that has both waste classification categories and case-by-case reviews. Such a program streamlines the review process for reuse activities that fall within waste classification categories, while remaining flexible by considering other reuse activities individually.

STEP 2 OF THE ROADMAP: Siting or Location Restrictions

States will likely have some areas deemed more sensitive than others due to environmental protection or public health concerns (such as wetlands). You can provide extra protection for these areas by establishing siting or location restrictions for confined and unconfined reuse activities.

The first step in developing siting restrictions is to consider local geography, geology, hydrology, weather, land use, et cetera, to identify the ecosystems and environments most susceptible to potential contamination by proper or improper use of otherwise reusable foundry sands. Using this information, you should then

consider the areas where, and the methods by which, unacceptable contamination or risks could occur, and identify the types of siting restrictions most appropriate to your state. For example, land application as a soil amendment over sandy soil with a shallow aquifer may not be appropriate. Alternatively, this reuse activity might be appropriate in areas with clay-based soil.

Some other states simply prohibit reuse in areas already listed as deserving special protection by another government agency.

MAINE **Maine's rules state that a beneficial reuse cannot be located in, on, or over any protected natural resource. In addition, the reuse cannot be located adjacent to, and manipulated in such a manner that materials could be washed into, any protected natural resource.**

ILLINOIS **does not list any specific geographical siting restrictions, but does require any potential end-user to demonstrate that the proposed activity will not cause an exceedance of the applicable groundwater quality standards for that area.**

Some states have created hybrid systems that require examination of potentially sensitive sites as part of the permitting process, but allow flexibility in permitting reuse.

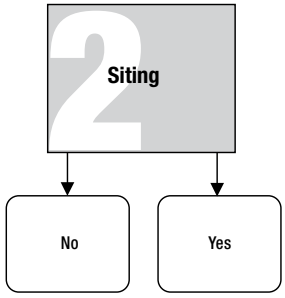
LOUISIANA, **a state with large swaths of ecologically sensitive wetlands, requires that applicants submit information on the environmental characteristics of land within 1,000 feet of the facility perimeter, with a particular emphasis on potable wells, groundwater, surface water, wetlands, floodplains, soil type, and other critical habitats. Applicants may receive a permit even if they discover and disclose these mitigating factors; however, they must meet a separate, more stringent set of restrictions.**

Another option for developing siting restrictions consists of combining waste classification categories and siting restrictions. It is possible that another agency within your state could introduce siting restrictions for projects that use foundry sands.

INDIANA **Indiana's Department of Transportation has adopted Special Provisions for foundry sand. These provisions only apply to INDOT projects, and are therefore not applicable to other projects that involve foundry sand, such as private projects or local government projects.**

Balancing Burden and Risk

The upfront burden associated with siting restrictions may be high for agencies because staff will need to develop the types of siting restrictions that are appropriate for the state. Over time, this burden is reduced because once the restrictions are



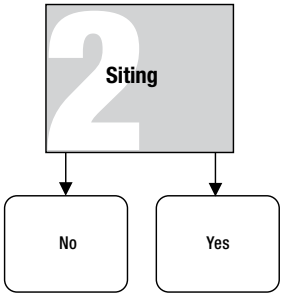
Cons

SITING RESTRICTIONS

Requires some agency time and resources.

Reduces beneficial reuse opportunities.

If poorly researched and implemented, may not adequately protect natural resources in some situations and may be unnecessarily restrictive in other situations.



established, generators and end-users must certify that proposed reuse activities are compliant with siting restrictions.

In terms of risk, siting restrictions may reduce the risk associated with beneficial reuse projects. The agency must dedicate some resources upfront to establish the restrictions, but this investment helps to protect against potential environmental degradation. This tradeoff is important to consider when establishing the siting restrictions.

If you do not develop specific siting restrictions, you should consider creating them on a case-by-case basis, looking at each project on its own merits. While this provides a low initial burden, it creates a larger agency burden than listed restrictions over time as the agency must more thoroughly examine every case for potential siting concerns.

Siting restrictions may reduce the risk associated with beneficial reuse projects. The agency must dedicate some resources upfront to establish the restrictions, but this investment helps to protect against potential environmental degradation.

Links to States with Siting Restrictions

Current as of July 2006.

Alabama Department of Environmental Management, Land Division
http://www.adem.state.al.us/LandDivision/LandDivisionPP.htm

Program Information

- http://www.adem.state.al.us/Regulations/Div13/D13Chapter%204.doc *(See Chapter 335-13-4-26)*

Louisiana Department of Environmental Quality
http://www.deq.state.la.us/

Program Information

- http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v07.pdf *(See Section 1107)*

Maine Department of Environmental Protection
http://www.maine.gov/dep/index.shtml

Program Information

- http://www.maine.gov/sos/cec/rules/06/096/096c418.doc *(See 06-096 Chapter 418 Section 3[E])*

Pennsylvania Department of Environmental Protection—Municipal and Residual Waste

http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1238&Q=463452&landrecwasteNav=|31070|

Program Information

- http://www.pacode.com/secure/data/025/chapter287/025_0287.pdf *[See 287.101(e)(6)]*

Tennessee Department of Environmental Conservation—Division of Solid and Hazardous Waste Management
http://www.state.tn.us/environment/swm/

Program Information

- http://tennessee.gov/environment/swm/pdf/SWPolicyManual.pdf *(See page 97)*

West Virginia—Office of Waste Management
http://www.dep.state.wv.us/item.cfm?ssid=10

Wisconsin Department of Natural Resources—Waste Management Program
http://www.dnr.state.wi.us/org/aw/wm/solid/beneficial/index.html

Program Information

- http://www.legis.state.wi.us/rsb/code/nr/nr538.pdf (See NR 538.04)

Sample Regulatory Language

The following regulatory language from Alabama's Solid Waste Program Permit Requirements does not allow reuse at certain sites under any circumstances.

Example excerpted from Solid Waste Program Administrative Code Chapter 335-13-4-26, *Requirements for Management and Disposal of Special Waste*

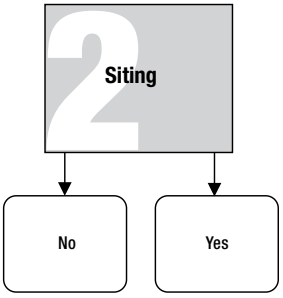
"(3) Disposal requirements for foundry wastes. Foundry waste which exhibits less than 50 percent of each of the TC Levels for metals as defined by the USEPA's Toxicity Characteristic Leaching Procedure (TCLP) may be managed in the following manner:
(a) Foundry waste may be managed in areas other than
1. Flood Plains;
2. Wetlands;
3. Residential zones; or
4. Areas less than 5 feet above the uppermost aquifer."

Current as of July 2006.

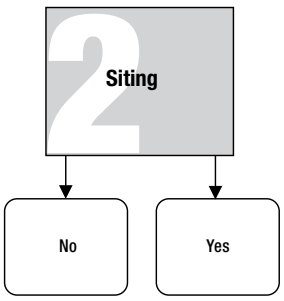
Maine's "Solid Waste Management Rules: Beneficial Use of Solid Wastes" (06-096 Chapter 418) includes the State's siting restriction based on a previous agency designation.

Example excerpted from 06-096 Chapter 418 Section 3[E]

"A beneficial use activity may not be located in, on, or over any protected natural resource or be located adjacent to and operated in such a manner



Regulatory language from Alabama's Solid Waste Program Permit Requirements does not allow reuse at certain sites under any circumstances.



that material or soil may be washed into any protected natural resource unless approved pursuant to 38 M.R.S.A. Section 480-A et seq."

Current as of July 2006.

Louisiana has two-pronged regulatory language, with one part asking for detailed information concerning the site of potential reuse, but theoretically allowing reuse to happen even if sensitive areas are located within 1,000 feet of the facility.

Louisiana has two-pronged regulatory language, with one part asking for detailed information concerning the site of potential reuse, but theoretically allowing reuse to happen even if sensitive areas are located within 1,000 feet of the facility.

Example excerpted from Title 33, Environmental Quality Part VII, Solid Waste, Subpart 1. Solid Waste Regulations, December 2004, Section 1107

"A. Location Characteristics. Standards pertaining to location characteristics are contained in LAC 33:VII.1109.A.

1. Area Master Plan. A location map showing the facility, major drainage systems, drainage flow patterns, location of the 100-year floodplain, and other pertinent information. The scale of the maps and drawings must be legible, and engineering drawings are required.
2. Environmental Characteristics. The following information is required:
   a. a list of all known recreation areas, designated wildlife management areas, swamps and marshes, wetlands, habitat for endangered species, and other sensitive ecologic areas within 1,000 feet of the facility perimeter or as otherwise appropriate;
   b. documentation from the appropriate state and federal agencies substantiating the recreation areas, designated wildlife management areas, wetlands, habitat for endangered species, and other sensitive ecologic areas within 1,000 feet of the facility; and
   c. a map showing the locations of all known locations of all public water systems, industrial water wells and irrigation wells within 1 mile of the facility."

Current as of July 2006.

However, Louisiana end-users must comply with the following hydrology provisions:

Example excerpted from Title 33, *Environmental Quality Part VII, Solid Waste, Subpart 1. Solid Waste Regulations*, December 2004, Section 1107

"C. Facility Surface Hydrology. The following standards regarding surface hydrological characteristics apply to beneficial-use facilities. . . .

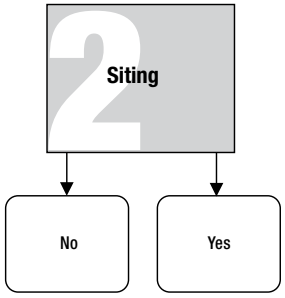
4. Wastes shall not be surface-applied within 100 feet of clean water ponds, lakes, or the 10-year high water mark for streams. In this 100-foot zone wastes must be injected.

5. Wastes shall not be applied within 300 feet of drinking water wells, irrigation wells, or industrial water supply wells.

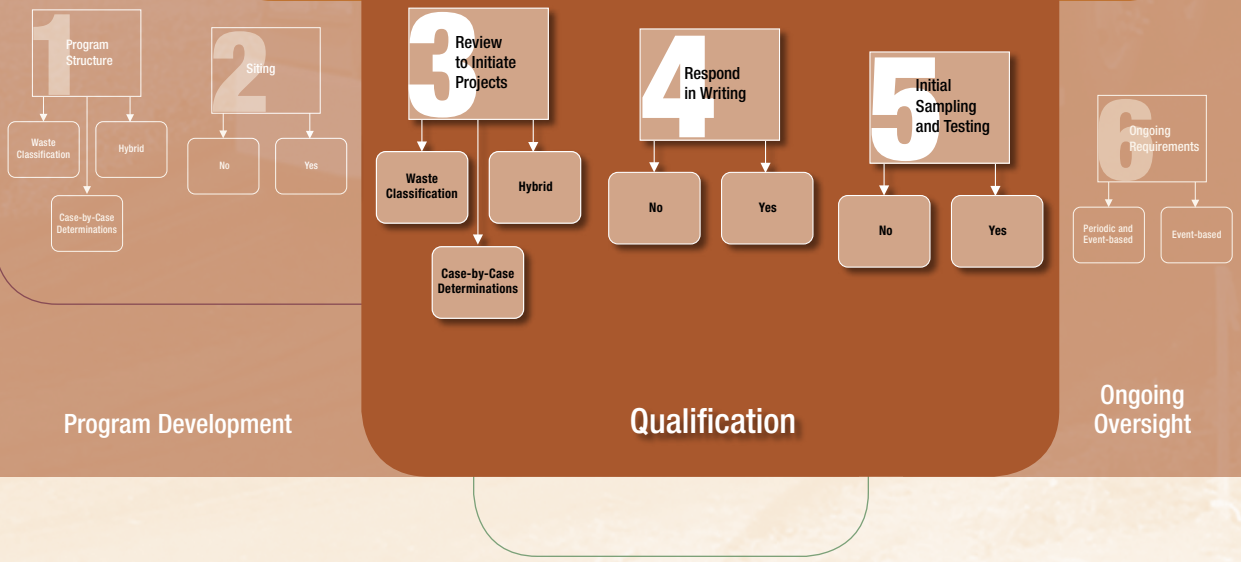
[Language omitted for brevity.]

E. Facility Subsurface Hydrology. The following standard applies to subsurface hydrology for beneficial-use facilities: The facilities shall be located in a hydrologic section where the historic high water table is at a minimum of a 3-foot depth below the zone of incorporation, or the water table at the facility shall be controlled to a minimum of a 3-foot depth below this zone."

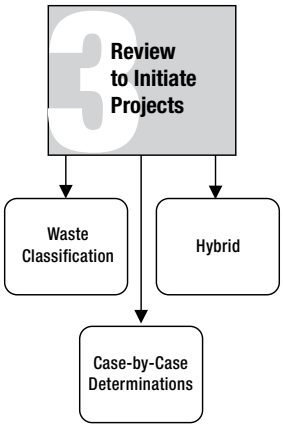
Current as of July 2006.



4 | Qualification



This section of the Toolkit addresses program processes that help states approve and generators or end-users initiate reuse activities. Proposed reuse activities must meet qualification requirements based on some level of State Review (Step 3), State Approval (Step 4), and Initial Sampling and Testing (Step 5).



STEP 3 OF THE ROADMAP: State Review Needed to Initiate Projects

Step 3 of the Roadmap identifies the types of state review processes that you may consider: waste classification, case-by-case determinations, and a hybrid review structure. This section of the Toolkit describes these options in detail.

Your choice in Step 3 will directly correlate to the choice you make in Step 1 of the Roadmap. The burden implications of Step 3, however, are significantly different from the burden implications of Step 1. When choosing a program structure in Step 1 and associated type of state review in Step 3, you should weigh the initial burdens of program setup against the ongoing burdens of reuse project review and approval. For example, the short-term (initial) burdens associated with Step 1 indicate that a waste classification structure is more burdensome to develop than a case-by-case determination structure. However, as explained in Step 3, the long-term (ongoing) implementation of a waste classification structure is less burdensome than the implementation of a case-by-case determination structure. As you review Step 3, consider your state's ability to commit the time and resources required for reviews under each program option. Your decision will have significant implications for your beneficial reuse program as agency resources are allocated to review reuse projects throughout the coming years.

When choosing a program structure in Step 1 and associated type of state review in Step 3, you should weigh the initial burdens of program setup against the ongoing burdens of reuse project review and approval.

Waste Classification

As discussed in Step 1, waste classification categories are defined by a range of constituent concentration thresholds which are matched with specific reuses.

A program stucture with waste classification categories can streamline the beneficial reuse project review and approval process. Once the waste categorization scheme is established during program development (see Step 1 of the Toolkit), your review of project proposals from generators or end-users may be as simple as reviewing the constituent concentrations detected in the foundry sand to ensure that they are within the parameters of the pre-determined category. This less burdensome review would confirm that the generator or end-user categorized the foundry sand properly and, therefore, the proposed reuse activities may proceed.

Pros

WASTE CLASSIFICATION

May reduce the timeframe to grant approvals (addressing a significant barrier to increased reuse), so generators and end-users may be more likely to participate.

Application reviews involve evaluating initial sampling and testing data and matching the foundry sand's constituent concentrations with the waste classification categories. This process is less labor-intensive.

INDIANA

In Indiana, if a generator or end-user proposes reuse activities for foundry sands that do not meet Type III constituent concentration thresholds, then the Indiana Department of Environmental Management (IDEM) reviews the application on a case-by-case basis. These reviews are authorized under 329 IAC 10-3-1(16), which states, "Any other use of solid waste approved by the commissioner based on the commissioner's determination that the use is a legitimate use that does not pose a threat to public health or the environment." Indiana does not have a regulatory definition for legitimate use. Instead, IDEM considers the merits of the reuse activity and asks questions, such as:

- **Is the foundry sand an effective substitute?**
- **Does the foundry sand meet product/material specifications?**
- **Is there valid research to support the reuse?**
- **Are there engineering and project plans?**
- **What physical tests have been performed?**

CASE STUDY 1

State Review of Reuse Projects with Waste Classification Categories in Wisconsin

In Wisconsin, the generator of the foundry sand submits a form with test results to the Department of Natural Resources (DNR). The applicant is required to characterize the foundry sand according to the initial sampling and testing requirements outlined in the regulation. Once the testing is complete, the generator compares the results to the waste classification categories and the corresponding constituent concentration thresholds to identify allowable reuse activities. Then, a short form is submitted to the DNR with information such as the name of the generator, the amount of foundry sand generated, the planned reuse activities, and the testing results.

When the Wisconsin DNR receives the form, a quick review may be performed. There are five program staff members, plus one coordinator, who work in regional offices around the state. The work conducted by these six individuals, however, amounts to 1.25 position equivalents. While the ongoing labor resource commitment is small, Wisconsin spent more time developing the categories up-front and ensuring that they are adequately protective.

Generally, the information provided by generators is complete and correct. The DNR does not submit any written approval to the generator. If asked by the generator, they will place a call or send an e-mail to the generator stating their approval. The turn-around time is immediate upon submittal of the information. The process is self-certifying for the most part.

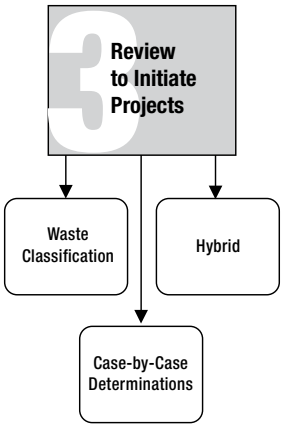
Wisconsin's hybrid structure allows for case-specific reviews when (1) the proposed reuse activity is outside the scope of the regulation, and (2) the source of the foundry sand is not one that is specified in the regulation (i.e., aluminum foundry).

Approximately 5 percent of all approvals conducted by Wisconsin are case-specific reviews. The generator has to submit a written request, which could be as short as two paragraphs long. This request includes information such as the name of the generator, the amount of foundry sand generated, the planned reuse activities, and the testing results. Depending on the complexity of the proposal, the state may require additional information, such as a description of the hydrogeology at the proposed reuse site. Following a review of the submitted information, the state writes up a formal exemption in response. At the most, these case specific reviews take 30 business days to complete.

Balancing Burden and Risk

The ongoing burden associated with waste classification categories is low as compared to case-by-case determinations because the reviews of beneficial reuse activities do not require much staff time. Waste classification determinations can easily be made given the waste's composition and the established categorization system.

In terms of determining risk, waste classification categories may not allow for the same level of scrutiny as case-by-case determinations because decisions are generally made with less information (i.e., waste composition data). Since there is less agency and industry burden in terms of project reviews, there may be less information available to determine risk.



Links to States with Waste Classification Categories

Page 19 in Step 1 of the Toolkit lists those states with beneficial reuse programs that have waste classification categories.

Sample Regulatory Language

Step 1 of the Toolkit provides sample regulatory language from the Illinois Administrative Code, which is an example of how waste classifications are incorporated into regulations (see page 19).

Case-by-Case Determinations

As discussed in Step 1 of the Toolkit, case-by-case determinations require careful review of beneficial reuse projects before they are initiated, and usually require significant ongoing agency resources to maintain the program in an efficient manner. Under this type of program, each end-user or generator submits an application to the agency describing the intended beneficial reuse and composition of the foundry sand. The state agency then examines whether or not the application meets the basic requirements and rejects or approves it. This application review and approval process may require a large outlay of agency expertise and time to review each application individually.

General Permit Option

To address the potentially lengthy amount of time it could take to review numerous, similar beneficial reuse applications, some states have implemented "general permitting" programs. A general permitting scheme has some characteristics in common with case-by-case reviews. Similar to the case-by-case reviews, states receive applications from generators and end-users for specific reuse activities. The difference is that multiple qualified applicants are allowed to engage in that particular reuse once the general permit is issued. The advantage of general permits is that you can allow multiple applicants to engage in specific beneficial reuse activities within one general permit, thus limiting the number of

Cons

WASTE CLASSIFICATION

You risk unintentionally allowing a beneficial reuse in a category that should not be allowed. To compensate, timely reporting requirements are recommended.

Pros

CASE-BY-CASE REVIEWS

Likely to be less resource intensive in terms of ongoing project monitoring because agency personnel would become familiar with each reuse project, and uncertainties during the reuse period would likely be minimal.

applications for review. The following case study details Pennsylvania's general permitting program design.

New York requires written approval on a case-by-case basis for reuse of foundry sand. The New York Department of Environmental Conservation (NYDEC) grants beneficial use determinations (BUDs) on a project-specific basis. To petition for a BUD for foundry sand, the generator or end-user must submit to DEC:

(1) A description of the waste and the proposed reuse;

(2) A demonstration that the management of the solid waste will not adversely affect human health and safety, the environment, and natural resources;

(3) A solid waste control plan, including, but not limited to, procedures for periodic testing of the solid waste and proposed product; and

(4) Assurance that for foundry sand used in a manufacturing process, the foundry sand must not require decontamination or special handling or processing before incorporation.

Maine issues general permits that allow end-users to receive by-products, like foundry sand, from generators without additional approval from the State.

CASE STUDY 2

State Review of Reuse Projects with General Permits in Pennsylvania

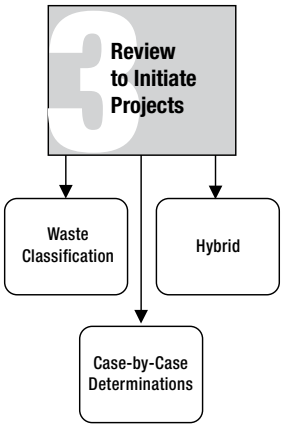
In Pennsylvania, the generator of the foundry sand or the proposed end-user can apply for a general permit. The applicant is required to characterize the foundry sand and suggest constituent concentration thresholds. When the Pennsylvania Department of Environmental Protection (PADEP) receives the application, one person from a team of three staff performs an administrative review to determine if all required information is included. If the application is complete, then the permit request is published in the Pennsylvania Bulletin (equivalent to the Federal Register) to announce that the application was received by the state.

Once the bulletin is published, there is a 60-day public comment period. During and after the public comment period, PADEP conducts a technical review on the chemical analysis and management plan submitted by the applicant. Once this review is done, PADEP makes a decision to approve or deny the general permit. PADEP has 160 days to make a decision on the application.

Once a general permit is approved, PADEP allows other generators or end-users to apply for reuse activities under the permit. This type of application by additional generators or end-users, called a "determination of applicability," takes less agency time to review than new permit applications, but the applicant must complete the same forms as those applying for an initial general permit application. The generator or end-user must receive written approval from the State before initiating their beneficial reuse project, however, applicants have a higher degree of certainty that their projects will be approved.

Pennsylvania issues general permits that cover a particular reuse and any producer of waste material meeting the specified thresholds can apply to join the permit.

Louisiana In Louisiana, most approvals are on a case-by-case basis, but a permit can be issued for a specific reuse at multiple locations of waste material from multiple sources.



Balancing Burden and Risk

For states with case-by-case determinations, the project review and approval process will result in a greater burden than those states with a waste classification program. Case-by-case reviews of beneficial reuse activities require significant staff time because states must collect and review more documentation on the proposed reuse activities.

In terms of determining risk, case-by-case determinations allow for a high level of scrutiny because decisions are generally made with detailed information, as required. However, waste classification systems can be designed with constituent levels that are stringent enough to ensure that the by-products could not pose a risk when reused. With appropriate documentation for each by-product waste stream, the classification system could be tailored to individual waste streams.

Links to States with Case-by-Case Determinations

Page 21 in Step 1 of the Toolkit lists those states with beneficial reuse programs that have case-by-case reviews.

Sample Regulatory Language

Step 1 of the Toolkit provides sample regulatory language from New York and Pennsylvania (see page 22). Both of these states review proposed reuse activities on a case-by-case basis.

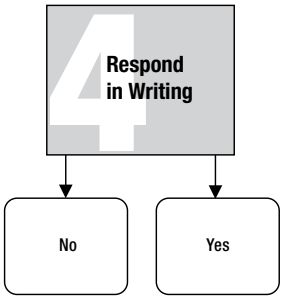
Hybrid Structure

As discussed in Step 1 of the Toolkit, the hybrid review structure combines the structures of waste classification categories and case-by-case reviews. A hybrid structure allows you to review certain by-products and reuse activities within a waste classification scheme, while allowing case-by-case reviews for other reuses that do not fall within the waste classification categories. This type of structure streamlines the review process for reuse activities that fall within waste classification categories, while remaining flexible by considering other reuse activities individually. Case Study #1 on page 32 explains how Wisconsin implements a hybrid structure in some cases.

Cons

CASE-BY-CASE REVIEWS

Resource intensive for agencies during the approval process because of the time and staff or contractor expertise needed to review each permit application on an ongoing basis.



STEP 4 OF THE ROADMAP: State Approval for Beneficial Reuse of Foundry Sands

Step 4 of the Roadmap presents the options for state approval before generators or end-users initiate reuse projects. This section describes those options in detail.

Written State Approval

To initiate reuse activities, you may require generators or end-users of foundry sand to gain written state approval. Several types of program options may require written approval, such as case-by-case review programs, general permits, and waste classification categories, as discussed in Steps 1 and 3 of this Toolkit. When written approval is required, unlike with waste exemptions and prior notice, generators or end-users may not initiate reuse activities until they receive written notification back from the state.

As you design your program, you should be cognizant of the amount of time state approval will take. Your approval will be based on a review of the generator or end-user's application. These application reviews vary depending on your program design. A waste classification program typically requires a relatively short review of the foundry sand's constituent concentration levels to ensure that they fall within the state's limits. Case-by-case determinations typically require states to conduct a comprehensive review to evaluate all aspects of the application. The latter example often takes longer to complete. The length of time it takes a state to complete the review and approve the reuse activity may affect industry's willingness to participate. You should consider this factor as you design your state's beneficial reuse program.

Balancing Burden and Risk

This program option results in agency burden due to the staff time required to respond to beneficial reuse proposals, particularly for programs that require case-by-case reviews. Since you have the opportunity to review each proposed reuse activity, the risk associated with reuse activities may be determined. Designing a program with state approval may be most appropriate for states who want to closely track and control foundry sand beneficial reuse activities. Also, depending on the amount of information gathered upfront, you may be able to reduce ongoing oversight activities because there is less uncertainty, and therefore potential risk, associated with the reuse activities.

Pros

WRITTEN APPROVAL REQUIREMENT

Ongoing compliance monitoring and enforcement activities may be less time consuming, because your agency will gain a better understanding of proposed reuse activities during the application review process.

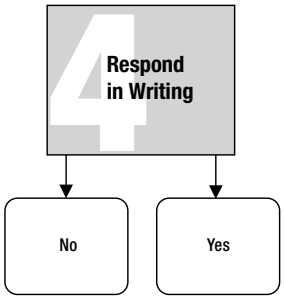
Reviewing and approving each application provides a higher level of oversight.

May allow for a greater variety of reuse activities if they have the opportunity to review and approve each application.

You may be able to tailor compliance monitoring and enforcement activities according to a project's relative "risk."

PENNSYLVANIA

In Pennsylvania, once written approval of a general permit is granted, the state generally does not require periodic monitoring activities. The applicant simply must certify each year that the process producing the foundry sand has not changed.



Links to States with Written Approval

Current as of July 2006.

Louisiana Department of Environmental Quality

http://www.deq.state.la.us/

Program Information:

- http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v07.pdf *(See Section 1103)*

Maine Department of Environmental Protection

http://www.maine.gov/dep/index.shtml

Program Information:

- http://www.maine.gov/sos/cec/rules/06/096/096c418.doc (See Section 7)

Michigan Department of Environmental Quality—Waste

http://www.michigan.gov/deq/0,1607,7-135-3306_28609---,00.html

Program Information:

- http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=29904101&Dpt=EQ&RngHigh= *(See R 299.4111)*

New York Department of Environmental Conservation—New York State Solid Waste Management Program

http://www.dec.state.ny.us/website/dshm/sldwaste/index.htm

Program Information:

- http://www.dec.state.ny.us/website/regs/subpart360_01.html [See Section 360-1.15(d)]

Pennsylvania Department of Environmental Protection—Municipal and Residual Waste

http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1238&Q=463452&landrecwasteNav=|31070|

Program Information:

- http://www.pacode.com/secure/data/025/chapter287/025_0287.pdf *(See Section 287.101)*

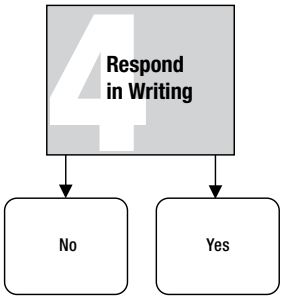
Cons

WRITTEN APPROVAL REQUIREMENT

Without waste classification program, may require significant state resources to review applications and provide written approval. These reviews are labor-intensive, and require commitments of agency staff time and expertise.

Will be more successful when the reviews are conducted expeditiously. Industry may be less willing to participate in reuse activities if the approval process takes too long.

Depending on the review criteria, the application process may require significant resources to gain state approval for industry.



State programs that use waste classification categories, which are discussed in Steps 1 and 3 of the Toolkit, are often paired with the prior notice or waste exemption program design options.

West Virginia—Office of Waste Management
http://www.dep.state.wv.us/item.cfm?ssid=11

Sample Regulatory Language

New York, a state with case-by-case determinations for the beneficial reuse of foundry sand, requires written approval for proposed activities.

Example excerpted from 6 NYCRR Part 360 *Solid Waste Management Facilities*, Title 6 of the Official Compilation of Codes, Rules, and Regulations, revised November 24, 1999

"(d) Case-specific beneficial use determinations.
(2) The department will determine in writing, on a case-by-case basis, whether the proposal constitutes a beneficial use based on a showing that all of the following criteria have been met: [Specific criteria omitted for brevity.]."

Current as of July 2006.

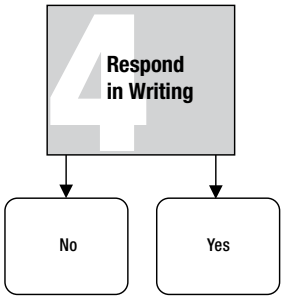
No Written State Approval

Streamlined approval processes like prior notice and waste exemptions, discussed below, do not require written state approval before a generator or end-user can initiate a beneficial reuse project. Streamlined approval options also provide a shorter and more predictable timeframe for the generator or end-user who wishes to initiate the beneficial reuse project. In addition, a streamlined approval process provides added certainty of project acceptance because of the explicit criteria that are included in regulations. State programs that use waste classification categories, which are discussed in Steps 1 and 3 of the Toolkit, are often paired with the prior notice or waste exemption program design options. The absence of written approval may also reduce the burden on states since they are not required to respond in writing to generators or end-users.

ALABAMA **In Alabama, prior to reuse, an applicant must "certify" the foundry waste by submitting a completed Solid/Hazardous Waste Determination Form and a Toxicity Characteristic Leaching Procedure (TCLP) analysis for metals. No response or approval from the state is required.**

This program design option, however, does not preclude the state from requiring reporting on the proposed reuse activities. Under this option, you may develop a beneficial reuse program which requires the applicant to report information regarding the proposed reuse activities. In return, you are not required to send written approval before the generator or end-user initiates the reuse activities.

Wisconsin has a prior notice approval process. The first step for generators or end-users who wish to participate in Wisconsin's program is to characterize the foundry sands that will be reused. The applicant sends the characterization results to the Department of Natural Resources and, for most beneficial reuses allowed under Wisconsin's rule, can immediately proceed with the beneficial reuse project without written specific departmental approval.



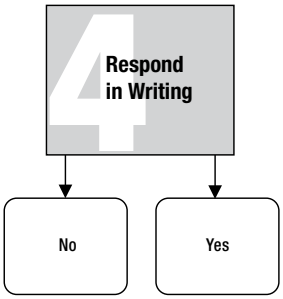
Streamlined approval may be most appropriate for states with foundry sand byproducts (1) that are relatively consistent in their waste constituents and concentrations, and (2) will consistently meet risk criteria. One option is to allow no state approval for safer beneficial reuse activities and require state approval for borderline risk projects.

Prior notice from generator or end-user

If you are interested in streamlined approval processes, it is recommended that you also consider a prior notice system. Under this option, states allow foundry sand beneficial reuse activities to proceed only after the state receives prior notification detailing the proposed reuse activities. If you were to choose the prior notice option, typically, the generator or end-user of the foundry sand only needs to notify you in writing before beneficial reuse activities commence. The prior notice application is generally a short form that does not require much information. You are not required to approve the activity and the applicant can initiate beneficial reuse within a certain period of time if the applicant does not receive a state response.

Prior notice, however, provides you with the opportunity to object, question, or deny the applicant regarding their reuse plans. This program design option also allows you to track and document reuse activities from the beginning. If a proposed reuse activity does not comply with your state requirements, then you have the option to respond to the generator or end-user and prevent the project before it begins. Therefore, a prior notice system with no state approval does not compromise risk determinations; rather, it allows for a streamlined review with the opportunity to stop projects that are too risky. As a result, you have more upfront oversight over proposed reuse activities in the state than with the waste exemption option. Unlike the waste exemption approach, prior notice requires agency or contractor resources to review each notification within a time constraint. If the agency's review is not completed before the deadline, then the reuse activities will commence.

Streamlined approval may be most appropriate for states with foundry sand byproducts (1) that are relatively consistent in their waste constituents and concentrations, and (2) will consistently meet risk criteria.



Pros

NO WRITTEN APPROVAL

Requires fewer agency and industry resources for project initiation than any other program type.

Initial application or notification requirements are relatively minimal and less burdensome on the generator or end-user.

OHIO

In Ohio, industrial waste material can be reused to manufacture another product without prior notification if it meets leachate thresholds equivalent to 30 times the state drinking water standards (DWS). In this case, the State does not even require an application or notification before the generator or end-user initiates beneficial reuse. However, to be reused in construction of roads and parking lots, the waste must meet leachate thresholds equivalent to five times the Ohio DWS.

Waste exemption

One streamlined approval process you might consider is a waste exemption approach, which requires little state involvement for a generator or end-user to initiate a beneficial reuse project. Under this option, the state would grant an exemption from non-hazardous industrial waste management requirements when the foundry sand meets specified, stringent thresholds. Several states provide waste exemptions under limited conditions.

Waste exemptions for the allowable reuses do not require state resources to initially review proposed reuse activities. The tradeoff, however, is that the state does not have a strong oversight position. If you were to choose this type of approval option, it is likely that you will not be aware of all of the reuse activities underway in your state. One way to address this situation would be to establish ongoing recordkeeping and reporting requirements, which are discussed in Step 6 of the Roadmap and Toolkit. By implementing such requirements, you may monitor a generator's or end-user's foundry sand reuse activities. Compliance monitoring and enforcement is an important program component to ensure environmental protection.

ILLINOIS

In Illinois, if foundry sand meets leachate concentration thresholds, it can be reused without notifying the State. Waste exemptions, however, do not apply to reuse of the sand in a land application.

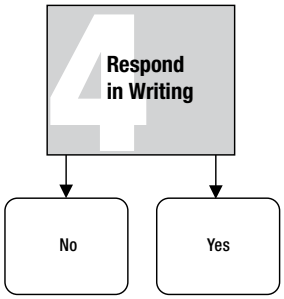
Another approach to address the reduced oversight associated with waste exemptions is to establish waste characteristics (e.g., source and constituent concentrations) and limit exemptions to specific beneficial reuses (e.g., reuse as a commercial material). Illinois and Tennessee are examples of states with these types of waste exemptions.

Balancing Burdens and Risk

As the pros and cons above indicate, a no written approval program results in very little upfront agency burden; however, you might not have sufficient information to determine where reuse activities exist and whether they present a risk. This program design approach may be appropriate for reuse activities that may be considered consistent and "safe" (i.e., in manufactured products like cement, asphalt, and concrete products).

To balance the burden and risk, you may want to develop a program that requires end-users and/or generators to report their activities to the state. With such a system in place, you can more effectively track and check on foundry sand reuse activities around the state.

In addition, you may be more restrictive with regard to allowable reuses under a streamlined process with no written agency approval. Such restrictions can limit the program's success in maximizing the amount of reused foundry sand unless different rules are developed for other planned reuses. If you want to broaden your program's reuse options, no written prior approval is best combined with written approvals for higher risk projects.



Links to States with No Written Approval

Current as of July 2006.

Alabama Department of Environmental Management, Land Division
http://www.adem.state.al.us/LandDivision/LandDivisionPP.htm

Program Information:

- http://www.adem.state.al.us/Regulations/Div13/D13Chapter%204.doc *(See Section 335-13-4-26)*

Illinois Environmental Protection Agency (IEPA)—Waste Management Programs
http://www.epa.state.il.us/land/waste-mgmt/

Program Information:

- http://www.ipcb.state.il.us/documents/dsweb/Get/Document-12195/ (See Section 817.203)

Indiana Department of Environmental Management (IDEM)—Office of Land Quality
http://www.in.gov/idem/programs/land/

Program Information:

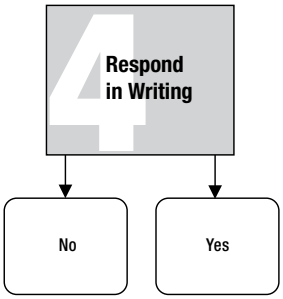
- http://www.ai.org/legislative/ic/code/title13/ar19/ch3.html#IC13-19-3-7
- http://www.in.gov/legislative/iac/T03290/A00100.PDF *(See 329 IAC 10-9)*
- http://www.in.gov/apps/idem/media/publications/ *(Type foundry sand in the keyword box)*

Cons

NO WRITTEN APPROVAL

May require more intensive ongoing agency work to compensate for the lack of an initial agency review.

An ongoing monitoring and enforcement program is essential to ensure industry compliance. This is particularly important with a waste exemption program, because the state does not collect any information about beneficial reuse activities prior to project commencement.



Illinois' beneficial reuse regulations allow generators or end-users to reuse foundry sand without gaining state approval (waste exemption).

Tennessee Department of Environmental Conservation—Division of Solid and Hazardous Waste Management
http://www.state.tn.us/environment/swm/

Program Information:

- http://tennessee.gov/environment/swm/pdf/SWPolicyManual.pdf *(See page 97)*

Texas Commission on Environmental Quality
http://www.tceq.state.tx.us/

Program Information:

- http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=335
- http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-387_202378.pdf *(See page 27)*

Wisconsin Department of Natural Resources—Waste Management Program
http://www.dnr.state.wi.us/org/aw/wm/solid/beneficial/index.html

Program Information:

- http://www.legis.state.wi.us/rsb/code/nr/nr538.pdf *[See NR 538.13(1).]*

No Written Approval—Sample Regulatory Language

Illinois' beneficial reuse regulations allow generators or end-users to reuse foundry sand without gaining state approval (waste exemption).

Example excerpted from 35 *Illinois Administrative Code Part 817, Requirements for New Steel and Foundry Sand Industry Wastes Landfills*, Section 817.203(a)

"The generator of wastes . . . shall certify that the waste sent to an offsite beneficial use meets the . . . requirements for beneficial waste. A copy of the certification shall be attached to the Bill of Lading for each shipment."

Current as of July 2006.

Illinois' regulations continue with a requirement that generators submit detailed information to the State regarding each recipient of the foundry sand. Even though Illinois has a waste exemption program, this provision gives the State information needed to oversee reuse activities.

Example excerpted from 35 Illinois Administrative Code Part 817, *Requirements for New Steel and Foundry Sand Industry Wastes Landfills*, Section 817.203(b)

"b) The generator of wastes . . . shall submit the following information to the Agency for each new recipient of the waste and for each new use location:

1) A detailed description of the process generating the material;
2) A demonstration that the proposed material handling activity will not cause a release or threat of release of contaminants to the air or water that will exceed standards promulgated by the Board or would adversely affect or impact human health or the environment;
3) A physical description of the waste stream. This description should include information on size, shape, form, particle size, and volume of the waste;
4) The analytical results of the leaching test completed pursuant to Section 817.103;
5) A physical analysis of the waste including percent moisture, ignitability, corrosivity, solubility, and reactivity;
6) Groundwater monitoring data, if available; and
7) A description of the proposed use or reuse activity and site including location, special handling instructions, and estimated usage timetable."

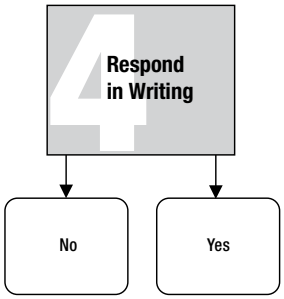
Current as of July 2006.

Wisconsin's regulations demonstrate the State's prior notice requirements.

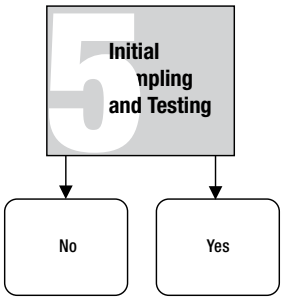
Example excepted from Chapter NR 538, Wisconsin Administrative Code, December 1997, ***Beneficial Use of Industrial Byproducts***, Section NR 538.13(1)

"INITIAL CERTIFICATION. Prior to beneficial use of industrial byproducts . . . or the establishment of a storage facility . . . each generator, storage facility operator, or their designee shall submit an initial certification form to the department that contains the information listed below. An initial certification form shall be submitted prior to beneficial use in accordance with this chapter for any industrial byproducts not previously classified, for any industrial byproduct for which the classification has changed or for the establishment of a storage facility for industrial byproducts. The initial certification form shall include the following information:

(a) Name and address of generator or storage facility operator.
(b) Name, address and telephone number of designated generator or storage facility operator contact.
(c) A description of each industrial byproduct intended for beneficial use or storage that clearly identifies the process that generated it and an estimate of the volume that could be made available for beneficial use on an annual basis.



Wisconsin's regulations demonstrate the State's prior notice requirements.



(d) The classification of each industrial byproduct to be beneficially used or stored for beneficial use. . . . Documentation, including test results supporting the classification, shall be included. Storage facilities may provide the name and address of the generators of the industrial byproducts to be stored as an alternative to this documentation.

(e) Authorization for Wisconsin department of natural resources staff to conduct inspections of the facilities generating industrial byproducts being beneficially used under this chapter or storage facilities for these industrial byproducts, and collect samples to verify compliance with this chapter.

(f) Certification by each generator, storage facility operator or their designee, that the information on the form is true and accurate, and that the performance standards . . . will be met."

Current as of July 2006.

Step 5 of the Roadmap: Initial Sampling and Testing

A critical component of a beneficial reuse program for foundry sands is initial sampling and testing of the foundry sand to characterize the materials before a beneficial reuse project is initiated. Although you have the option to not require initial sampling and testing, we strongly recommend it. A chemical characterization of the foundry sand helps to assess the impact of its beneficial reuse on human health and the environment. If you want to pre-establish testing requirements for industry to follow, then you will need to decide which constituents to include in testing and what concentration limits must be met.

States require an initial characterization of the foundry sand to demonstrate that it qualifies as non-hazardous. To complete the characterization, states generally require a leachate test, with toxicity characteristic leaching procedure (TCLP) being the most frequently specified test. Alternatively, states may use the synthetic precipitation leaching procedure (SPLP). For example, Florida recommends the SPLP because they believe it is a better test for leaching conditions in their state. You may also want to require an analysis of the composition of the waste itself, which entails a totals analysis. You may require a sampling and analysis plan (SAP) consistent with EPA's test methods for evaluating solid waste, SW-846. There is significant variation in testing methods among the states. Some state examples are provided below. Your selection of an appropriate analytical test method may be one of the most important issues to consider when developing initial sampling and testing requirements.

There may also be a linkage between the initial sampling and testing and waste classification categories, which are discussed in Steps 1 and 3 of the Roadmap and Toolkit. If you decide to establish waste classification categories, you have the opportunity to establish a range of constituent concentration thresholds to

Pros

INITIAL SAMPLING AND TESTING

Provides states with a better understanding of the foundry sands that will be used in proposed reuse activities.

For programs with pre-established initial sampling and testing: **establishes uniform sampling and testing procedures for industry to follow.**

For programs with pre-established initial sampling and testing: **your reviews may be simplified because there is less need to scrutinize the applicant's selected technique.**

For programs with case-by-case initial sampling and testing requirements: **reduces upfront burden on the state since constituents and concentration limits do not need to be developed.**

correspond to waste categories and the affiliated reuse activity. By testing the foundry sand, a generator or end-user may determine if the foundry sand meets constituent concentration thresholds established by the state and therefore is eligible for certain types of reuse.

The constituents and concentration thresholds may be established by the state. In some cases, these thresholds are outlined in regulation. States often define their constituent concentration thresholds according to RCRA toxicity characteristic (TC) levels. Other states establish thresholds according to state or federal drinking water standards. For example:

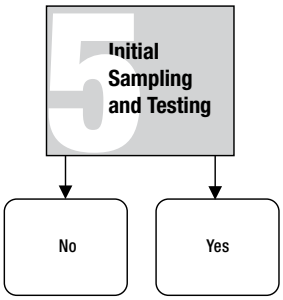
- Alabama sets the threshold at 50 percent of RCRA TC levels,
- Indiana uses variable percentages of RCRA TC levels, in addition to selected other drinking water constituents, and
- Tennessee's threshold is 10 times the federal drinking water standard.

Alternatively, you may place the burden on industry to identify the constituents to test for, and to set constituent concentration thresholds on a case-by-case basis. This option is appropriate for states that have the case-by-case determination program structure (see Steps 1 and 3 of the Roadmap and Toolkit). Pennsylvania has such requirements. In their view, the generator or end-user knows the process generating the foundry sand better than state agency staff and can therefore propose the most reasonable thresholds. During the application review process, PADEP can ensure that these thresholds are protective of human health and the environment. Florida has established a risk standard, and requires generators or end-users to demonstrate that the proposed reuse activity meets the risk standard. To help with this determination, Florida issues guidance on how to demonstrate that the risk standard may be met, but does not require a specific testing method for this determination.

Balancing Burden and Risk

Programs with pre-established initial sampling and testing methods create an agency burden because the agency will need to choose constituents to test for and concentration thresholds. This work will require agency staff resources upfront. This program component, however, reduces the risk associated with beneficial reuse activities because it establishes uniform testing requirements with which generators or end-users must comply. One tradeoff, however, is that you may need to be overly cautious upfront as you establish constituents and concentration levels. Testing is very expensive for industry and you may be unintentionally curtailing reuse activities with extensive testing requirements.

Case-by-case initial sampling and testing provides generators and end-users with more flexibility, but the application process is highly burdensome to both industry and the state. There may be less of a burden on industry because they would only need to test for constituents that are a concern, but they need to expend

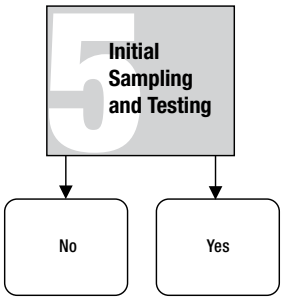


Cons

INITIAL SAMPLING AND TESTING

For programs with pre-established initial sampling and testing: **requires an upfront commitment of agency time and expertise to establish testing methods and thresholds.**

For programs with case-by-case initial sampling and testing: **requires ongoing commitment of agency time and expertise to review proposed testing methods and thresholds.**



Most states specify initial sampling and testing requirements in their regulations.

resources to justify their selection of constituents. This option also places a greater ongoing burden on the state because for each application, the initial sampling and testing decisions would need to be reviewed for sufficiency.

Links to States with Initial Sampling and Testing Requirements

All of the states previously identified in the toolkit require initial sampling and testing of foundry sands. See the previous Steps in the Toolkit for links to specific state program information.

Sample Regulatory Language

Most states specify initial sampling and testing requirements in their regulations. For example, Wisconsin's regulations are excerpted in the following example.

Example excerpted from Chapter NR 538, Wisconsin Administrative Code, December 1997, ***Beneficial Use of Industrial Byproducts***, Section NR 508.06(3)(c) and (d)

> "(c) All industrial byproducts which are characterized to determine eligibility for category 1 to 4 . . . shall be analyzed using the most recent revision of the ASTM D3987 water leach test.
>
> (d) All industrial byproducts which are characterized to determine eligibility for category 1 or 2 . . . shall be analyzed using a total elemental analysis, unless another analysis method is approved by the department."

Current as of July 2006.

Wisconsin's regulation also contains the constituents and concentration levels that must be met for each waste category. Table 2 summarizes Wisconsin's constituents and concentration levels for category 1-4. Category 5 material, the "safest" category, is defined separately in Section NR 600.03(98).

The following is a sample of Indiana's regulations for this option.

Example excerpted from ***Indiana Administrative Code***, 329 IAC 10-9-4

> "(A) Table 1 lists the maximum levels for constituents using Method 1311, the toxicity characteristic leaching procedure test described in U.S. Environmental Protection Agency Publication SW-846: Table 1. Constituents Using Method 1311, Toxicity Characteristic Leaching Procedure."

Current as of July 2006.

Indiana's regulation also contains the constituents and concentration levels that must be met for each waste category. Tables 3, 4, and 5 summarize Indiana's constituents and concentration levels for Types I-IV.

TABLE 2
Wisconsin's Waste Characterization Standards for Ferrous Foundry Sands
Current as of July 2006

	Category 1		Category 2	Categories 2 & 3	Category 4
Parameter	Total Elemental (mg/kg)	Leachate Standard (mg/L)	Total Elemental (mg/kg)	Leachate Standard (mg/L)	Leachate Standard (mg/L)
Aluminum		1.5		15	
Antimony	6.3	0.0012		0.012	
Arsenic	0.042	0.005	21	0.05	
Barium		0.4		4.0	10
Beryllium	0.014	0.0004	7	0.004	
Cadmium		0.0005		0.005	0.025
Chromium, Hex.	14.5				
Chromium, total		0.010		0.10	
Copper		0.130			
Total Cyanide		0.040			
Fluoride		0.8		8.0	
Iron		0.15		1.5	3
Lead		0.0015		0.015	0.075
Manganese		0.025		0.25	
Mercury		0.0002		0.002	0.01
Nickel		0.020			
Phenol		1.2		12	
Selenium		0.010		0.10	
Sulfate		125			
Thallium	1.3	0.0004			
Zinc		2.5			
Acenaphthene	900		x		
Acenaphthylene	8.8		x		
Anthracene	5000		x		
Benz(a)anthracene	0.088		44		
Benzo(a)pyrene	0.0088		4.4		
Benzo(b)fluoranthene	0.088		44		
Benzo(ghi)perylene	0.88		x		
Benzo(k)fluoranthene	0.88		x		
Chrysene	8.8		x		
Dibenz(ah)anthracene	0.0088		4.4		
Fluoranthene	600		x		
Fluorene	600		x		
Indeno(123-	0.088		44		
1-methyl naphthalene	8.8		x		
2-methyl naphthalene	8.8		x		
Naphthalene	600		x		
Phenanthrene	0.88		x		
Pyrene	500		x		
Total PAHs			100		

TABLE 3
Indiana's Waste Classification Thresholds
for Constituents Using Method 1311, TCLP (in mg/L)
Current as of July 2006

Parameter	Type I	Type II	Type III	Type IV
Arsenic	5.0	1.3	0.50	0.05
Barium	100	25	10	1.0
Cadmium	1.0	0.25	0.10	0.01
Chromium	5.0	1.3	0.50	0.05
Lead	5.0	1.3	0.50	0.05
Mercury	0.2	0.05	0.02	0.002
Selenium	1.0	0.25	0.10	0.01
Silver	5.0	1.3	0.50	0.05

TABLE 4
Indiana's Waste Classification Thresholds
for Constituents Using the Neutral Leaching Method Test (in mg/L)
Current as of July 2006

Parameter	Type I	Type II	Type III	Type IV
Barium	*	25	10	1
Chlorides	*	6,300	2,500	250
Copper	*	6.3	2.5	.25
Cyanide, total	*	5	2	.2
Fluoride	*	35	14	1.4
Iron	*	*	15	1.5
Manganese	*	*	.5	.05
Nickel	*	5	2	.2
Phenols	*	7.5	3	.3
Sodium	*	6,300	2,500	250
Sulfate	*	6,300	2,500	250
Sulfide	*	13	5	1
Total dissolved solids	*	12,500	5,000	500
Zinc	*	63	25	2.5

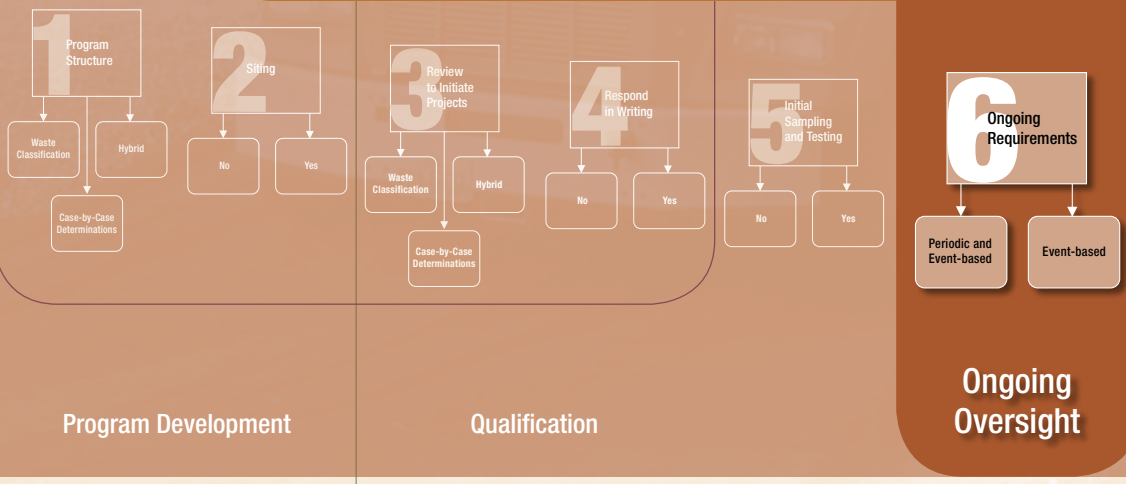
* Testing not required.

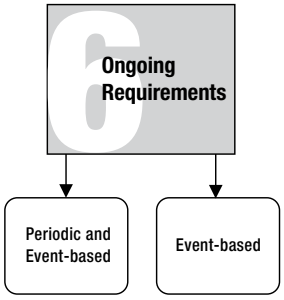
TABLE 5
Indiana's Acceptable Range for pH (in Standard Units)
Current as of July 2006

Parameter	Type I	Type II	Type III	Type IV
pH	*	4.0–11.0	5.0–10.0	6.0–9.0

*Testing not required.

5 | Ongoing Oversight





If you wish to ensure that foundry sands are falling within acceptable parameters throughout the entire beneficial reuse period, you should require ongoing sampling and testing of reused foundry sand and reporting of those test results.

Once reuse activities have commenced, you may be interested in tracking these activities over time. The final topic, Step 6, addressed in the Roadmap is Ongoing Oversight. This section of the Toolkit discusses the types of ongoing sampling, testing, and recordkeeping that you may adopt as part of your state's beneficial reuse program.

STEP 6 OF THE ROADMAP: Periodic and Event-Based Sampling, Testing, and Reporting

If you wish to ensure that foundry sands are falling within acceptable parameters throughout the entire beneficial reuse period, you should require ongoing sampling and testing of reused foundry sand and reporting of those test results. Ongoing sampling and testing may be periodic, which takes place on a specified frequency (e.g., annually), or it may be event-based, which is required anytime there is a change in the materials or processes that may affect the composition of the foundry sands.

Under this program option, states request that the generator or end-user in question submit to a new round of testing in order to show that the new process does not bring constituent concentrations above state limits.

MICHIGAN, a state with an extremely large and varied foundry industry due to the heavy presence of the automotive industry, mandates annual sampling and testing and submission of these results to the Michigan Department of Environmental Quality (DEQ). The DEQ also reserves the right to demand additional and more frequent testing if it feels the characteristics of the material can vary significantly.

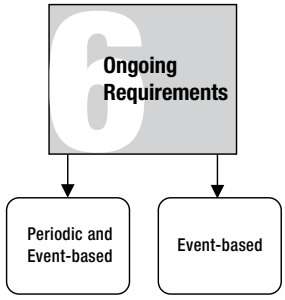
Frequency of Periodic Sampling and Testing

Frequency of periodic sampling, testing, and reporting can vary according to foundry circumstances. If foundry sands are likely to be made up of consistent waste constituents and concentrations, then you may be comfortable with significant periods of time between sampling and testing events. Some states, such as Indiana, allow up to five years between retesting as long as the waste material shows no signs of significant change.

WISCONSIN uses its waste classification categories to dictate sampling, testing, and reporting requirements. For the most volatile reusable sands, Wisconsin requires an annual submission of test results, with reporting frequency decreasing as the volatility of materials decreases. The "safest" category, Category 5, only requires event-based ongoing testing.

Alternatively, more frequent sampling, testing and reporting is more helpful if your state has a wide variety of foundries producing sands that, over time, vary in waste content and constituent concentrations.

If your state chooses periodic sampling and testing, then you will need to decide what frequency is sufficient. To make this decision you may need to weigh the tradeoffs. As the frequency increases, you will need to commit more resources to reviewing the sampling and testing reports. If you require frequent reporting, though, you will reduce the uncertainty regarding the risk associated with reuse activities.



WEST VIRGINIA

The West Virginia Office of Waste Management, Solid Waste Management Section requests a minimum of annual testing for continued beneficial reuse. In addition, applicants should submit test results at any point when the production process or raw materials used in that process change.

Event-based Sampling and Testing

Your state may not have the resources to review periodic sampling and testing results or may not wish to require it from end-users. Some state agencies may feel more comfortable with the consistency of their industry's foundry sands. Other states may philosophically agree with the idea that if the process which affects the foundry sands does not change, then most likely the constituent concentrations of the foundry sands will not change either. Agencies interested in an event-based testing only regulatory regime might look at Texas' Commission on Environmental Quality requirement that the potentially reusable material only be retested when there is a change in the foundry process generating the waste sand.

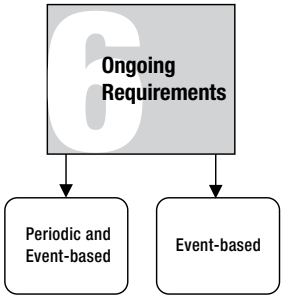
If your state chooses periodic sampling and testing, then you will need to decide what frequency is sufficient. As the frequency increases, you will need to commit more resources to reviewing the sampling and testing reports.

Combining Periodic and Event-based Sampling and Testing

You may decide that both periodic and event-based sampling and testing is preferable for your state. In this case, you would require a generator or end-user to test reused foundry sands on a regular basis (e.g., annually), and anytime there is a change in the materials or processes that may affect the composition of the foundry sands. Although this approach imposes a greater burden on the state and industry, it provides a consistent flow of information to the state regarding the make-up of reused foundry sands.

Reporting

After deciding on the frequency of sampling and testing, you should then examine how you want the industry to report these results to the state. Agencies can choose from a variety of options with varying burdens to both the state and industry. You can achieve the highest level of assurance by requiring both periodic and event-based sampling and testing and require reporting of all results. This approval ensures that in addition to periodic oversight, you are notified when there might be a need for re-evaluation of the beneficial reuse. If your state does not have



the resources to consistently review the sampling and testing results when they are submitted, you may still require the generator or end-user to submit the records. Rather than review them immediately, these records can be kept on file for reference and record-keeping purposes.

Balancing Burden and Risk

As a state, you gain important information about ongoing reuse activities from frequent sampling, testing, and reporting requirements. Specifically, regular testing updates may help you track the environmental safety of reuse activities. This benefit, however, does create ongoing burdens for the agency and industry. These burdens are warranted if there is uncertainty regarding the ongoing risk of foundry sand. For example, if the foundry sands could be inconsistent in composition over time, then it may be prudent to adopt periodic, as well as event-based, sampling, testing, and reporting.

Alternatively, if a state is confident in the long-term consistency and safety of its foundry sand byproducts, then it may feel the additional costs associated with more frequent and event-based sampling, testing, and reporting work to the detriment of a successful beneficial reuse program. You must also consider the compliance issues that may occur if your state adopts only event-based sampling, testing, and reporting. Without the burden of periodic sampling, testing, and reporting there is the risk that the composition of reused foundry sand will change and not be detected if industry does not report the change to the state. By requiring periodic sampling, testing, and reporting, you may reduce this risk because generators or end-users must regularly submit testing results to you.

Therefore, you must strike a balance between the burden (both agency and industry) associated with frequent sampling, testing, and reporting and the risk associated with infrequent or event-based sampling, testing, and reporting. You must determine what combination and frequency of periodic and event-based sampling, testing, and reporting is satisfactory for your state.

Pros

PERIODIC AND EVENT-BASED SAMPLING, TESTING, AND REPORTING

Periodic only: **In states with a wide variety of byproduct types and consistencies, you benefit from more oversight and control.**

Event-based only: **Decreases the burdens placed on you and generators or end-users, relative to more frequent testing, sampling and reporting.**

Combined: **Provides highest level of oversight of reused foundry sand composition.**

Links to States with Periodic, Event-Based, and Combined Sampling, Testing, and Reporting

Current as of July 2006

Below are those states with beneficial reuse programs that require only periodic sampling, testing, and reporting.

Louisiana Department of Environmental Quality

http://www.deq.state.la.us/

Program Information:

- http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v07.pdf *[See Section 1109(f)]*

Maine Department of Environmental Protection
http://www.maine.gov/dep/index.shtml

Program Information:

- http://www.maine.gov/sos/cec/rules/06/096/096c418.doc *(See Section 8)*

Michigan Department of Environmental Quality
Waste and Hazardous Materials Management Division

http://www.michigan.gov/deq/0,1607,7-135-3306_28609---,00.html

Program Information:

- http://www.deq.state.mi.us/documents/deq-wmd-swp-pt115rls.pdf *(See R299.4118 (4))*

Below are those states with beneficial reuse programs that require only event-based sampling, testing, and reporting.

Texas Commission on Environmental Quality
http://www.tceq.state.tx.us/

Program Information:

- http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=335 *(See Section 335.513)*

Below are those states with beneficial reuse programs that require both periodic and event-based sampling, testing, and reporting.

Alabama Department of Environmental Management, Land Division
http://www.adem.state.al.us/LandDivision/LandDivisionPP.htm

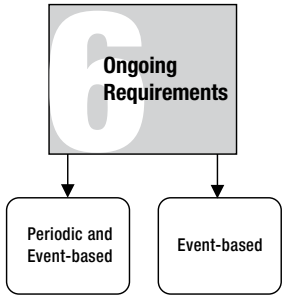
Program Information:

- http://www.adem.state.al.us/Regulations/Div13/D13Chapter%204.doc *[See 335-13-4-26(3)(c)]*

Illinois Environmental Protection Agency (IEPA)—Waste Management Programs
http://www.epa.state.il.us/land/waste-mgmt/

Program Information:

- http://www.ipcb.state.il.us/documents/dsweb/Get/Document-12195/ *(See Section 817.104)*



Cons

PERIODIC AND EVENT-BASED SAMPLING, TESTING, AND REPORTING

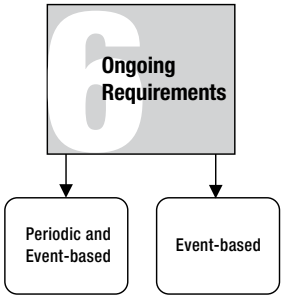
Periodic only: **You must dedicate resources to reviewing reports on a frequent basis.**

Periodic only: **Industry faces a higher burden as they must test and report to the state more frequently.**

Event-based only: **Less ongoing assurance and oversight.**

Event-based only: **Risk that changes in the reused foundry sand will occur and not be detected in a timely fashion, thus compromising environmental protection.**

Combined: **Imposes greatest burden on generators or end-users and agency staff due to ongoing resource requirements.**



Michigan's statute provides an example of how a state can mandate periodic testing.

Indiana Department of Environmental Management (IDEM)—Office of Land Quality

http://www.in.gov/idem/programs/land/

Program Information:

- http://www.ai.org/legislative/ic/code/title13/ar19/ch3.html#IC13-19-3-7
- http://www.in.gov/legislative/iac/T03290/A00100.PDF *(See 329 IAC 10-9)*
- http://www.in.gov/apps/idem/media/publications/ *(Type foundry sand in the keyword box)*

West Virginia—Office of Waste Management

http://www.dep.state.wv.us/item.cfm?ssid=11

Wisconsin Department of Natural Resources—Waste Management Program

http://www.dnr.state.wi.us/org/aw/wm/solid/beneficial/index.html

Program Information:

- http://www.legis.state.wi.us/rsb/code/nr/nr538.pdf *(See NR 538.06)*

Regulatory Language

Michigan's statute provides an example of how a state can mandate periodic testing. The passage requires that applicants retest the material intended for reuse at least annually, and leaves the agency discretion in increasing the frequency of testing.

Example excerpted from Part 115 of 1194 PA 451, R299.4118 (4), *Petitions to Classify Wastes*

"(4) Material that is classified by the director based on a petition under this rule shall be retested to confirm the classification not less than annually using procedures specified in this rule. The test results shall be submitted to the director. The director shall specify a more frequent schedule for testing if the characteristics of the material may vary significantly."

Current as of July 2006.

Wisconsin's regulation combines periodic and event-based sampling and testing. The frequency of periodic sampling and testing varies based on Wisconsin's waste classification system.

Example excerpted from Chapter NR 538, Wisconsin Administrative Code, December 1997, *Beneficial Use of Industrial Byproducts*

"(4) RECHARACTERIZATION.

(a) Industrial byproducts that are beneficially used under this chapter shall be recharacterized after the initial characterization in accordance

with this section, unless the department approves an alternative recharacterization method. A representative sample of each industrial byproduct shall be recharacterized whenever there is a change in the process that produces the industrial byproduct that could result in a change of the category of the industrial byproduct.

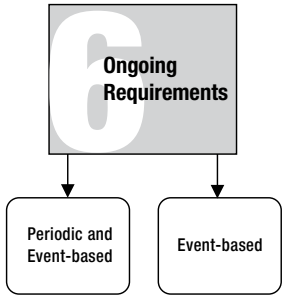
(b) A representative sample of each category 1 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once each year. Recharacterization is not required for any category 1 industrial byproduct of which less than 1000 cubic yards were beneficially used or stored for beneficial use in the previous year.

(c) A representative sample of each category 2 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once every 2 years. Recharacterization is not required for any category 2 industrial byproduct of which less than 2000 cubic yards were beneficially used or stored for beneficial use during the previous 2–year period.

(d) A representative sample of each category 3 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once every 3 years. Recharacterization is not required for any category 3 industrial byproduct of which less than 3000 cubic yards were beneficially used or stored for beneficial use during the previous 3–year period.

(e) A representative sample of each category 4 industrial byproduct shall be recharacterized in the same manner as specified for the initial characterization once every 5 years. Recharacterization is not required for any category 4 industrial byproduct of which less than 5000 cubic yards were beneficially used or stored for beneficial use in the previous 5–year period."

Current as of July 2006.



Texas' regulations contain a provision requiring event-based testing, sampling and reporting.

Texas' regulations contain a provision requiring event-based testing, sampling and reporting. Specifically, documentation and reporting are only required when there is a change in waste composition, waste management methods, facility engineering plans and specifications, or the geology where the facility is located.

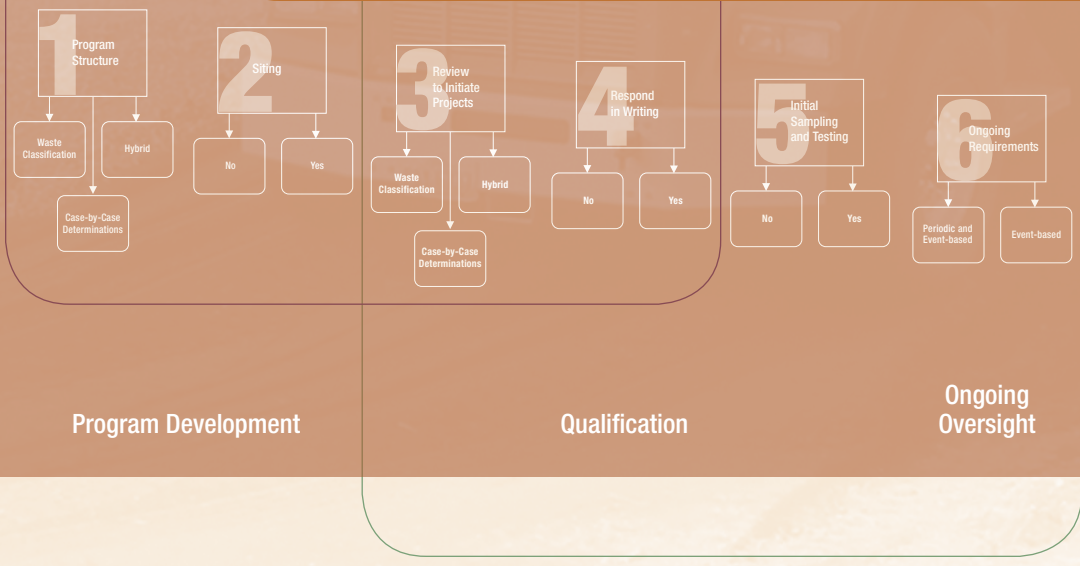
Example excerpted from *Title 30 Environmental Quality, Chapter 335 Industrial Solid Waste and Municipal Hazardous Waste*, §335.513

"(b) Any person who stores, processes, or disposes of municipal hazardous waste or industrial solid waste shall have the continuing obligation to immediately provide notice to the executive director in writing or using

electronic notification software provided by the executive director, of any changes or additional information concerning waste composition, waste management methods, facility engineering plans and specifications, or the geology where the facility is located to that reported in subsection (a) of this section, authorized in any permit, or stated in any application filed with the commission."

Current as of July 2006.

6 | Appendix A: Current State Program Designs



Appendix A

Current as of July 2006

(Steps Correspond to Roadmap Elements)

State	STEP 1 Program Structure	STEP 2 Siting and Location Restrictions	STEP 3 Level of State Review	STEP 4 Written Approval	STEP 5 Initial Sampling/ Testing	STEP 6 Ongoing Testing/ Recordkeeping/ Reporting
AL	www.adem.state.al.us/LandDivision/SolidWaste/SolidWasteMainInfo.htm					
		Wetlands, Floodplain, and Residential		No	Yes	Periodic and Event-based
IL	www.epa.state.il.us/land/waste mgmt/					
	Waste classification		Waste classification	No	Yes	Periodic and Event-based
IN	http://www.in.gov/idem/programs/land/					
	Hybrid		Hybrid	No	Yes	Periodic and Event-based
IA	www.legis.state.ia.us/Rules/Current/iac/567iac/567108/567108.pdf					
	Waste classification	Potable wells, Ground water, Surface water, Wetlands, Floodplain	Waste classification	Yes	Yes	Periodic
LA	www.deq .state.la.us/					
	Case-by-Case	Potable wells, Ground water, Surface water, Wetlands, Floodplain, Soil Type, Critical Habitat	Case-by-Case	Yes	Yes	Periodic
ME	www.maine.gov/dep/rwm/					

State	STEP 1 Program Structure	STEP 2 Siting and Location Restrictions	STEP 3 Level of State Review	STEP 4 Written Approval	STEP 5 Initial Sampling/ Testing	STEP 6 Ongoing Testing/ Recordkeeping/ Reporting
	Case-by-Case	Potable wells, Ground water, Surface water, Wetlands, Critical Habitat	Case-by-Case	Yes	Yes	Periodic
MA	www.mass.gov/dep/recycle/laws/policies.htm					
	Case-by-Case		Case-by-Case	Yes	Yes	
MI	www.michigan.gov/deq/0,1607,7 135 3312 4123 ,00.html					
	Waste classification		Waste classification	Yes	Yes	Periodic
MN	www.pca.state.mn.us/waste/sw utilization.html					
	Hybrid		Hybrid	Yes (for some uses)	Yes	Periodic
NY	www.dec.state.ny.us/website/dshm/sldwaste/index.htm					
	Case-by-Case		Case-by-Case	Yes	Yes	
OH	www.epa.state.oh.us/dsw/policy/04 07r.pdf					
	Waste classification	Potable wells, Surface water, Wetlands, Floodplain, Residential	Waste classification	No (for 3 out of 4 waste categories)	Yes	Periodic
PA	www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a 1238&Q 463452&landrecwasteNav |31070|					
	Case-by-Case	Potable wells, Ground water, Surface water, Wetlands	Case-by-Case	Yes	Yes	
RI	www.dem.ri.gov/programs/benviron/waste/index.htm					
	Case-by-Case		Case-by-Case	Yes	Yes	Periodic
TN	www.state.tn.us/environment/swm/					

State	Step 1 Program Structure	Step 2 Siting and Location Restrictions	Step 3 Level of State Review	Step 4 Written Approval	Step 5 Initial Sampling/ Testing	Step 6 Ongoing Testing/ Recordkeeping/ Reporting
TX	www.tceq.state.tx.us/nav/permits/hiw.html					
	Waste classification		Waste classification	No	Yes	Event-based
WV	www.dep.state.wv.us/item.cfm?ssid 10					
	Case-by-Case	Ground water, Surface water, Floodplain, Soil type	Case-by-Case	Yes	Yes	Periodic and Event-based
WI	www.dnr.state.wi.us/org/aw/wm/solid/beneficial/index.html					
	Hybrid	Ground water, Surface water, Wetlands, Critical habitat	Hybrid	No	Yes	Periodic and Event-based

NOTES

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United States
Environmental Protection
Agency

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EPA100-R-06-003
July 2006
www.epa.gov/sectors