Exh. 6, + 4

Testimony of Edwin C. Bakowski, P.E.
Illinois Environmental Protection Agency
Bureau of Land

Regulation of Landscape Waste Composting Facilities

March 17, 1994

My name is Edwin C. Bakowski. I manage the Solid Waste/UIC Unit in the Permit Section and am currently the Solid Waste Branch Manager, Division of Land Pollution Control, Bureau of Land, Illinois EPA ("Agency"). My unit will have the responsibility for implementing and administering the landscape waste regulations in Illinois, and currently has this responsibility pursuant to Section 39(m) of the Illinois Environmental Protection Act. I have served in this capacity for more than six and one-half years. Prior to that, I was the Mine Pollution Control Program, Permit Manager. Please see my resume for my educational qualifications and professional work experience. (Attachment A to this testimony.)

My testimony today addresses primarily Parts 831 and 832 of the proposed landscape waste composting regulations. Part 831 lists the information required to be included in a permit application and Part 832 sets out the procedural requirements for

applicants applying for permits and for the Agency in making permit determinations.

Part 831

This Part sets forth the information that needs to be in an application for permit. As is true of many provisions in this regulatory proposal, much of this Part parallels Part 812 of the landfill rules. I will briefly comment on each Section, elaborating regarding any provisions that are substantively different or complex.

831.101 and 831.102

These provisions address the scope and applicability and severability of this Part. The IEPA relies on the Act to determine who needs a permit.

831.103

This provision requires an engineering certification for all designs presented in a permit application. Certain design requirements imposed on permitted composting facilities include engineering features. For that reason, this Section mandates that, when required by the Illinois Professional Engineering Practice Act, certification by an Illinois licensed engineer

accompany any application that includes designs. This requirement parallels 35 Ill. Adm. Code 807.205(d).

831.104

There are no fees at this time, but if they are required, they will have to be submitted with the permit application. This Section implements Section 5(f) of the Act.

831.105

This Section sets forth the signatures required in a permit application. Signatures of both the operator and property owner are necessary to identify responsible parties and assure legal rights to enter exist.

831.106

This provision requires that the permit application include site identification by name and precise location, and codifies the use of the IEPA's Inventory Identification Number System as an administrative mechanism.

831.107 and 108

These Sections require the submittal of a site location map and a site plan map respectively as part of the permit

application, detailing information necessary to demonstrate compliance with applicable statutory provisions and proposed Part 830 rules.

831.109

This provision requires a narrative description of the facility. The information required in subsections a and (c-i) is necessary to demonstrate compliance with proposed Part 830 and to enable the Agency to determine whether issuance of a permit is appropriate. Subsection (b) is taken directly from Section 39(m) of the Illinois Environmental Protection Act.

831.110

This Section requires that the permit application contain a legal description of the facility boundary. Any data supplied by a registered land surveyor must be certified, and references included for any such data obtained from published sources. This provision parallels 35 Ill. Adm. Code 812.112.

831.111

This requirement, that the permit application contain a certificate of ownership of the land on which the facility is located or a copy of the lease and its duration, is similar to one applying to landfills, contained in 35 Ill. Adm. Code

812.113. Its purpose is to identify all parties responsible for activities at the facility.

The main difference from the provision in the landfill rules is the use of the new term "property owner," defined in Section 830.102. The property owner is the owner of the land on which the facility is located, unless the operator, having obtained a lease for at least the duration of the proposed permit term plus one year, is deemed the property owner. Normally, the operator owns the land, and is considered solely responsible for activities at the facility. However, if the operator has leased the land, both the operator and the landowner are to be identified. This is due to the fact that the requested permit term may exceed the term of the lease authorizing construction of the composting facility. In addition, an operator may become insolvent or desert a site without following proper closure requirements. The landowner, having authorized the construction of the facility, would be a second party against whom to proceed. This procedural requirement is consistent with the procedures followed in issuing permits pursuant to 35 Ill. Adm. Code 807 provisions.

The 30 day notice of changes in property ownership or conditions in the lease affecting the permit area, certification of which is required, will allow Agency review of proposed changes to determine, before the changes occur, whether any permit modifications are necessary.

831.112

This Section requires the submittal of a closure plan. The requirements with which an applicant must comply in developing a closure plan are set forth in Part 830.

831.113

This Section requires that a permit application include a plan to ensure financial assurance, as required by Section 22.33(a)(5).

831.114

This requirement sets up a mechanism to determine when a currently permitted facility must demonstrate, by way of a permit application, compliance with these rules. It specifically identifies that changing the operation in a manner requiring construction, expanding capacity or extending the expiration date will trigger a full review of compliance with all the new rules.

It is felt that currently permitted facilities that propose other changes, such as a change in operating hours, will not need to demonstrate compliance until permit renewal. This is based on the assumption that many sites are currently permitted pursuant to Section 39(m) of the Act and operating without problems. Those that do have problems will be under enforcement and any significant corrective action measures will trigger a modification under 831.114(a), requiring submittal of a complete permit application.

831.115

This provision, requiring an operator to obtain an operating authorization prior to placing into service any structure constructed at a facility, parallels the landfill rules, but, by means of the language stating "unless otherwise authorized in the facility permit....," specifically allows the facility permit alone to authorize operation. This is the current practice with respect to landscape waste composting facilities in that, when little "construction" is required, permits are issued that allow operation upon completing necessary development. Experience has shown this to save resources in permitting and review with no known problems.

831.116

This provision requires the submittal of information that has changed since the original permitting in an application for permit renewal. Unchanged information would already be on file, obviating any necessity for its submittal.

Part 832 -- Permitting

The permitting requirements contained in this Part were developed using the Part 813 landfill permitting requirements as a guide. They parallel those rules in most regards. The specific differences are discussed on a rule by rule basis. The most notable differences are the noticing requirement and the ten year permit term, both included to be consistent with the Act.

832.101 and 102

These provisions contain standard language which is self explanatory, addressing scope and applicability and severability.

832.103

This Section requires that permit applications be on Agency forms, as a means of ensuring Agency recognition that they are requests for permits. It also establishes uniform procedures regarding delivery and filing of permit applications.

831.104

This provision, setting forth notifications required of a permit applicant, is largely a restatement of language in the Act and the Illinois Notice by Publication Act. Subsection (c)(2) establishes a routine format for notices. Subsection (c)(3) sets limits for notices reasonably close to the permit application submittal date.

832.105

This Section, containing Agency decision deadlines, parallels the landfill rules (35 Ill. Adm. Code 813.103 except that Subpart (e) considers the action taken when the decision is signed rather than on the date postmarked. This will allow for decisions to be recognized when they occur and not subject to the third party post office mark.

832.106 and 107

The standards for issuance and denial included in these Sections are taken directly from the Act.

832.108

This provision contains standard language governing permit appeals, mostly taken verbatim from Section 40(a)(1) of the Act.

832.109

This provision roughly parallels 35 Ill. Adm. Code 813.107, setting forth that possession of a permit does not constitute a defense to a violation of the Act or Board regulations. The Agency inadvertently omitted the last portion of the language in 35 Ill. Adm. Code 813.107, which carves out an exception in that possession of a permit does constitute a defense to an allegation that a facility is operating without a permit. That exception should be included in this provision as well. The Agency recommends the revision of this Section to that effect, i.e. adding at the end of the sentence the following language: "except for the development and operation of a facility without a permit."

832.110

This provision, limiting permit terms to 10 years, is consistent with Section 39(m) of the Illinois Environmental Protection Act.

832.111

This transfer of permits section sets forth procedures enabling a new operator to obtain operating rights. The transfer of ownership must be memorialized by the signing, by both the

transferor and the transferee, of an application for permit modification.

832.201

This provision, addressing Agency-initiated modification of an approved permit, is identical to 35 Illinois Admin. Code 813.201(b) and (c).

832.202

This Section prescribes that the requirements and time schedules of this Part will govern any application for modification of an approved permit.

832.301

This provision, requiring the filing of an application for permit renewal at least 90 days prior to the expiration date of the existing permit, is standard language consistent with review times established in this Part.

832.302

This Section, continuing an existing permit in full force and effect upon filing of an application for renewal, is consistent

with Section 16(b) of the Illinois Administrative Procedure Act, and parallels 35 Ill. Adm. Code 813.302.

832.393

This Section establishes that applications for renewal are subject to the schedules and requirements in Subpart A of this Part.

EB/mls/sp79W/1-6

Exhibit 2

**BEFORE THE**
**ILLINOIS POLLUTION CONTROL BOARD**

| | | |
|---|---|---|
| **IN THE MATTER OF:** | ) | |
| | ) | |
| | ) | **R93-29** |
| | ) | **(Rulemaking)** |
| **REGULATION OF LANDSCAPE** | ) | |
| **WASTE COMPOST FACILITIES** | ) | |
| | ) | |

**TESTIMONY OF GARY CIMA**

**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

**IN THE MATTER OF:**

**Regulation of Landscape Waste Composting Facilities**

Testimony of: Gary Cima
Environmental Protection Specialist
Permit Section, Bureau of Land

Part 830, Subpart B: Standards for Owners and Operators of Landscape Waste Compost Facilities

My name is Gary Cima. I have been an employee of the Illinois Environmental Protection Agency since February, 1980. I have worked in the Division of Land Pollution Control, Permit Section, Solid Waste/UIC Unit as an Environmental Protection Specialist for the last 3 1/2 years. My duties include the review of permit application plans and specifications for non-hazardous solid waste management facilities, including composting facilities. Prior to working in the Division of Land Pollution Control, I worked for the Division of Water Pollution Control. My resume is attached to my testimony as Exhibit 2-1.

I received my bachelor's degree in zoology from Northern Illinois University in 1972. I have earned continuing education unit credits for attending courses addressing hydrogeology and landfill liners and covers, and have completed a two day course on composting.

I am providing Agency testimony in support of Subpart B of proposed Part 830. Part 830, Subpart B specifies performance standards for owners and operators of landscape waste compost facilities subject to Part 830. In accordance with Section 22.33 of the Act, this Subpart specifies performance standards for all landscape waste compost facilities not exempt from regulation.

**Section** 830.201 specifies which of the performance standards of Subpart B apply to permit exempt facilities (Section 830.202) and which apply to facilities required to have a permit (Sections 830.203 through 830.213). The requirements of Section 830.202 are applicable to both permitted landscape waste compost facilities and facilities exempt from permits pursuant to Section 21(d), Section 21(q)(1) and Section 21(q)(3) of the Act. Facilities required by these regulations to have a permit have to meet, in addition to the general performance standards set forth in Section 830.202, specific performance standards set forth in Sections 830.203 through 830.213.

**Section** 830.202 specifies, in subsections (a) through (i), minimum performance standards applicable to all operators of landscape waste compost facilities, except those specifically excluded from regulation pursuant to Section 830.104 (discussed in Shirley Baer's testimony).

**Section** 830.202(a) specifically prohibits the use of domestic sewage, sewage sludge or septage in landscape waste composting. The composting of sludge is regulated under 40 CFR 503 (Exhibit 1-39 to Dr. Baer's testimony) and 35 Ill. Adm. Code 309 and 391. These regulations require substantial testing of and reporting

regarding sewage sludge being composted (Exhibit 1-75A to Dr. Baer's testimony). The IEPA's position is that the problems inherent in allowing the use of sludge in landscape waste composting - the variable quality of sludge, the breadth of the universe of sludge, the potential for introduction of pathogens and contaminants such as PCBs not otherwise found in landscape waste - justify this prohibition. Moreover, allowing the use of sludge would effectively turn landscape waste composting into organic waste composting.

Section 830.202(b) requires adequate control of odors and other nuisances, as mandated by Section 22.33 of the Act. Odor control, dust control and noise control are the main compatibility issues with surrounding area residents. Odor can be controlled through a variety of methods, so no specific technology is mandated. Odor control must be sufficient to prevent violation of the Act. For odor and dust emission standards, regulations implementing the Act can be found at 35 Ill. Adm. Code 201.141 and 212.301. For noise standards, regulations implementing the Act can be found at 35 Ill. Adm. Code 400.

Section 830.202(c) specifies that all landscape waste compost

facilities must have a written plan for use of the compost produced and a written plan to deal with any off-specification material or immature compost, as mandated in Section 22.33 of the Act. The required plans must be available for Agency inspection and will aid the Agency in determining compliance.

**Section 830.202(d)** specifies that landscape waste received at a facility must be placed in a suitable environment to begin composting. This includes piling the processed material, within five days, into a windrow or other form which will promote composting. Five days was chosen as the maximum time for waste storage prior to treatment by composting to minimize the potential for odor problems due to anaerobic conditions in accumulated material.

**Section 830.202(e)** specifies that storm water runoff must be diverted away from composting areas. This provision is intended to effectuate the requirement in Section 22.33 of the Act to have a performance standard addressing the management of surface water. Excess water retained in the base of windrows or piles of composting material may lead to anaerobic conditions and odor problems. Excess water on soil surfaces of composting areas makes access difficult and adds to maintenance expense.

Control of runoff from composting areas is intended to prevent off-site impacts. Controls must be capable of handling the volume of runoff from a 10 year, 24 hour precipitation event (Exhibit 2-2). Typical storm water controls consist of berms or perimeter ditches to divert run-on and ditches, retention basins or vegetative filters to control run-off (Exhibit 2-3). Stormwater controls minimize suspended solids transport off the site. Note that any discharge of water that has come in contact with landscape waste material from a point source to waters of the State is subject to permit pursuant to 35 Ill. Adm. Code 309.

**Section 830.202(f)** specifies that good housekeeping must be practiced at landscape waste compost facilities to promote safe, efficient operation. Fire fighting lanes must be maintained between windrows or other piles to the extent necessary for safe operation.

**Section 830.202(g)** specifies that compost quality standards set forth in Section 830.503 must be met for compost which is offered for sale or use off-site (to another person). The testing required, set forth in Section 830.504, covers pH, percent contamination by man-made materials > 4 mm, maturity of the compost and the level of pathogens. The testing frequency is a

minimum of once per year or once for each 5000 $yd^3$ sold. Shirley Baer's testimony addresses Subpart E of Part 830, including Sections 830.503 and 830.504.

**Section 830.202(h)** specifies who must file a report to the Agency on composting activities each year of facility operation. This reporting requirement affects any person composting more than 100 cubic yards per year. Permitted facilities, and permit-exempt facilities composting more than 100 cubic yards of landscape waste per year, must report by April first each year on the amount of material received and its disposition for the previous January through December period. The IEPA included permit-exempt facilities composting more than 100 cubic yards per year because, in the IEPA's experience, this volume is sufficiently large to warrant tracking. A farmer operating a landscape waste compost facility on his farm, in accordance with the criteria set forth in Section 21(q)(3) of the Act and restated verbatim in this Section, must report to the Agency each January first on the amount of material received during the previous year and must certify continued compliance with the criteria of Section 21(q)(3) of the Act.

**Section 830.202(i)(1)** specifies that closure of a compost

facility must include removal of all waste, compost and additives from the site within 180 days following commencement of closure. A 180 day timeframe was chosen to enable the operator both to complete composting of the last material received and to market or dispose of all end-product compost. Closure is a process generally consisting of ceasing to accept any more waste, completion of composting all remaining material, removal of all end-product compost, additives and processing equipment from the site, and site restoration.

**Section 830.202(i)(2)** specifies the degree of cleanup required for closure of a landscape waste compost facility. These cleanup requirements are drawn from 35 Ill. Adm. Code 807.503, the closure performance standards for waste management facilities.

**Section 830.202(i)(3)** requires operators of permit-exempt facilities composting greated than 100 cubic yards per year to report to the Agency upon completion of closure. This requirement aids the Agency in determining compliance and tracking waste in the State.

**Section 830.203**, the first Section setting forth additional standards applicable to compost facilities required to have a

permit, specifies the criteria to be followed in locating a landscape waste compost facility. The location standards included are derived from 35 Ill. Adm. Code 811.102 (location standards for landfills) and Section 39(m) of the Act (statutorily-prescribed location standards for permitted landscape waste compost facilities). Composting is an industrial activity which can convert land use and be a source of odors and pollutants. Planned use of the land will reduce or eliminate any adverse environmental impact. A demonstration must be made that the location criteria will be met. Documentation to show compliance with the Wild and Scenic Rivers Act, floodplain regulations, historic and archaeological site protection requirements, protection of natural landmarks, natural areas and critical habitat is required.

Groundwater protection measures for landscape waste compost facilities are taken from Section 39(m) of the Act. A setback of 200 feet from a potable water supply well must be maintained. Composting material must not be placed within five feet of the water table. Any landscape waste leachate must be collected and managed.

The setback from a residence of 1/8 of a mile set forth in

Section 39(m) of the Act has been adopted as a further location standard to help minimize any impact to surrounding area residents.

**Section 830.203(a)** is taken from Section 39(m) of the Act, which requires that a setback of at least 200 feet be maintained between composting and the nearest potable water supply well. This setback is to be measured from the composting area, which is defined in Section 830.102 to mean the area of a composting facility in which waste, composting material or undistributed end-product compost is unloaded, stored, staged, stockpiled, treated or otherwise managed.

**Section 830.203(b)**, taken from Section 39(m) of the Act, requires that a landscape waste compost facility be located out of the 10 year floodplain or be floodproofed to the elevation of the 10 year floodplain. Floodplain maps are available from the Federal Emergency Management Agency and the Illinois State Water Survey.

**Section 830.203(c)**, derived in part from Section 39(m) of the Act, requires a 200 foot minimum setback distance between the composting area of a landscape waste compost facility and the nearest residence, and a 1/8 mile setback between the composting

area of a facility developed or expanded after November 17, 1991, and the nearest residence. In addition, a landscape waste compost facility sited within 1/4 mile of the nearest off-site residence or within 1/2 mile of the nearest platted subdivision containing a residence, or having more than 10 residences within 1/2 mile of its boundaries, must implement a special operating requirement, set forth in Section 830.205(a)(1)(B), to minimize incompatibility with surrounding residences. All waste received each day must be processed in accordance with the facility's permit-approved operating plan by the end of the operating day, rather than within 24 hours. Immediate attention to incoming waste is effective in controlling odors generated from the incoming material. This operating practice is applicable if the facility falls within the above category at the time the Agency deems the facility's application for permit complete pursuant to Section 832.105(b) of these regulations.

**Section 830.203(d)**, also taken from Section 39(m) of the Act, requires that all compost material be placed at least five feet from the water table and mandates adequate control of run-off and leachate from the site. Two methods of demonstrating compliance with the depth to water table requirement are specified: the use of published information to document location of the water table

at the site; and actual measurement by appropriate field techniques. Measurement of the water table must be for a period of at least three months to examine water level fluctuations.

**Subsections 830.203(e) through (h)** contain the location standards for landfills set forth in 35 Ill. Adm. Code 811.102. Composting is an industrial activity which (in the case of contained composting) may include large buildings to house operations. The location standards addressing the Wild and Scenic Rivers Act, floodplains, protection of natural landmarks, natural areas or critical habitats, and the National and State Historic Preservation Acts are included to prevent any impact to these State resources. Documentation of compliance with these requirements, required pursuant to Part 831 as part of a permit application, may be accomplished by contacting appropriate State agencies for review of the potential impact of facility development on State resources.

**Section 830.204** addresses the management of surface water at permitted landscape waste compost facilities.

**Section 830.204(a)** specifies that stormwater runoff which comes from composting areas, preparation areas and storage areas is

landscape waste leachate and must be managed to prevent any environmental impact. 35 Ill. Adm. Code Subtitle C, referenced in this subsection, contains water pollution control regulations, including NPDES permit requirements. Any point source discharge from a landscape waste composting area is subject to NPDES permit requirements, pursuant to 35 Ill. Adm. Code 309. This subsection is intended to put facility operators on notice that they must comply with water pollution control regulations. Constituents from composting material carried in stormwater runoff are generally solids, nutrients, salts and organic acids (Exhibit 2-4). These constituents place such stormwater runoff in the wastewater category. Treatment by retention and settling may be necessary to meet discharge limits. Such treatment has been demonstrated to be effective.

**Section 830.204(b)** requires management of leachate from compost facilities to prevent ponding in and around composting material. Collection of landscape waste leachate in a retention basin cannot be done unless authorized in the facility permit. Leachate ponding in composting areas has been a source of odor problems at Illinois facilities. Eliminating this ponding, except to the extent done by design, is an effective odor control measure. Section 39(m) of the Act requires leachate collection

and management.

Retention basins have provided an effective means of water treatment and storage at Laidlaw and Meadowview facilities in Illinois (Exhibits 1-91A,1-91D to Dr. Baer's testimony). The collection and retention of run- off/leachate drainage from the composting area may also provide a cost effective source of water for landscape waste compost operations. Most compost facilities require water for addition to the composting process and on-site maintenance such as dust control on haul roads.

A vegetative filter for runoff/leachate treatment and control is another means of managing leachate. The City of Crystal Lake uses such a vegetative filter. (Exhibit 2-3).

**Section 830.204(c)** requires operators to allow soil surfaces in the composting area to dry periodically to control leachate migration into the soil. Periodic drying of the soil beneath compost piles will both promote aeration of the soil surface layer and cause a wick effect, pulling soil moisture to the surface. The aeration will in turn enhance microbial degradation of leachate located in the surface soil layer.

**Section 830.205** establishes additional operating standards for permitted landscape waste compost facilities. The operating requirements cover the composting process, the surface on which it is conducted, proper compost facility operation and maintenance, nuisance prevention measures and monitoring.

**Section 830.205(a)(1)(A)** specifies that landscape waste received at a permitted facility must be processed within 24 hours after receipt. Processing may include mixing, shredding and watering of composting material to begin the composting process, and includes piling the processed material into a form which will promote composting such as a windrow. Specifying a maximum waste storage time serves as an effective odor prevention measure. Anaerobic conditions tend to predominate in bagged compressed landscape waste. Quick processing of the incoming material to promote a suitable composting environment is essential in controlling odors. Parallel requirements to minimize waste storage times are imposed on landfills, pursuant to 35 Ill. Adm. Code 807.305 and 811.106, and waste transfer stations, pursuant to permitting procedures, to control odors.

**Section 830.205(a)(1)(B)** applies to those compost facilities operating in close proximity to residences. For these facilities

odor prevention must be a priority. Processing of all waste received is required by the end of the day. Immediate attention to waste processing for control of odors and placement of processed material into windrows or other piles suitable for composting has been effective in odor control at Illinois facilities.

**Section 830.205(a)(1)(C) and (D)** specify that, unless a facility is designed for anaerobic composting, proper oxygen and moisture levels to promote aerobic microbial degradation of the waste must be maintained in the composting material. The oxygen level of composting material is adjusted by shredding, turning and mixing the material. Moisture addition is accomplished by watering or mixing materials of various moisture levels. A range of 40 - 60% moisture, the range recommended in the literature to promote aerobic composting, is required (Exhibits 1-13, 1-71, 1-87 to Dr.Baer's testimony). Control of oxygen and moisture levels is essential for vigorous microbial activity (Exhibit 2-5).

**Section 830.205(a)(1)(E)** specifies that the staging area must be of adequate size to facilitate handling the incoming waste load while operating in a safe manner and in compliance with odor control and processing requirements. The staging area is

necessary for load checking, initial mixing or blending and odor control. The design of the staging area is currently evaluated by the Agency in reviewing applications for facility development or expansion. The staging area must be operable during inclement weather when waste is received, and traffic flow through the facility must be safe, i.e. a minimum of backing up or steep grades to contend with. Delays in processing can result from inefficient handling of incoming waste loads. Delays in inspecting and processing landscape waste at facilities may cause odor problems.

**Section 830.205(a)(1)(F)** prohibits mixing landscape waste and composting material with finished end product. Some facilities use mature compost for covering or seeding composting material or incoming waste; this provision does not prohibit such use of end-product compost.

Pathogens and viable weed seeds can be introduced into finished compost if care is not taken to prevent contact with incoming waste materials. Site design must include separate areas for handling incoming waste, composting and handling or loadout of end-product compost to prevent gross contamination of end-product compost.

**Section 830.205(a)(1)(G)** requires the operator to maintain sufficient machinery and personnel onsite to prevent odor problems and to handle and process the waste in accordance with the permitted operating plan. The requirement that a facility have sufficient capacity to handle projected volumes of incoming landscape waste can be met through site design capacity or by alternative measures, for example a contingency plan for bringing in additional equipment during peak periods.

**Section 830.205(a)(1)(H)** requires the operator to obtain specific authorization to use additives to landscape waste composting material other than water. Additives to landscape waste composting material are not to exceed a rate of 10 percent by volume. In determining whether to authorize the use of a particular additive, the Agency, during its review of a permit application, evaluates the ability of the additive to enhance the composting process yet not result in degradation of end product quality. This provision allows operators the flexibility to use a number of types of additives containing nutrients, innoculants and odor control chemicals while safeguarding, through the authorization process, against the use of improper additives. Additive quantity is limited to protect product quality and prevent landscape waste compost facilities from being outlets for

various waste disposal problems. Chemical analysis of an additive may be necessary prior to authorization to demonstrate that use of an additive does not contribute to contaminants in the end-product compost or degrade the end-product compost quality.

**Section 830.205(a)(2)** requires turning as part of active management of landscape waste composting material. For open composting done under aerobic conditions, each pile or windrow of landscape waste composting material must be turned at least four times per year and not less than once every six months. The reasons for requiring occasional turning of landscape waste composting material are: to aerate the material for odor and leachate control; to break down the material; to distribute moisture; and to innoculate the material to promote rapid composting.

**Section 830.205(a)(3)** requires that landscape waste compost facilities using a contained composting process, as defined in **Section 830.102**, implement mechanisms to control the flow of air within and air emissions from the facility and a mechanism to add water to the composting material. Since containment of composting material serves to concentrate odors, increasing the

.tential for odor complaints, control of air flow and air emissions is necessary at contained composting facilities to prevent nuisance conditions. Control of air emissions is intended to be accomplished through treatment of air emissions, commonly done using scrubbers or filters (Exhibits 2-6, 2-7, 2-8). Control of the air flow through a containment building is typically accomplished by maintaining negative air pressure within the building and treating all exhaust air (Exhibits 2-6, 2-7, 2-8). Adjustment of the moisture content of composting material may be necessary to achieve an optimal rate of composting or to bring composting material to a temperature enabling pathogen destruction.

Contained composting facilities generally are used for organic and mixed municipal waste composting. Therefore, empirical evidence regarding odor control at contained composting facilities comes from organic waste and mixed municipal waste compost facilities (Exhibits 2-6, 2-7, 2-8). The Agency's intent in including operating requirements applicable specifically to contained landscape waste compost facilities is to address the enhanced potential for odors unique to contained processes and to provide a regulatory framework allowing operators the freedom and scope to develop and use contained processes to compost landscape

waste.

**Section 830.205(a)(4)** specifies thermal processing requirements to further reduce pathogens, taken from 40 CFR 503, the federal sludge regulations (Exhibit 1-39 to Dr. Baer's testimony). None of these requirements applies unless a facility's permit so provides. The Agency intends to require thermal processing and/or testing (pursuant to Section 830.504(b)) to demonstrate pathogen reduction meeting the performance standards set forth in Section 830.503(e) only if a facility proposes the use of an additive with the potential to contain pathogens posing a threat to human health or the environment. In determining whether to require a facility to implement one of the thermal processing requirements contained in this Section and/or to do testing for pathogens, the Agency, in reviewing a permit application, will evaluate proposed additives for their potential to harbor pathogens. Recordkeeping and monitoring requirements relating to testing and temperature of the composting material are the proposed means of demonstrating compliance with pathogen reduction requirements. For a detailed discussion of recordkeeping, monitoring and testing provisions, see the testimony addressing those provisions.

**Section 830.205(b)** sets forth operating standards governing the surface upon which composting is done. **Section 830.205(b)(1)** addresses the surface for open composting processes; **Section 830.205(b)(2)** addresses the surface for contained composting processes.

**Section 830.205(b)(1)(A)** requires that the composting area meet one of three requirements. The first alternative is to locate the composting area on relatively impermeable soils, which are defined in Section 830.103 as soils located above the water table having a hydraulic conductivity no greater than $1 \times 10^{-5}$ cm/sec. for a thickness of at least one foot. The second is to locate the composting area on a base certified to have resistance to saturated flow equivalent to the resistance of relatively impermeable soils. The third is to subject the composting area to an early detection and groundwater monitoring program developed in accordance with Appendix A to this Part (see Heather Young's Testimony on Appendix A).

To establish the hydraulic conductivity of soils, for the purpose of these regulations, a facility may rely on laboratory or field testing, examination of soil texture and structure by a qualified groundwater specialist, or referencing and presentation of

previously-collected soil data sufficient to indicate resistance to saturated flow above the water table equivalent to the resistance provided by one foot of soil with a hydraulic conductivity of $1 \times 10^{-5}$ cm/sec.

Results of compost leachate studies suggest that anions such as nitrogen, chloride, sulfate and borate will be leached from composting material into a soil base below (Exhibits 2-4). Nutrients such as potassium and phosphorus and metals such as iron, magnesium, copper, zinc and calcium may be leached from compost. The resulting concentrations of these constituents in the soil and impact on the water table depend not only on the hydraulic conductivity of the soil but also on pH, organic matter content of the soil and ion exchange capacity. Most constituents in landscape waste leachate are attenuated in the soil surface and subsoil layers. Some cations such as calcium, magnesium, iron and manganese may contribute to increased hardness of underground waters. The precautions specified in these regulations are intended to control leachate from landscape waste composting material in accordance with Sections 21(q)(3), 22.33 and 39(m) of the Act. The impact of cumulative loading of leachate on compost site soils requires further investigation.

The CQSTAC had difficulty agreeing on a criterion to use to regulate compost surfaces (Exhibits 1-28D, 1-28F to Dr. Baer's testimony). Soils at Illinois compost facilities have not been evaluated to determine whether their chemical and physical characteristics are favorable for treating landscape waste leachate. A study of site soils in Lake County, Illinois, indicated minimal impact on the soils from composting (Exhibit 1-3E to Dr.Baer's testimony).

The CQSTAC could not reach a consensus regarding the soil thickness, type and hydraulic conductivity needed to attenuate leachate and prevent water table impact (Exhibit 1-28F to Dr. Baer's testimony) . Standards designed to protect the water table, set forth in Sections 21(q)(3)(D) and 39(m)(4) of the Act, require a thickness of five feet between composting material and the water table but are silent on the type of material and its properties. The IEPA has provided a standard addressing these points.

As calculated by Dr. Cole (Exhibit 1-108 to Dr.Baer's testimony), travel time through the resistance layer proposed in this subsection is approximately 30 days. Soil may be used as the treatment mechanism for leachate upon demonstration of adequate

soil properties to attenuate potentially hazardous constituents prior to migration of the leachate into underground waters. All facilities required to have a permit must demonstrate adequate protection of the water table or monitor for any adverse impact. Compliance with this subsection must be certified by a qualified groundwater specialist.

**Section 830.205(b)(1)(B)** specifies design requirements for the composting area. These requirements include diversion of stormwater around composting material, managing stormwater runoff that has come in contact with composting material and maintaining access to composting material during inclement weather without destruction of the composting surface. Specifically, the compost area must be sloped at two percent to promote drainage. Runoff management must be sufficient to reduce total suspended solids. This is generally accomplished by retention, detention or filtering devices. Odor problems have occurred at Illinois facilities due to poor surface conditions, attributable to inadequate design of the composting surface, preventing access to composting material.

**Section 830.205(b)(2)(A)** specifies the type of surface upon which contained composting may be conducted. This provision parallels

Section 830.205(b)(1)(A), requiring that a soil surface must be relatively impermeable. This is usually accomplished by compaction. A manmade surface must be engineered to withstand the forces imposed on it for the life of the surface without a significant increase in hydraulic conductivity, or monitoring is required. Monitoring consists of early detection and groundwater monitoring pursuant to Section 830.205(m)(4) and in accordance with Appendix B of these regulations.

**Section 830.205(b)(2)(B)** requires that the composting surface support all structures and equipment. This requirement is intended to protect against migration of contaminants into underground waters.

**Sections 830.205(c) through (l)** set forth the minimum operating standards for permitted facilities necessary for control of nuisances and to conduct safe operations. Control of nuisances such as noise, vectors, dust and litter is required to prevent off-site impacts and violations of the Act and regulations promulgated under the Act. These nuisance controls were derived from the landfill regulations at 35 Ill. Adm. Code 811.107. These subsections mandate availability of utilities and equipment to do the job and nuisance control to demonstrate compliance with

operating requirements and quality of the end-product compost.

**Section 830.205(c)** requires that all utilities necessary for safe operation be available at a facility at a facility at all times. This may be achieved by public utility connection or by portable equipment.

**Section 830.205(d)** requires that equipment at a compost facility be maintained. This Section also requires that auxiliary or rental equipment be brought on-site as needed to maintain compliance with permit conditions. Due to the daily inflow of waste to a compost facility and potential odor problems if such waste is not managed quickly upon receipt, composting equipment must always be available to manage incoming waste. Delays in processing incoming waste and composting material due to prolonged equipment repair time have caused odor problems at Illinois facilities. Landfills and transfer stations are required to have equipment on-hand to contain and manage each day's waste by the end of the operating day. We find landscape waste needing similar attention.

**Section 830.205(e)** prohibits open burning unless a permit is secured from the Agency's Division of Air Pollution Control for

the activity. Open burning is discouraged.

**Section 830.205(f)** requires implementation of methods for controlling dust in accordance with air pollution control regulations 35 Ill. Adm. Code 212 Subparts B and K. Dust control must be implemented to prevent fugitive dust emissions off-site. At open composting sites dust control is generally required on haul roads, in turning composting material and, in some operations, when forming windrows. Haul roads over soil surfaces must usually be rocked or paved to control dust. Composting material must be moist when turned or low dust emission equipment used to reduce dust. Dust emissions have caused off-site impacts at some Illinois compost fac lities resulting in enforcement citations. During dry weather, when dust is easily produced, care must be taken to slow down vehicles and equipment at a compost facility until adequate moisture has been spread on-site. In some instances material turning or other dust-producing operations may have to cease until weather conditions improve. Current dust control practices include watering haul roads, wetting composting material during turning, wetting incoming landscape waste after grinding, and paving areas of heavy vehicle traffic.

**Section** 830.205(g) requires all composting facilities to meet the noise limits specified in 35 Ill. Adm. Code 900-905, pursuant to Section 24 of the Act. Noise measurements are taken to determine compliance in noise complaint situations. Some common approaches to control noise at compost facilities include minimizing truck backing on-site to reduce vehicle back-up beeper noise, operation of noisy equipment at hours of the day most compatible with the surrounding area, installation of noise-reducing mufflers on equipment, slowing of equipment cooling fans to reduce machine noise and constructing berms to break up sound transmission.

**Section** 830.205(h) requires vector control at all permitted compost facilities. Waste material brought to a compost facility and waste piles on-site can harbor rodents and insects. Control is typically maintained through periodic inspection and immediate corrective action in response to any vector problem.

**Section** 830.205(i) specifies that fire extinguishers must be maintained at compost facilities. A water supply must be available for fire protection. Communication equipment is required, in accordance with Section 830.205(c) of this Part.

**Section** 830.205(j) specifies that litter must be controlled at

permitted compost facilities. Daily patrol of the facility for litter collection and disposal is required. The operator is responsible for any litter from operations that is strewn beyond the facility boundaries. Paper from paper yard waste bags and incidental paper and film plastic contamination in the waste received create potential litter problems. Initial shredding of the waste material can exacerbate litter problems. Moisture must be maintained to control blowing paper, and film plastic contaminants must be picked from the waste.

Section 830.205(k) specifies that operating procedures at a compost facility must include plans for the collection, containment and disposal of non-compostable waste removed from landscape waste and landscape waste composting material. The soda cans, golf balls, tennis balls, plastic, wire and rope contaminants seen at many Illinois facilities in the composting material appear to be the most conspicuous contaminant problems. These contaminants become more difficult to recover from composting material after it is processed for size reduction. Screening is used to remove or reduce film plastic contamination in composted material.

Section 830.205(l) requires that mud tracking be controlled at

compost facilities to prevent mud from being carried off-site onto public roadways. Site improvements must be made to keep waste delivery vehicles out of the mud, or mud must be cleaned from vehicles before they leave the facility.

**Section 830.205(m)** specifies monitoring requirements. **Section 830.205(m)(1)** addresses monitoring applicable to batch, windrow and pile systems. Monitoring of the temperature, moisture level and, for aerobic composting, the oxygen level of composting material is required. Monitoring of these key factors enables an operator to tell when and to what extent adjustments are necessary. In addition, monitoring records provide documentation of compliance with other applicable requirements in these regulations and with the facility permit. The frequencies of monitoring required are, in our opinion, adequate to provide data trends without being unduly burdensome.

**Section 830.205(m)(2)** addresses monitoring applicable to in-vessel continuous feed systems. The same parameters - temperature, moisture level and, for aerobic composting, oxygen level - are required to be monitored. Monitoring is required daily due to the faster composting rate of an in-vessel continuous feed system.

**Section 830.205(m)(3)** provides the IEPA the discretion to require additional monitoring to demonstrate compliance with the Act or these regulations. Additional monitoring may be needed for a particular composting technique or facility location. Also, the IEPA may need to require additional monitoring at a facility experiencing problems.

**Section 830.205(m)(4)** requires that early detection and groundwater monitoring be done in accordance with 830.Appendix A. Heather Young's testimony addresses the early detection and groundwater monitoring program set forth in 830.Appendix A.

**Section 830.206, Subsections (a) through (o)** require the operator to provide descriptions of the proposed waste handling and waste treatment operations. These subsections require the detailed presentation, in an operating plan, of the methods by which the operating standards of Section 830.205 will be met. The operating plan allows the explanation of the individual approach of each facility. The information contained in an operating plan will be incorporated by reference in the facility's operating permit. The operating plan must document how the production of general use compost can be accomplished while minimizing odors or other nuisance conditions. Use of an operating plan was agreed

upon by the CQSTAC as a means to allow the level of diversity in operating practices found at Illinois facilities. The use of an operating plan is also being proposed by the National Composting Council (Exhibit 1-13 to Dr. Baer's testimony). The operating plan documents the methods by which the facility, in conducting its composting activities, will meet the requirements contained in these regulations.

Section 830.207 specifies that any salvaging done at permitted landscape waste compost facilities must be conducted in a manner which does not create an unsightly appearance, cause odor problems or harbor vectors. Speculative accumulation of waste is prohibited. Firewood is the only material that has been salvaged from Illinois facilities, to the IEPA's knowledge. This provision addressing salvaging was taken from the landfill regulations at 35 Ill. Adm. Code 811.108.

Section 830.208 requires access control at permitted landscape waste compost facilities to prevent random dumping. Posting at the site entrance of public information including the facility name and its operating hours is required.

Section 830.209 requires that loads of incoming landscape waste

and other materials be inspected for acceptability at the facility. Personnel of the compost facility must inspect each load for contaminants and remove them prior to processing . After contaminants are mascerated it becomes more difficult to remove them. This inspection for and removal of contaminants helps protect processing equipment from damage as well.

Section 830.210 addresses personnel training at permitted landscape waste compost facilities. Section 830.210(a) requires that personnel at a compost facility be trained in operating procedures and emergency procedures at the facility. Initial and annual training of employees at compost facilities is required. Employee familiarity with operating and emergency procedures will help prevent non-compliance with the Act, these regulations or permit conditions. Formal training in how to compost is available from only a few universities and consultants at this time to the best of our knowledge; due to this limited availability, operator training has not been required. The IEPA relies on the demonstration made in the operating plan to assess an operator's knowledge of proper compost technique and nuisance control procedures.

Section 830.210(b) requires training of new employees prior to

their participation in operations at the facility. The level of training required is limited to that which is relevant to their employment responsibilities.

**Section 830.210(c)** mandates that the operator document compliance with the personnel training required, by having personnel sign an acknowledgement to that effect. Such acknowledgement serves as documentation of compliance with the requirements of this Section.

**Section 830.210(d)** requires that the facility operating plan be made available and explained to all employees. The operating plan contains the methods by which the facility will comply with the Act and these regulations. In the IEPA's opinion, requiring that all employees be familiar with the operating plan will reduce the likelihood of noncompliance.

**Section 830.211** specifies recordkeeping requirements for permitted landscape waste compost facilities. Recordkeeping serves the purpose of tracking waste in the State by identifying the type of waste received and the end-product produced. The records required under this Section must be kept at the facility or other permitted location. All records must be kept for at

least 3 years.

Subsections 830.211(b)(1)-(3) require the recording of the type of landscape waste and additives received at the facility. Subsections 830.211(b)(4)-(6) require that a daily log of operations be maintained identifying when windrows are turned and weather conditions. Subsections 830.211(b)(7)-(9) require the recording of any complaints and actions taken to address them. Subsection 830.211(b)(10) requires that sample collection quality assurance records be maintained. Subsection 830.211(b)(11) requires recordkeeping of the quantity of end-product compost sold.

**Section 830.212** requires that a written plan be developed for dealing with typical problems encountered at compost facilities and some emergency situations. Having and keeping these contingency plans on-site will speed up corrective actions in emergencies and maintain compliance with permit requirements.

**Section 830.213** requires permitted compost facilities to develop a written closure plan. The closure of a landscape waste compost facility generally commences with ceasing to accept new waste and terminates when waste, composting material and compost are

removed from the site to the extent necessary to prevent threats to the environment.

**Section 830.213(a)** specifies that a closure plan must contain a description of actions to be taken during unexpected closure of the site and for planned closure of the site.

**Section 830.213(b)** requires that the facility closure plan be retained at the facility or designated other location.

**Section 830.213(c)** requires an operator to file a revised closure plan when closure cost estimates are increased.

**Section 830.213(d)** requires an operator to implement approved closure activities within 30 days of closure.

**Section 830.213(e)** requires that the operator inform the public of site closure by posting a sign at the facility entrance stating the facility is closed.

**Section 830.213(f)** requires an operator to notify the Agency in writing within 30 days of site closure by filing a closure report form with the Agency.

**Section 830.213(g)** specifies the actions necessary to complete closure of a landscape waste compost facility and terminate the facility permit. An affidavit by the operator stating that the facility has been closed in accordance with the closure plan is required. The Agency will issue a certificate of completion of closure to terminate a permit.

GC/mls/sp86W/1-13

Ex 1.3.43

**BEFORE THE**

**ILLINOIS POLLUTION CONTROL BOARD**



| | | |
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| **IN THE MATTER OF:** | ) | |
| | ) | |
| | ) | **R93-29** |
| | ) | **(Rulemaking)** |
| **REGULATION OF LANDSCAPE WASTE COMPOST FACILITIES** | ) | |
| | ) | |
| | ) | |

**TESTIMONY OF HEATHER YOUNG**

My name is Heather Young. I have worked for the Illinois Environmental Protection Agency (IEPA) since October 16, 1991. I hold the position of an Environmental Protection Specialist in the Groundwater Assistance Unit, Permit Section, in the Bureau of Land. My primary responsibility is the technical review of permit applications, closure plans, remediation proposals and proposed adjusted standards in relation to groundwater, including groundwater contaminant transport modeling, under the Resource Conservation and Recovery Act (RCRA) (Subtitle C and Subtitle D), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (also known as Superfund) programs. I developed guidance for the interpretation of the 35 Ill. Adm. Code 620 Groundwater Quality Standards, aided in the development of IEPA guidance for the landfarming of petroleum contaminated soils (Exhibit 3-2) and reviewed the proponent's testimony and provided cross examination questions and additional testimony regarding the analytical model used to support the R90-26 Steel and Foundry Industry Amendments to the Landfill Regulations (35 Ill.

Adm. Code 810 through 815 and proposed 35 Ill. Adm. Code 817).

I graduated from Illinois Valley Community College (IVCC) Cum Laude with an Associate of Arts Degree and from Illinois State University (ISU) with a Bachelor of Science Degree in Geology with Departmental Honors. For a complete description of my education and work experience, please see my resume, attached to my testimony as Exhibit 3-1.

Today I will testify in support of proposed Part 830. Appendix A: Early Detection and Groundwater Monitoring Program. Part one of my testimony consists of a brief summary of the rationale supporting Appendix A. Part two of my testimony provides a brief overview of and the justification for the requirements in each subsection of the Appendix.

Part One

Appendix A was developed considering all three types of composting facilities: landscape waste; organic waste; and mixed municipal waste. In developing proposed regulations for organic and mixed municipal waste, the Agency may expand this Appendix and incorporate additional restrictions, if needed, into the main body of the proposed regulations. Keeping in mind that no landscape waste composting facility meeting the proposed standards in Section 830.205(b)(1)(A) or (b)(2)(A) (located on relatively impermeable soils or equivalent base) will be required to conduct monitoring,

when monitoring is required an early detection program using lysimeters would be the most common and appropriate monitoring system. Groundwater monitoring would be for unique situations and determined by the location of the water table. Groundwater monitoring is expensive and may not be appropriate considering depth to groundwater and the nature of the constituents expected in leachate produced from a landscape waste compost facility. For example, analysis of groundwater samples for routine metals, nitrates, ammonia and other routine inorganics costs approximately $400 per well. The addition of a volatile organic analysis would raise the cost to approximately $600 per well. If a compost facility had four groundwater monitoring wells and analyzed samples quarterly, the cost to the compost facility per year at $400 per well would be approximately $6400. The $6400 covers only the analysis of the groundwater samples, not the installation, sampling or maintenance of the groundwater monitoring wells. It would be unreasonable to require an operator to conduct such costly monitoring when the water table is, for example, fifteen or twenty five feet below ground surface with relatively impermeable materials above the water table, since the main constituents of concern in landscape waste compost leachate (nitrate, ammonia and soluble salts) are not hazardous pursuant to RCRA (35 Ill. Adm. Code 721 Subpart D).

Many requirements included in the Appendix are taken from other regulations already promulgated by the Board. The concerns addressed in this Appendix parallel those addressed in the regulations from which these requirements are taken. It is believed

that these requirements are reasonable and accepted standards as well as protective of human health and the environment.

The cutoff of ten feet to groundwater used to determine whether groundwater monitoring or an early detection monitoring system is required is drawn from 35 Ill. Adm. Code 620.210(a) and supported by the record of R89-14C (35 Ill. Adm. Code 620 standards). In that proceeding the Board, "...recognized that many surface activities can impact very shallow underground water without also impacting the great bulk of potable groundwater.". The Board endorsed the ten foot rule as a reasonable compromise between the need to protect potable groundwater and the need to carry on legitimate surface activities. Landscape waste composting is a legitimate surface activity. This is further discussed in Section 830.Appendix A Subsection(a)(3) in Part II of my testimony.

It has been suggested in a comment received during the development of these proposed regulations that Appendix A should require the establishment of background groundwater quality for compost facilities (see Exhibit 1-108 of Shirley Baer's Testimony). Background is not always necessary upfront. If a facility is triggered into an assessment or evaluation, background groundwater quality may be investigated or more extensively developed at that point, deferring the cost of background analysis until needed. This is not a strange concept in that only permitted land disposal operations are required to establish background groundwater quality; sites relgulated through other programs such as Superfund, LUST sites or the State voluntary program

gather such data at the point an impact is suspected. This type of monitoring is conducted by evaluating the routine monitoring data generated at a point immediately downgradient of the unit of concern. If an adverse trend is identified, the additional background data is then gathered for further comparisons. Establishing background in this manner rather than as proposed by Kevin Rogers in Exhibit 1-108 of Shirley Baer's Testimony, delays the expense until such time as needed.

Part Two

Section 830.Appendix A provides minimum procedures and standards for an early detection or groundwater monitoring system applicable to any compost facility which does not meet the additional operating standards for permitted landscape waste compost facilities set forth in 35 Ill. Adm. Code 830.205(b)(1)(A) or 35 Ill. Adm. Code 830.205(b)(2)(A).

Section 830.Appendix A.Subsection (a) instructs the operator to perform a hydrogeologic investigation to determine which program, early detection or groundwater monitoring, he must propose as part of an application for a facility permit. The monitoring system must be capable of detecting an impact or potential impact to groundwater. If such an impact is proven to exist, additional steps set forth in subsection (e) must be taken to evaluate the impact and to propose and complete further evaluation and, if necessary, remedial action.

Section 830.Appendix A.Subsection (a)(1) states that a hydrogeologic site investigation must be performed pursuant to subsection (b) to determine the location and quality of groundwater and subsurface characteristics. Presently, hydrogeologic site investigations parallel to the investigation required by this subsection are performed to determine the uppermost aquifer, to design appropriate monitoring systems and to determine appropriate groundwater classification pursuant to 35 Ill. Adm. Code 620, 724, and 725, respectively. A hydrogeologic site investigation is also required at municipal solid waste landfills pursuant to 35 Ill. Adm. Code 811.315 and at steel and

foundry landfills pursuant to proposed regulations 35 Ill. Adm. Code 817.411. A hydrogeologic site investigation is key in determining whether land-based activities will have an impact on groundwater and, if so, to what extent.

Section 830.Appendix A. Subsection(a)(2) states that an appropriate monitoring system shall be designed, capable of determining the compost facility's impact or potential impact on the quality of groundwater beneath the facility. The phrase "appropriate monitoring system" is used rather than the specification of a certain number of monitoring devices or wells so that there is flexibility to design a monitoring system capable of detecting an impact from the facility based on the site specific hydrogeologic information obtained from the site investigation.

Section 830.Appendix A.Subsection(a)(3) identifies when an early detection system rather than a groundwater monitoring system may be used. If the water table is located greater than ten (10 ) feet below the ground surface and the soil has been classified as a soil exhibiting moderate or poor drainage by the U.S. Department of Agriculture's Soil Conservation Service on a published county soil survey map, the operator is given the option of installing either an early detection system, pursuant to subsection (d)(1) of the Appendix, or a groundwater monitoring system, pursuant to subsection (d)(2) of the Appendix. Otherwise, the operator is required to install a groundwater monitoring system, pursuant to subsection (d)(2) of the Appendix. The Agency relies on the Board's rationale for adopting the 10 foot rule in 35 Ill. Adm. Code Part 620 to justify the use of ten feet in this subsection as the criterion for

requiring a groundwater monitoring program. With the promulgation of Part 620, the impact of legitimate surface activities on shallow underground water was recogn ed. (Underground water as defined in the Illinois Groundwater Protection Act means all water beneath the land surface.) The "ten foot" rule, contained in 35 Ill. Adm. Code 620.210(a), states that groundwater occuring within ten feet of the land surface is always Class II, III or IV, depending on the local circumstances, and groundwater occurring greater than ten feet below the land surface may be classified as potable resource groundwater or Class I groundwater. In the Opinion and Order of the Board for 35 Ill. Adm. Code 620, "Lastly the Board notes that the 10-foot rule arises from the need to recognize that many surface activities can impact very shallow underground water without also impacting the great bulk of potable groundwaters.... The Board today endorses the "ten-foot" rule as a reasonable compromise between the need to protect potable groundwater and the need to carry on legitimate surface activities, of which agriculture is but one." Landscape waste composting is a legitimate surface activity.

An early detection system is much more practical than directly monitoring the groundwater in situations in which the groundwater is located fifteen, thirty or forty feet below the ground surface, as it is unlikely that leachate from a landscape waste composting operation will adversely affect groundwater at these depths.

The drainage characteristic of soil within the upper ten feet was incorporated in subsection (a)(3) to encourage the location of composting facilities in areas with

appropriate natural soil characteristics. Moderately to poorly drained soils should somewhat inhibit the downward movement of water through the soil to provide further protection of groundwater.

Section 830 Appendix A Subsection(a)(4) states that if early detection monitoring or groundwater monitoring indicates an impact on underground water beneath the facility, a site evaluation shall be performed, using the procedures set forth in subsection (e) of this Section, and remedial action implemented, if appropriate. Current regulations such as 35 Ill. Adm. Code 724 Subpart F, 725 Subpart F and 811 Subpart C include provisions requiring evaluation of a suspected or confirmed impact to groundwater and, if necessary, proposal of remedial action. Such procedures are appropriately required in this context as well.

Section 830 Appendix A Subsection(a)(5) states that the results of the hydrogeologic site investigation and the proposed monitoring system design shall be submitted to the Agency as part of an application for a facility permit. Receipt of this information allows the Agency to provide limited oversight on activities proposed, to ensure protection of the groundwaters of the State of Illinois.

Section 830 Appendix A Subsection (b) outlines the minimum requirements of a hydrogeologic site investigation.

Section 830. Appendix A Subsection(b)(1) requires the operator to obtain information

on the regional hydrogeologic setting beneath the landscape waste compost facility. This provision was incorporated from Kevin Rogers' comments dated October 26 1993, submitted to the Board as Exhibit 1-108 of Shirley Baer's Testimony. This information is required for a Phase I investigation pursuant to 35 Ill. Adm. Code 811.315(c). This information is also requested by the Agency in determining groundwater classification pursuant to 35 Ill. Adm. Code 620 Subpart B, as part of an application to landfarm petroleum contaminated soils and when proposing a groundwater monitoring system meeting the requirements of 35 Ill. Adm. Code 724 or 725 Subpart F. From this information the operator and the Agency can determine the level of protection already afforded by the hydrogeologic setting and the amount of additional data which must be collected to adequately characterize the local hydrogeologic setting.

Section 830 Appendix A Subsection (b)(2) requires that information on the site-specific hydrogeologic setting be collected. This information is to be obtained from continuously sampled borings of the site and information collected from on site piezometers (nonpumping wells which are generally small in diameter used to measure the elevation of the water table) or monitoring wells. This provision was incorporated from Kevin Rogers' comments dated October 26, 1993 submitted to the Board as Exhibit 1-108 of Shirley Baer's Testimony. At a minimum the borings must be to a depth of (10) feet, to determine whether, in accordance with Appendix A Subsection (a)(3), an early detection system or a groundwater monitoring system is appropriate for site-specific conditions. Site-specific information obtained from

continuously sampled borings is required as part of a Phase I investigation pursuant to 35 Ill. Adm. Code 811.315(c)(2)(B). This information is also required in groundwater classification pursuant to 35 Ill. Adm. Code 620, a Remedial Facility Investigation as required by a RCRA Part B permit, the determination of the uppermost aquifer pursuant to 35 Ill. Adm. Code 724 Subpart F and the design of groundwater monitoring systems pursuant to 35 Ill. Adm. Code 724 and 725 Subpart F. The information obtained from the borings determines whether regional hydrogeologic information is accurate and characterizes the site-specific hydrogeologic setting.

Section 830.Appendix A.Subsection(b)(3) requires that information be obtained on the soil characteristics, including soil types, physical properties of the underlying strata, and potential pathways for contaminant migration. This provision was incorporated from Kevin Rogers' comments dated October 26, 1993 submitted to the Board as Exhibit 1-108 of Shirley Baer's Testimony. Any confining unit relative to waste constituents expected to be present shall also be identified. Knowledge of the existence of confining units (a body of material of low hydraulic conductivity that is stratigraphically adjacent to one or more aquifers) relative to waste constituents aids in the design of a groundwater monitoring system or early detection system since some waste constituents may react differently to confining units than others. For example, although clay is considered a confining unit, manganese is eluted (removed or washed out) from clay. Therefore, clay may not act as a barrier relative to this particular constituent. The information required of landfills in this subsection is also required pursuant to 35 Ill. Adm. Code 811.315(J), in groundwater classification pursuant to 35

Ill. Adm. Code 620, a Remedial Facility Investigation as required by a RCRA Part B permit and the design of groundwater monitoring systems pursuant to 35 Ill. Adm. Code 724 and 725 Subpart F.

Section 830. Appendix A Subsection(b)(4) requires the operator to obtain information during the hydrogeologic investigation on the water-bearing sediments or geologic units beneath the facility, their classification pursuant to 35 Ill. Adm. Code 620, the direction and rate of groundwater flow and regional and local areas of groundwater discharge and recharge affecting groundwater at the facility. A recharge area is an area in which water is absorbed and added to the zone of saturation. Infiltration moves downward into deeper parts of an aquifer in a recharge area. The discharge of groundwater directly from the zone of saturation upon the land surface or into a body of water as a seep, spring, or baseflow or by evaporation or transpiration occurs in a discharge area. A portion of this requirement was incorporated from Kevin Rogers' comments dated October 26, 1993 submitted to the Board as Exhibit 1-108 of Shirley Baer's Testimony. The information required in this subsection is similar to information required pursuant to 35 Ill. Adm. Code 811.315(d) for landfills. It is also used in a Remedial Facility Investigation as required by a RCRA Part B permit and the design of groundwater monitoring systems pursuant to 35 Ill. Adm. Code 724 and 725 Subpart F. Knowledge of regional and local areas of recharge and discharge is important to predict or anticipate changes in the local hydrogeologic setting.

Section 830.Appendix A. Subsection(b)(5) requires information to be collected on the

water quality beneath the facility. This information is required in 35 Ill. Adm. Code 811.315, a parallel provision.

Section 830.Appendix A.Subsection (c) requires that all drill holes, including exploration borings that are not converted into monitoring wells, monitoring wells that are no longer necessary to he operation of the facility, and other holes that may cause or facilitate contamination of groundwater, be sealed in accordance with the standards of 35 Ill. Adm. Code 811.316. The sealing of abandoned boreholes and monitoring wells prevents the downward migration of surface water which may introduce contamination subsurface. This provision was incorporated from Kevin Rogers' comments dated October 26, 1993 submitted to the Board as Exhibit 1-108 of Shirley Baer's Testimony.

Section 830.Appendix A.Subsection (d) outlines the minimum requirements of an early detection system ((d)(1)) and a groundwater monitoring system ((d)(2)).

Section 830.Appendix A.Subsection(d)(1)(A)(i) requires that early detection monitoring devices be installed hydraulically upgradient (i.e., in the direction of increasing static head) from the facility or at a sufficient distance from the composting area so as not to be affected by it, to establish representative ba ground water quality in the waters beneath or near the facility. The information ot ..ned from such monitoring devices is important in establishing ambient water quality to determine whether an impact from the facility has occurred. An upgradient or background well is required in the design of

groundwater monitoring systems pursuant to 35 Ill. Adm. Code 724 and 725 Subpart F, and 35 Ill. Adm. Code 811.320.

Section 830.Appendix A.Subsection(d)(1)(A)(ii) requires that early detection monitoring devices be installed beneath and around the composting area sufficient to enable the early detection of downward migration of constituents related to the composting activities at the facility. Unlike groundwater monitoring wells, early detection monitoring devices do not have to be installed downgradient, in the direction of groundwater flow, to be effective because they monitor only the vadose zone. Migration of water in the vadose zone, that portion of the soil which is unsaturated between the land surface and the water table, is mainly vertical due to gravity. Therefore, placement of monitoring devices beneath and around the composting area is appropriate.

Section 830.Appendix A.Subsection(d)(1)(B) requires that the parameters monitored be those expected in the leachate considering the type of composting facility. Specific constituents were not identified in this requirement to allow flexibility dependent on the type of composting to be done and additives to be used.

Section 830.Appendix A.Subsection(d)(1)(C) outlines the minimum requirements to be followed if lysimeters are the early detection devices to be utilized. Lysimeters measure concentrations of constituents present in the vadose zone. Since water does

not "flow" in the vadose zone, a vacumn is applied to the lysimeter which draws soil moisture inside the lysimeter. The minimum requirements were taken from page five, Groundwater Protection, of the IEPA guidance document entitled, "Land Treatment of Petroleum Contaminated Soils" (Exhibit 3-2). This guidance document is intended to aid in the preparation of a permit application to landfarm petroleum contaminated soil, non-hazardous only. The groundwater protection requirements taken from the guidance document are appropriate in the context of composting.

Section 830.Appendix A.Subsection(d)(1)(C)(i) requires that lysimeters be located, when possible, in a depression in the path of site runoff in each direction of flow and topographically low areas associated with the composting facility. In such areas infiltration may be increased due to increased surface-water contact and possible ponding which may initially increase the rate of downward water movement. Since lysimeters can be difficult to obtain a sample from, the chances of obtaining a sample will be greater when more water is available in the soil which would most logically be after a rain event.

Section 830.Appendix A.Subsection(d)(1)(C)(ii) requires at a minimum that each lysimeter be sampled within 48 hours of each rain event exceeding 0.5 inches, provided that the rain event is not within two weeks after the date previous samples were successfully collected. Lysimeters installed at an angle may be only three feet below the ground surface. Since a lysimeter collects underground water very near the surface, it is logical to relate the sampling of the lysimeters to rain events. The

increased supply of water will increase the ability to obtain a sample from the lysimeter. As stated in the requirement, this is only a minimum.

Section 830.Appendix A.Subsection(d)(1)(C)(iii) requires that any lysimeter placed around the perimeter be installed at an angle so that the cup of the lysimeter is beneath the unit(s). This requirement is included since any leachate that escapes the composting area will migrate mainly in a vertical direction and the cup of the lysimeter, where the sample is physically drawn into the lysimeter, will be closer to the composting surface.

Section 830.Appendix A.Subsection(d)(2)(A)(i) requires that groundwater monitoring wells be installed hydraulically upgradient from the facility to establish representative background water quality in the groundwater beneath or near the facility. This will allow the collection of ambient groundwater samples for comparison to downgradient groundwater samples. Such monitoring wells are required pursuant to 35 Ill. Adm. Code 811.320(d)(2) and 35 Ill. Adm. Code 724 and 725 Subpart F, parallel contexts.

Section 830.Appendix A.Subsection(d)(2)(A)(ii) requires that groundwater monitoring wells also be installed hydraulically downgradient from the compost facility. Downgradient wells are also required in the design of groundwater monitoring systems pursuant to 35 Ill. Adm. Code 811.318(b) and 35 Ill. Adm. Code 724 and 725 Subpart F. This monitoring allows for the collection of information on groundwater quality and groundwater elevations for utilization in evaluations, pursuant to subsection

(e), of a suspected impact on groundwater.

Section 830.Appendix A.Subsection(d)(2)(B) requires that the parameters monitored be those expected in the leachate considering the type of composting facility. Specific constituents were not identified into this requirement to allow flexibility dependent on the type of composting to be done and the additives to be used.

Section 830.Appendix A.Subsection(d)(2)(C) requires that the monitoring system be installed at the closest practicable distance from the composting area boundary or at an alternate distance specified in the permit. This is similar to 35 Ill. Adm. Code 811.318(b)(3) and is also required in the design of groundwater monitoring systems pursuant to 35 Ill. Adm. Code 724 and 725 Subpart F.

Section 830.Appendix A.Subsection(d)(3) requires approval of an early detection system or groundwater monitoring system by the Agency prior to operation. Receipt of this information allows the Agency to provide limited oversight on activities proposed, to ensure protection of the groundwaters of the State of Illinois.

Section 830.Appendix A.Subsection(e) outlines the methods of evaluation to be used, if necessary, after collection of monitoring data.

Section 830.Appendix A.Subsection (e)(1)(A) requires further evaluation of an impact to underground water if exceedance of the appropriate standard as stated in 35 Ill.

Adm. Code 620 is confirmed. This standard is applicable only to groundwater concentrations since the 620 groundwater standards apply only to groundwater. This requirement is appropriate to include since 35 Ill. Adm. Code 620 applies to all resource groundwaters or other groundwaters of Illinois, as set forth in 35 Ill. Adm. Code 620.440.

Section 830.Appendix A.Subsection(e)(1)(B) requires further evaluation of an impact to underground water when measured parameters other than pH show a progressive increase in concentration over two consecutive sampling events. This requirement applies to an early detection system monitoring the vadose zone. To my knowledge, no standards similar to 35 Ill. Adm. Code 620 groundwater quality standards have been promulgated by the Board for underground waters present in the vadose zone. In the absence of any such standards, it is felt that two consecutive sampling events provide a built in confirmation of an impact to underground water warranting further evaluation pursuant to subsection (e)(3).

Section 830.Appendix A. Subsection(e)(1)(C) requires further evaluation of an impact to underground water where a statistical increase over background or upgradient concentrations, calculated in accordance with 35 Ill. Adm. Code 811.320(e), is observed. Parallel statistical evaluations are required in 35 Ill. Adm. Code 811. 320(e) and 35 Ill. Adm. Code 724 and 725 Subpart F.

Section 830.Appendix A. Subsection(e)(2) allows the confirmation of either the

exceedance of an applicable groundwater quality standard or a statistically significant increase by resampling. Confirmation by resampling is allowed pursuant to 35 Ill. Adm. Code 811.319(a)(4), 620.305, 724 and 725. This allows the operator an opportunity to determine whether the observed exceedance or increase is indeed just that or if it is an anomaly, seasonal fluctuation or due to field or laboratory error.

Section 830.Appendix A. Subsection (e)(3) requires the operator to propose, as a permit modification, a plan to address an impact to groundwater as evaluated and confirmed in subsection (e)(1) and (e)(2). Similar requirements are included in 35 Ill. Adm. Code 811, 724 and 725.

Exhibit 5


**BEFORE THE**
**ILLINOIS POLLUTION CONTROL BOARD**

| | | |
|---|---|---|
| **IN THE MATTER OF:** | ) | |
| | ) | |
| | ) | **R93-29** |
| | ) | **(Rulemaking)** |
| **REGULATION OF LANDSCAPE** | ) | |
| **WASTE COMPOST FACILITIES** | ) | |
| | ) | |

**TESTIMONY OF JOHN TAYLOR**

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

**MEMORANDUM**

**Date:** March 3, 1994

**To:** Judy Dyer - Division of Legal Counsel
**From:** John Taylor - Bureau of Land

**Re:** TESTIMONY IN SUPPORT OF FINANCIAL ASSURANCE REGULATIONS (Subpart F of 830)

My name is John Taylor. I am employed as a financial assurance analyst by the Illinois Environmental Protection Agency. My work address is:

JOHN TAYLOR
PLANNING AND REPORTING SECTION
BUREAU OF LAND
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
POST OFFICE BOX 19276
SPRINGFIELD, ILLINOIS 62794-9276
Office Telephone: 217/782-6761
Desk Telephone: 217/782-9613
Telecopier: 217/524-4193

My educational background is as follows:

I was awarded a Master of Business Administration degree from the John M. Olin School of Business, Washington University in St. Louis, Missouri and a Bachelor of Arts in Economics, Summa Cum Laude, from Sangamon State University in Springfield, Illinois. I graduated from Sangamon State University with a 4.0 Grade Point Average. While at Sangamon State University I was a member of the School of Business Curriculum Committee, the Dean's Advisory Committee and President of The Economics Club. I edited the Economics Club bulletin and was a Graduate Member of the Omicron Delta Epsilon Graduate Honor Society in Economics.

My relevant professional experience is as follows:

I have been employed by the Illinois Environmental Protection Agency as a Financial Assurance Analyst from January, 1990 to the present time. I currently have sole responsibility for compliance tracking of $165 million of solid waste financial assurance. Further, I have authority to determine compliance, initiate appropriate enforcement proceedings and negotiate settlements on behalf of the Agency. I serve as a financial assurance expert, developing

and writing regulatory proposals and testimony, assisting enforcement attorneys and testifying as an expert witness. I previously was employed by the Agency as a Field Operations Specialist from 1975 to 1980.

I have been employed in several capacities in the environmental control industry. I served as Marketing Manager for the Donley Companies, then owner of Christian County (Five Oaks) Recycling and Disposal Facility of Taylorville, Illinois, and several other landfills, from 1988 to 1990. I was Vice President and Corporate Secretary for DTC Laboratories, Inc., of Springfield, Illinois from 1987 to 1988. I served as Director of Regulatory Compliance for Peoria Disposal Company, a hazardous waste transporter and disposer, from 1981 to 1983 and was employed as an Environmental Engineering Consultant by M. Rapps Associates of Springfield, Illinois from 1980 to 1981 and again from 1983 to 1984.

PROPOSED COMPOST FINANCIAL ASSURANCE REQUIREMENTS

Three sections of the Act require the IEPA to propose to the Board performance standards for financial assurance plans for restoration of landscape waste, organic waste and mixed municipal waste compost sites. Specifically, Sections 22.33(a), 22.34(a) and 22.35(a) of the Illinois Environmental Protection Act[1] require the Agency to develop and recommend, inter alia, performance standards for these three types of compost facilities which are to include:

> a financial assurance plan necessary to restore the site as specified in Agency permit.[2]

The Agency feels that this statutory directive does not impart the authority necessary to require financial assurance demonstrations similar to those required under the Solid Waste and Hazardous Waste Rules, whereby operators are required to provide binding financial commitments to the Agency. It appears that the compost site operator need only make a showing of compliance with a permit approved plan to restore the site.

Given this constraint, the Agency has developed the proposed rules which require the operator either to establish a fund to cover the cost of site closure and cleanup or to provide evidence of financial staying power and strength to show that the operator can remain in business into the future and will have the financial resources to properly close the facility.

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[1] 415 ILCS 5/1 et seq.
[2] 415 ILCS 5/22.33(a)(5), 22.34(a)(5) and 22.34(a)(5).

The Agency feels that there is not sufficient legislative authority to require the posting of surety bonds, letters of credit or some form of closure insurance.

Also, the Agency has no first hand experience or guidance to propose any form of municipal self-insurance at this time. Although the USEPA has proposed Local Government Financial Tests for both underground storage tank (UST) facilities and Subtitle D municipal solid waste landfill (MSWLF) facilities, the information gathered and used to develop these standards has not been available to the Illinois EPA. Without a review of the underlying rationale for these proposed USEPA regulations, it is not possible to develop an opinion as to their possible suitability for the purpose at hand.

COMMENTS SPECIFIC TO SECTIONS

Section 830.601 Scope and Applicability

This section provides the scope of financial assurance requirement and states that separate financial assurance is not required if the compost facility closure is included in a RCRA or Solid Waste closure plan and financial assurance for that plan has already been provided.

Section 830.602 Financial Assurance Plan

This section sets forth the financial assurance plan requirement and requires selection of a financial mechanism by the operator.

Section 830.603 Written Cost Estimate

This section requires the operator to provide a detailed cost written cost estimate and requires the operator to revise the estimate whenever a change in the closure plan increases costs.

Section 830.604 Financial Assurance Fund

This section requires the operator to provide financial assurance and that any funds so accumulated shall be used for the stated purpose.

Section 830.605 Financial Assurance Mechanism

This section requires the use of one of two mechanisms. As the Agency feels that the legislative mandate does not allow the Board to require a financial obligation to the Agency, the best alternative is to require the operator to establish and maintain monetary reserves for closure of the facility. In the alternative, operators may also self-insure by passing a net worth test identical to the one formerly

contained in the Board's Solid Waste Rules at 35 Ill. Adm. Code 811.715.

Section 830.606 Financial Assurance Certification

This section sets forth the required mechanism for reporting financial assurance plan information to the Agency. Certification is envisioned as the method of demonstrating compliance with this Subpart.

JPT/jt

Exh. 1



**BEFORE THE**
**ILLINOIS POLLUTION CONTROL BOARD**

| | | |
|---|---|---|
| **IN THE MATTER OF:** | ) | |
| | ) | |
| | ) | **R93-29** |
| | ) | **(Rulemaking)** |
| **REGULATION OF LANDSCAPE** | ) | |
| **WASTE COMPOST FACILITIES** | ) | |
| | ) | |

# TESTIMONY OF SHIRLEY BAER

My name is Shirley Baer. I have worked at the Illinois Environmental Protection Agency ("IEPA") in the Bureau of Land for 5 years. I was a project manager in the Solid Waste Management Section from February 1989 to October 1989, and a project manager in the Federal Sites Unit in the Remedial Project Management Section from September 1989 to October 1991. I joined the Disposal Alternatives Unit in the Permit Section on October 1, 1991 to help coordinate and implement the Potentially Infectious Medical Waste ("PIMW") program mandated by Title XV of the Illinois Environmental Protection Act (415 ILCS 5/1(1992)) ("Act"). This included working with the Illinois Medical Waste Study Group and IEPA personnel on the development of the PIMW regulations. The PIMW regulations were adopted by the Illinois Pollution Control Board ("Board") on June 14, 1993. Since March 1993, I have been working on the development of compost quality standards for landscape waste compost facilities, organic waste compost facilities, and mixed municipal waste compost facilities.

My educational background is in the life sciences. I received a bachelor degree in Botany and a master of science degree in Food Science & Technology at the University of California at Davis, in 1979 and 1982, respectively. My master's thesis was on the inhibitory effects of metabolic end-products on the fermentation

of whey by Klebsiella pneumoniae. In 1982, I was awarded a graduate research internship at the University of Illinois at the Urbana-Champaign campus in the Department of Food Science. My doctorate was on the changes in the biological membranes of two strains of Clostridium acetobutylicum when exposed to elevated concentrations of butanol. Upon receiving my doctorate in Food Science, prior to working at the IEPA, I worked briefly at the Southern Illinois University School of Medicine in Springfield as a research associate. For a complete description of my education and work experience please see my resume, attached to my testimony as Exhibit 1-83.

Today I will testify in support of Subpart A (General Provisions) and Subpart E (Quality of Finished Products) of proposed Part 830. I will be providing some general background information on landscape waste composting in Illinois, before I describe, in detail, the substance of the regulations and the justification for the requirements in each Subpart.

LANDSCAPE WASTE MANAGEMENT IN ILLINOIS

The Illinois Solid Waste Management Act, enacted in September 1986, established the State's commitment to address solid waste

management needs in Illinois. The Solid Waste Management Act states:

> It is the purpose of this Act to reduce reliance on land disposal of solid waste, to encourage and promote alternative means of managing solid waste, and to assist local governments with solid waste planning and management. In furtherance of those aims, while recognizing that landfills will continue to be necessary, this Act establishes the following waste management hierarchy, in descending order of preference, as State policy:
>
> 1. volume reduction at the source;
> 2. recycling and reuse;
> 3. combustion with energy recovery;
> 4. combustion for volume reduction; and
> 5. disposal in landfill facilities.

Landscape waste[1] has been estimated to comprise approximately 18% of the national municipal solid waste ("MSW") stream on an annual basis (Exhibits 1-73 and 1-97). In Illinois, landfill disposal

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[1]Landscape waste is defined in Section 3.20 of the Act and these proposed regulations as "all accumulations of grass or shrubbery cuttings, leaves, and tree limbs and other materials accumulated as the result of the care of lawns, shrubbery, vines and trees".

of landscape waste has been banned since July 1, 1990[2].

In response to the ban, various management practices have been employed to decrease the fraction of MSW comprised of landscape waste. Several of these management practices have satisfied one or both of the first two hierarchical strategies - volume reduction at the source and recycling and reuse. For example, the practice of allowing grass clippings to remain on the lawn as mulch is a significant means of source reduction. Leaving the grass clippings on the lawn is beneficial so long as other good lawn maintenance practices, for instance frequent mowing, are followed (Exhibits 1-28A, 1-73, 1-91D, 1-91E, 1-94, and 1-80). Reduction in the quantities of landscape waste generated can also be accomplished by the selection of appropriate plant species in designing a landscape. For example, shrubbery requiring minimal or infrequent pruning would generate less landscape waste (Exhibit 1-73). The process of collecting landscape waste separately, processing it into a usable product (compost or woodchips), and then utilizing that product is a form of recycling and reuse (Exhibits 1-71 and 1-94).

Composting can be viewed as a method for renewing a dwindling

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[2]Section 22.22 of the Act.

natural resource, namely soil. It has been estimated that approximately 1.7 billion tons of soil are lost to erosion annually in the United States (Exhibit 1-71). The use of end-product compost as a soil amendment has been demonstrated to be effective in controlling erosion by mitigating the loss of organic matter from the soil (Exhibits 1-34 and 1-71).

In 1992, permitted landscape waste compost facilities in Illinois received approximately 418,330 tons of landscape waste, representing approximately 3% of the MSW stream, an 89% increase from the 1991 figure (p. 14 of Exhibit 1-54).

Thus, composting is gaining acceptance as an alternative to waste disposal and waste combustion (i.e., leaf burning) (Exhibit 1-94) by creating a product derived from landscape waste that can be mixed with soil to improve its quality (Exhibit 1-87).

Section 3.70 of the Act defines composting to mean the biological treatment process by which microorganisms decompose the organic fraction of waste, producing compost. Composting is not simply piling up landscape waste and then sitting back until the organic fraction decomposes (Exhibits 1-28, 1-71, 1-80 and 1-91). Unmanaged landscape waste piles decompose slowly and have the

potential to create environmental and aesthetic problems due to their odorous and unstable nature (Exhibits 1-5 and 1-100).

It was the firm belief of the Compost Quality Standards Technical Advisory Committee[3] ("CQSTAC") that, in order to manage a composting process effectively and efficiently, as well as to produce a high-quality end-product compost, a person must understand the interrelationship between the biological systems and physical parameters involved in composting. In addition, a person must monitor and manage the process properly to avoid operational problems, in particular the generation of offensive odors from the composting material (Exhibits 1-28 and 1-91).

Composting is a natural process, occurring over a wide range of conditions and materials, by which soil organisms decompose landscape waste and other organic materials (Exhibits 1-71, 1-87 and 1-105). As long as the nutritional and environmental requirements for their activity and growth are maintained, these soil organisms (mainly bacteria, fungi and actinomycetes, and to a lesser degree insects and earthworms) will break down the available biodegradable organics into simple, more stable

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[3]Page 4 of the 12/29/93 Statement of Reasons explains how members were chosen for this committee. Attachment 1 of the 12/29/93 Statement of Reasons is a list of committee members.

compounds and carbon dioxide (Exhibits 1-78, 1-94 and 1-105). The least decomposable organics (i.e., lignins, hemicellulose and cellulose in woody material) will form the final physical structure of the end-product compost (Exhibits 1-87 and 1-88).

Composting may occur with either aerobic[4] or anaerobic[5] organisms (Exhibit 1-105). Since anaerobic organisms tend to generate offensive odors (usually in the form of volatile organic compounds) that are difficult to control during processing, the common practice in Illinois is to compost landscape waste aerobically (Exhibit 1-105)[6]. Aerobic composting has the additional advantages of generating higher temperatures (Exhibit 1-105), necessary to destroy noxious weed seeds or human and plant pathogens in the end-product compost (Exhibit 1-62), and proceeding at a faster rate than anaerobic composting.

Generally, in Illinois, landscape waste compost facility

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[4]In the presence of free oxygen.

[5]In the absence of free oxygen.

[6]It should be noted that it was the consensus of the COSTAC that it is almost impossible to maintain aerobic conditions (≥5% oxygen) throughout the composting material (Attachment 63-1). Anaerobic pockets form in the composting material, even at properly managed composting operations. Trying to increase oxygen supply by turning the compost when anaerobic conditions exist may only make the problem worse because it could potentially cause a massive release of the volatile organics from the compost. In some cases, allowing the outer layer of the composting material to act as a biofilter may be more appropriate to control odors (Attachment 22, Attachment 3-2).

operators collect and blend raw landscape waste with materials commonly referred to as additives and bulking agents[2] to achieve the optimal substrate (in terms of nutrients and porosity) for microbial activity and growth. Formulation of this substrate, with a specific focus on the carbon to nitrogen ("C/N") ratio, is an important consideration in maximizing the decomposition of the composting material (Exhibits 1-10, 1-13, 1-71 and 1-87).

Soil organisms use carbon as a source of energy and both carbon and nitrogen for building cell structure. Under ideal conditions, soil organisms use these two elements in a proportion that averages about 30 parts carbon to 1 part nitrogen. Most materials available for composting do not fit the 30:1 ratio. Fresh grass clippings, with a C:N ratio of 20:1, have too much nitrogen, while leaves, with a C:N ratio of 40:1, have too little nitrogen. Exhibit 1-7 is a table of C/N ratios of common organic waste. By combining these materials, one can obtain the proper 30:1 ratio, and faster decomposition will occur (Exhibits 1-13, 1-71 and 1-91).

Once the composting material has been properly blended, it is

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[2]Wood chips and leaves are common bulking agents utilized at many Illinois landscape waste compost facilities (Attachment 3).

formed into elongated piles, called windrows, which are mixed or turned periodically to help physically break down the composting material, incorporate oxygen into the windrows, and control temperatures. The composting process can be divided into four stages (Exhibit 1-10). The first stage occurs within the first couple days of composting. During this stage, mesophilic microorganisms[8] initiate decomposition of readily degradable compounds, heat is given off and the temperature rises. The pH typically falls as organic acids are produced. In the second stage, the thermophilic microorganisms take over the composting process. This stage is characterized by the temperature of the composting material rising above 45°C; readily degradable substances (e.g. sugars, fats, starch and proteins) are consumed and most pathogens are destroyed. The pH frequently turns alkaline as ammonium and carbon dioxide are liberated from the breakdown of proteins. The rate of the composting process slows as more resistant materials (e.g., lignins, cellulose, and hemicellulose) are subject to degradation. During this second phase, water must be added to the composting material to maintain the proper moisture level (usually between 45 to 60% water) to expedite the composting process (Exhibit 1-13). The third stage,

[8]Microorganisms are divided into three broad groups based on their temperature range of growth. Thermophiles grow at elevated temperatures (45 to 75°C/113 to 167°F). Mesophiles grow well in the midrange of temperature (20 to 45°C/68 to 115°F). Psychrophiles grow at freezing temperature (0°C/32°F).

sometimes referred to as the cooling down or stabilization phase, is characterized by thermophilic fungi growth in the composting material as the temperature decreases. Further degradation of more resistant materials takes place. Once the composting material has reached the desired reduction in volume (usually a 40 to 75% reduction in volume), the final stage occurs. The windrows are combined to form curing piles. The composting material sits in curing piles while the microbial activity slows sufficiently to qualify the material as stable end-product compost. (Exhibits 1-87, 1-94 and 1-105).

The end-product compost can be further processed to prepare it for market. Such processing can include screening to recover the bulking agent, grinding to remove oversized material, blending with various additives, and bagging to facilitate the storage and shipping of the end-product compost (Exhibit 1-105). The ultimate goal of the operator is to produce stable end-product compost with nutritional content available for plant uptake when it is applied to soil (Exhibit 1-94).

Although the windrow method is the most common landscape waste composting process used commercially in Illinois, other composting methods are available, for example passive composting,

aerated piles, and a group of methods known collectively as contained composting processes (Exhibits 1-28 and 1-87). Passive composting involves simply stacking the blended composting material in piles to decompose over a long period of time (up to 3 years) with some agitation and management (Exhibits 1-88 and 1-94). The aerated piles method eliminates the need for turning by providing air to the material through air ducts or pipes. One approach relies on passive air movement through ducts and pipes, while another approach uses blowers to force air through pipes. Contained composting processes refer to a group of methods which confine the composting material within a building, container or vessel (Exhibits 1-28 and 1-87).

I would like to point out that land application of landscape waste is not composting, but an alternative landscape waste management strategy. In Illinois, application of landscape waste at agronomic rates[9] does not require a permit from IEPA[10]. At the November 23, 1993 CQSTAC meeting, Mr. Jerry Joyce, a farmer from Kankakee, Illinois, strongly urged that these compost regulations

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[9]Agronomic rate is defined in 21(q)(3)(D) of the Act and these proposed regulations as "the application of not more than 20 tons per acre per year, except that the Agency may allow a higher rate for individual sites where the owner or operator has demonstrated to the Agency that the site's characteristics or crop needs require a higher rate".

[10]Section 21(q) of the Act.

not interfere with the practice of land-applying landscape waste onto farmlands. IEPA has clarified the limited scope of this proposal, by defining composting, for purposes of this Part, to mean the following:

> "... THE BIOLOGICAL TREATMENT PROCESS BY WHICH MICROORGANISMS DECOMPOSE THE ORGANIC FRACTION OF THE WASTE, PRODUCING COMPOST (Section 3.70 of the Act). Land application is not composting".

For further clarity, we have also defined "land application" and "agronomic rates" in the definitions section (Section 830.202). The definition for "agronomic rates" is taken directly out of the Act.

End-product compost is the stabilized product resulting from the composting process. End-product compost has little resemblance in physical form to the original wastes from which it was derived (Exhibits 1-78, 1-87 and 1-100). It is free of unpleasant odors, easy to handle and rots slowly over a long period of time. It is generally dark in color and humus-like, has a crumbly texture, and resembles and smells like rich topsoil. Exhibit 1-71 is a list, developed by ENR, of the physical and chemical properties of landscape waste end-product compost.

As a soil amendment, end-product compost improves the physical, chemical and biological properties of soils and horticultural soil mixes (Exhibits 1-61, 1-71, 1-81, 1-87, 1-94 and 1-100). By binding soil particles together, it enhances the structure of soil, improving aeration and the ability of the soil to retain water and nutrients. End-product compost improves the buffering capacity of the soil and minimizes adverse effects to plants due to extreme shifts in soil pH. It also improves drainage in clay soils and water retention in sandy soils. Adding compost to soil attracts earthworms, which aerate the soil and provide additional nutrients. Compost can store nutrients and release them slowly for use by surrounding plants. Although compost is not considered a fertilizer, it does contain essential plant nutrients. Recent studies have demonstrated that compost is effective in suppressing various soilborne plant diseases, especially fungi, and may in the future replace part of the fumigants and fungicides used on some food crops (Exhibits 1-25, 1-48, 1-65, 1-71 and 1-73). End-product compost has been shown to be effective in controlling erosion and removing pollutants contained in runoff (Exhibits 1-34, 1-65, 1-87 and 1-94).

Other uses for compost include use as a mulch (i.e., to control weeds and modify soil temperatures) and as an animal bedding

(Exhibits 1-87 and 1-94).

Marketing an odorous, improperly composted end-product can result in complaints, rejection of the product and bad publicity. The reason one compost may look very good and another compost not so good has to do with: (a) the waste(s) and additive(s) utilized in the composting process and the qualities they impart to the end-product compost; and (b) the composting method and the degree of maturity reached. The landscape waste compost facility operator and his or her employees have control over both of these parameters. Good operational practices and quality control from beginning to end of the composting process are necessary to produce a high quality end-product compost (Exhibits 1-2, 1-30 and 1-48).

Rapid growth of the landscape waste compost industry in Illinois, meaning greater quantities of materials collected for processing and more and larger facilities, has increased the potential for a number of problems. Potential problems include inadequate drainage and storm water control, odor and noise complaints, underground water quality concerns, and inadequate planning for handling and storage of materials during periods of high landscape waste generation (Exhibits 1-88 and 1-94).

The CQSTAC's interests and concerns, as voiced during CQSTAC meetings, are best served by regulations that are: (1) flexible, to accommodate and promote current and future composting technologies, (b) economically reasonable for landscape waste compost facility operators to implement; (c) enforceable, with the requirements clearly and logically presented; and (d) protective of the environment.

This proposal represents IEPA's effort to address the concerns and interests of the CQSTAC and, pursuant to the Act, to enhance the quality of the environment.

SUBPART A

This Subpart identifies those measures pertaining to all operators of landscape waste compost facilities, organic waste compost facilities, and mixed municipal waste compost facilities to be regulated under these proposed regulations.

830.101 PURPOSE, SCOPE AND APPLICABILITY

Section 830.101 describes the purpose, scope and applicability of this proposed Part.

Section 830.101(a) states that the purpose of the regulations is to establish performance standards for landscape waste, organic waste and mixed municipal waste compost facilities operating in the State of Illinois and to establish testing procedures and standards for end-product compost offered, by a facility, for sale or use in the State of Illinois.

Section 830.101(b) states the general applicability of the proposed regulations.

Section 830.101(b)(1) identifies composting facilities operating in the State of Illinois as subject to this Part unless expressly exempted by Section 22.33, 22.34 and 22.35 of the Act or regulated pursuant to the federal and state regulations addressing treatment of sewage sludge. I would like to point out that the definition of landscape waste compost facility was narrowed to exclude landscape waste composting operations which are both small in size and noncommercial. The rationale for doing so is addressed below when I discuss the specifics regarding the exemptions outlined in Section 830.104 of this Part.

Facilities composting domestic sewage, sewage sludge and septage

are regulated under 35 Ill. Adm. Code 391 and 40 CFR Part 503 (Exhibit 1-97). Operators of landscape waste compost facilities that utilize domestic sewage, sewage sludge and septage, even as an additive[11], in their process would presently be regulated by both the state and federal requirements listed in the above regulations. These include requirements for monitoring the composting process, testing the end-product compost, reporting by the generator, and recordkeeping by both the generator and end-user of the end-product compost. Jeff Hutton of the IEPA Bureau of Water and John Colletti of the USEPA recommended that, to simplify the management of domestic sewage, sewage sludge and septage in Illinois, we exclude composting operations utilizing such wastes from any additional regulations (Exhibit 1-75A). In order to accomplish this end, Section 830.202(a) of this proposed Part prohibits the use of these materials at landscape waste compost facilities regulated under this proposed Part.

Section 830.101(b)(2) clarifies that these regulations, upon promulgation, will supersede the requirements of 35 Ill. Adm. Code 807 for all composting facilities operating in the State of Illinois that will be subject to Part 830.

[11]Less than 10% by volume of the raw landscape waste composted

Section 830.101(c) states the specific applicability of each Subpart in Part 830.

Section 830.101(c)(1) states that Subpart A is applicable to all facilities subject to the requirements of Part 830. In addition, the definitions set forth in Section 830.104 apply also to the compost facility permitting procedures and requirements set forth in Parts 831 and 832.

Section 830.101(c)(2) states that Subpart B applies to landscape waste compost facilities subject to Part 830. Gary Cima of the IEPA will be explaining and justifying the provisions within Subpart B in his testimony.

Section 830.101(c)(3) states that Subpart C applies to organic waste compost facilities. At this time IEPA has reserved this Subpart for standards to be proposed as a separate regulatory proposal governing organic waste compost facilities in the near future, as mentioned in the December 29, 1993, Statement of Reasons prepared by IEPA Assistant Counsel Judith S. Dyer.

Section 830.101(c)(4) states that Subpart D applies to mixed municipal waste compost facilities. At this time IEPA has

reserved this Subpart for standards to be proposed as a separate regulatory proposal governing mixed municipal waste compost facilities in the near future, as mentioned in the December 29, 1993, Statement of Reasons prepared by Ms. Dyer.

Section 830.101(c)(5) states that Subpart E sets forth the performance standards and testing requirements to demonstrate the quality of the end-product compost. I will be explaining and justifying the provisions within this Subpart later in my testimony.

Section 830.101(c)(6) states that the financial assurance requirements set forth in Subpart F apply to all permitted facilities subject to Part 830. Section 22.33(a)(5) of the Act requires operators to have a financial assurance plan to restore the site as specified in their IEPA permit. John Taylor of the IEPA will be explaining the provisions within Subpart F in his testimony.

830.102 DEFINITIONS

Section 830.102 provides definitions of terms used throughout this Part and Parts 831 and 832. The definitions were derived

from : (1) definitions in the Act; (2) definitions in 35 Ill. Adm. Code Subtitle G; (3) definitions in other State laws and regulations (Exhibit 1-16); (4) definitions commonly utilized in the composting industry (Exhibits 1-13, 1-15 and 1-87); and (5) definitions provided by members of the CQSTAC during the development of this proposal (Exhibits 1-28 and 1-108).

The CQSTAC spent a considerable amount of time and effort discussing and refining several of the definitions, since the definitions provide the foundation for this proposal. I would like to point out that Section 830.102 is limited to landscape waste composting operations and will probably have to be amended when regulations governing organic waste compost facilities (Subpart C) and mixed municipal waste compost facilities (Subpart D) are developed.

The words and terms not defined in this Section shall have the meanings stated in the Act.

Definitions for additive, aerobic composting, bulking agent, closure, composting area, landscape waste leachate, maturity, open composting process, processing into windrows or other piles, and woody landscape waste were substantially revised in efforts

to address the CQSTAC's concerns. At this time, I would like to briefly discuss how these definitions evolved.

1) additive: This definition was originally provided by the Illinois Department of Energy and Natural Resources ("ENR"). During our discussion at CQSTAC, several committee members raised concerns regarding this definition, which IEPA believes have been resolved.

The first issue raised was whether water is considered an additive. Water deliberately added would be considered an additive under this proposal since it affects the moisture level (and thus the decomposition rate) of the composting material. At the July 12, 1993 CQSTAC meeting, Mr. Richard DeGarmo of the Illinois Composting Council, Dr. Michael Cole of the University of Illinois, and Ms. Kris Kaar of the City of Naperville recommended that water not be considered an additive since in some cases the source, type and quantity of water may be difficult to quantify for recordkeeping purposes. For example, water from runoff and rainfall would be virtually impossible to measure (Exhibits 1-28A and 1-28B). However, at the same meeting Ms. JoAnna Hoelscher of Citizens for a Better Environment warned against excluding water as an additive,

because water is not always pure. Ms. Hoelscher contended that treatment water from an industrial source should be accounted for, since this type of water could have an impact on the quality of the landscape waste. To address Ms. Hoelscher's concern and to keep the terminology simple, as recommended by Rodd Elges of DuPage County (Exhibit 1-28A), IEPA elected to regard water as an additive under this proposed Part. However, IEPA also exempted water from the recordkeeping requirement, contained in subsection 830.211(b)(3) of this proposed Part, to quantify the amount of additive used during composting.

The second issue was the use of animal waste[12] in landscape waste composting operations. At the August 3, 1993 CQSTAC meeting, Mr. DeGarmo requested that animal bedding be allowed as an additive, since it is a good bulking agent which improves oxygen transfer and provides a good source of nitrogen (Exhibit 1-28B). At the same meeting, Dr. Cole noted that some types of animal waste (e.g., swine, chicken and old cattle manure) may pose severe composting problems due to their malodorous nature. Ms. Lisa Disbrow of Waste

[12]Incidental waste from domestic animals would not be considered an additive under this proposal.

Management, in her written comments to IEPA, recommended that animal waste be prohibited as an additive (Exhibit 1-108). At the October 5, 1993 CQSTAC meeting, Ms. Disbrow, Dr. Cole and Ms. Christina Negri of Argonne Laboratories recommended that the use of animal waste at landscape waste compost facilities be prohibited due to the possible risk of exposure of compost workers to pathogens and contamination or reinfection of end-product compost from raw material containing pathogens (Exhibit 1-28E). It was pointed out by Dr. Cole at this meeting that although swine and poultry wastes have the greatest potential to carry pathogenic strains[1] of Salmonella, these wastes are currently being applied to farmlands without any restrictions. Dr. David Bromwell of the Illinois Department of Agriculture, Mr DeGarmo, and Dr. Cole all agreed that under normal (aerobic) composting conditions, the temperature generated during processing would destroy any pathogens in animal waste (Exhibit 1-77). Mr. DeGarmo pointed out to CQSTAC members at this meeting that there are several permitted landscape waste compost facilities currently authorized in their IEPA permits to utilize animal bedding as an additive or bulking agent. Ms. Disbrow recommended that if

[1] At the October 5, 1993 CQSTAC meeting, Dr. David Bromwell of the Illinois Department of Agriculture explained that most strains of Salmonella are not pathogenic to humans.

animal waste is used, then additional requirements (e.g., pathogen testing) should apply to verify that the compost is safe (Exhibit 1-108). IEPA has chosen to allow the use of any additive, if the operator both obtains authorization in an IEPA permit (see Section 830.205(a)(1)(H) of this proposed Part) and demonstrates that the composting process has sufficiently reduced pathogens, either by using an applicable thermal processing requirement described in Section 830.205(a)(4) of this Part or by meeting the pathogen reduction performance standard for general-use compost stated in Section 830.503(e). The thermal processing requirement will be further expanded upon by Mr. Cima in his testimony. I will provide more details on the pathogen reduction performance standard when I testify later on the requirements in Subpart E.

2) aerobic composting: Originally, ENR proposed defining aerobic composting to mean "in the presence of oxygen concentration greater than 5%". At the July 12, 1993 CQSTAC meeting, Mr. Charlie Pick of DK Recycling, Dr. Cole, Mr. DeGarmo, and Ms. Kaar objected to having a minimum oxygen level that must be maintained through the composting material because such a requirement would be virtually impossible to meet using the

composting methods currently utilized by landscape waste compost facility operators in Illinois (Exhibit 1-28). At this meeting, Mr. DeGarmo explained that after a rainfall, the oxygen level generally drops below 5% in windrows. IEPA, recognizing that an oxygen requirement should be flexible to accommodate a variety of environmental and operational conditions, incorporated such flexibility into the operating requirements relating to oxygen level (see Sections 830.205(a)(1)(C) and 830.206(l) of this proposed Part). The definition of aerobic composting ultimately agreed upon was generated from suggestions provided by Mr. DeGarmo and Dr. Cole in their written comments to IEPA (Exhibit 1-108).

3) bulking agent: A bulking agent is, for purposes of this Part, limited to those materials intentionally brought in to add structure or porosity to piles of composting material. A tree trunk brought in with a load of landscape waste and processed into wood chips to be used later in the composting process should not be measured and recorded as a bulking agent. It should be noted that a bulking agent would be regarded as an additive since it improves oxygen transfer and thereby increases the efficiency of the process. This was the consensus of the CQSTAC.

4) closure: Closure is a process that has a beginning and an end. There are minimum closure requirements for all compost facilities regulated under this proposed Part, as well as additional closure requirements, in this Part for permitted facilities. These provisions will be further expanded upon by Mr. Cima and Mr. Bakowski in their testimony. IEPA has chosen a 180 day timeframe to trigger closure for a landscape waste compost facility that stops accepting waste because it: (1) provides a reasonable amount of time for an operation to get back on its feet following operational difficulties (e.g., labor disputes, equipment failure); (2) sets forth when IEPA can deem a site abandoned; and (3) accommodates seasonal variations a composting operation may experience. Seasonal variations can have a major influence on the volume of material landscape waste composting operations will accept and process at any given time, as was pointed out in Mr. Pick's written comment to IEPA (Exhibit 1-108).

5) composting area: At the August 7, 1993 CQSTAC it was the consensus of the group to clarify the setback requirements stated in the Act. Currently the Act, in Section 39(m), contains two setback requirements, one tied to the facility boundary and one tied to the composting area. One of the

problems is that the composting area boundary is not necessarily the same as the facility boundary. Most neighbors of composting operations erroneously conclude that all setbacks are measured from the facility's fence line. To eliminate this confusion, IEPA has defined the composting area to equate with the permitted area. Section 830.203 of this proposed Part, addressing location standards, has been written so that all setback measurements for location standards are to be taken from the composting area boundary. The term facility encompasses a broader scope, describing the entire operation. The definition for composting area is similar to the definition included in the current permit application for landscape waste compost facilities (Exhibit 1-55).

6) landscape waste leachate: This definition parallels the definition for leachate in the landfill regulations (35 Ill. Adm. Code 811). At the July 7, 1993 CQSTAC meeting, Mr. Greg Maxwell of Waste Management requested that we distinguish this type of leachate (which is only in contact with waste constituents in landscape waste and landscape waste composting material) from other types of leachate which generally have a greater environmental impact (e.g., leachate from hazardous waste) (Exhibit 1-28A). Mr. Maxwell felt such a distinction

would aid the composting industry in explaining the regulations to the public. IEPA felt that this would be an appropriate term to aid in distinguishing landscape waste composting operations from other waste management activities.

The issue of whether landscape waste leachate need even be defined and addressed in these regulations was also raised during the CQSTAC meetings. That issue, touched on in the Statement of Reasons, will be further discussed by Mr. Cima in his testimony.

7) maturity: Maturity was defined with the goal of preventing partially composted landscape waste from being disposed of in Illinois landfills. Mr. Robert Johnson of Macon County and Mr. Elges felt that this definition would provide the flexibility for field inspectors to use their discretion in enforcing this requirement (Exhibit 1-28F). This definition, similar to the definition provided by Mr. DeGarmo in his written comments to the IEPA (Exhibit 1-108), was derived from an article printed in the July 1989 edition of Waste Age magazine (Exhibit 1-78).

8) open composting process: The original version of this

definition was provided by Mr. DeGarmo in his written comments to the IEPA (Exhibit 1-108). The intent is to distinguish an open composting process from a contained composting process. The definition was refined in response to CQSTAC members input regarding precisely what distinguishes an open from a contained process. This distinction is important in relation to composting process requirements in Section 830.205(a) of this proposed Part and composting surface requirements in Section 830.205(b) of this Part. Mr. Cima will be elaborating on the different requirements in his testimony.

9) processing into windrows or other piles: This term accommodates all composting processes that are not contained composting processes. It should be noted that "windrows and other piles" does not include "waste piles" since the pile must be comprised of appropriate composting materials and managed for composting to occur. As previously stated in my testimony, composting is more than just piling up landscape waste, either in windrows or other piles, and then sitting back. Originally, the term was "processing into windrows or other aerated piles"; in the course of CQSTAC discussion, it was agreed that "aerated" should be deleted as a criterion applying per se to "other piles."

10) woody landscape waste: Originally, IEPA envisioned that processing of landscape waste pieces too large for processing in a mobile chipper not be required within the timeframe set forth in Section 830.205(a). At the October 5, 1993 CQSTAC meeting, Mr. DeGarmo, pointing out that there are several large mobile units that can process landscape waste pieces up to 16" in diameter, recommended that the IEPA use a dimensional standard. Dr. Cole recommended diameters over 6 to 8 inches be used to classify oversized or woody landscape waste (Exhibit 1-28E). At the November 23, 1993 CQSTAC meeting, IEPA approached the CQSTAC with a new definition for woody landscape waste that would be less restrictive in that it would allow woody material to have attached branches greater than 2 inches in diameter. Since there were no objections from the group, IEPA has proposed this definition for this rulemaking.

The basis for defining any remaining term included in this definition Section will be expanded upon, if necessary, in the context of testimony relating to Sections in which such defined term is used.

830.103 INCORPORATION BY REFERENCE

Section 830.103 lists three publications which are incorporated by reference into this body of regulations.

The first publication is Standard Methods for the Examination of Water and Wastewater, American Public Health Association et al. (1015 Fifteen Street, N.W., Washington, D.C. 20005) (18th edition, 1992). This is the current edition. Part 900 of the 18th Edition provides a detailed description of procedures a person should use for the examination and enumeration of indicator microorganisms (e.g., fecal coliforms to test for pathogens) in a semi-solid medium.

The second publication is Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846 (Third Edition, 1986 as amended by Revision I (December, 1987), Final Update I (November, 1992) and Proposed Update II (July, 1992). SW-846 and amendments are available on a subscription basis, from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202)783-3238. Part I of this publication describes analytical procedures for measuring pH, as well as the concentration of inorganics, in waste materials. Part III of this publication describes the methods and equipment to be used for obtaining a representative sample of waste materials for

examination and analysis.

The final document is Recommended Chemical Soil Test Procedures for the North Central Region, Publication 221 (Bulletin No. 499, October 1988; Exhibit 1-79). These test procedures are available from the North Dakota Agricultural Experiment Station, North Dakota State University, Fargo, North Dakota 58105.

The procedures described in these publications are to be used in fulfilling the test requirements set forth in Subpart E.

830.104 EXEMPTIONS

Section 830.104 specifies those persons exempt from the requirements of proposed Part 830.

Section 830.104(a) identifies composting activities exempt from the requirements of proposed Part 830. The first two exemptions, printed in capital letters, are statutory exemptions taken directly from Sections 22.33(c) and 22.34(c) of the Act. The third exemption references the definition of landscape waste composting facility, narrowed, as mentioned earlier, to exclude certain landscape waste composting operations appropriately

beyond the scope of these regulations due to their small size and noncommercial nature. I would like to explain the rationale for narrowing this definition.

On several occasions, Ms. Hoelscher contended that the legislature did not intend to regulate composting operations conducted in residential backyards, community gardens or in the inner city as landscaping projects. (Exhibits 1-28B and 1-108). According to Ms. Hoelscher, the "facilities" intended to be regulated were "commercial facilities." At the CQSTAC meetings and in her written comments, Ms. Hoelscher recommended that "homeowners and others who compost less than 100 cubic yards of landscape waste/year should be exempt from these regulations - even if they accept such waste from off-site and/or give the finished compost product to some who will use it off-site". She commented further that "... the Agency is given the authority to regulate compost facilities and the finished product that is produced at such facilities - nothing more. Thus, the key to the Agency's regulatory authority rests in the definition of "facility" (Exhibit 1-108).

Several participants in the development of this proposal disagreed with Ms. Hoelscher's interpretation of the statute.

Mr. Maxwell contended that it was the intent of the legislat n that all persons offering end-product compost for sale or u: be held to the same standards. Mr Maxwell recommended that ere not be different standards for end-product compost based c volume or whether it was sold or not - the performance standards for end-product compost should apply across the board (Exhibit 1-28A). Mr. Patrick Freeland of Joliet, Illinois, wrote that accommodating facilities as proposed by Ms. Hoelscher would just lead to problems for the residences surrounding a facility not subject to the regulations and cloud the issue and make it difficult for IEPA to enforce against "problem" sites (Exhibit 1-108).

IEPA ultimately decided to define landscape waste compost facility to exclude landscape waste composting operations small in size (i.e., less than 25 cubic yards of composting material on site at any one time) and not engaged in commercial activity (i.e., an activity involving a transfer of money). The 25-cubic-yards-of-composting-material-on-site-at-any-one-time restriction was chosen because: (1) 25 cubic yards is equivalent to the normal volume reduction, through composting, of 100 cubic yards of raw landscape waste and thus would not create a conflict with the reporting requirement, proposed in Section 830.202(h)(2) of

this Part, for facilities receiving more than 100 cubic yards of landscape waste annually; (2) 25 cubic yards of material (equal to approximately 167 thirty-gallon paper landscape waste trash bags or a pile that is 8-3/4 feet high, 8-3/4 feet long and 8-3/4 feet wide) could be managed by low technology equipment (i.e., pitchforks and shovels) and inexperienced labor (i.e., volunteers); and (3) an on-site volume restriction, rather than the amount received annually for composting, will make it easier for inspectors to determine if the operation has lost its exempt status[14], as well as provide an incentive for operators to quickly process landscape waste and to use or distribute the end-product compost promptly.

The State of California has taken a similar approach in narrowing the definition of a "green composting facility[15]" by exempting noncommercial facilities with less than 15 cubic yards (4.5 tons) of composting material on-site at any one time (Exhibit 1-17). In addition, other states have chosen either to exempt all

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[14]It would be difficult for an inspector to assess when (which year) landscape waste was received for composting, since such facilities will not be required to maintain any recordkeeping. Since composting could take up to three years, a person could argue that the composting material at the site had been received over several years.

[15]California defines a "Green Composting Facility" to mean a facility that is operated for the purpose of producing compost from the green material fractions of the waste stream. Green composting facilities may use amendments and additives in the production of compost. Green composting facilities do not include those facilities which have on-site at any given time 15 cubic yards (4.5 tons), or less, of any combination of composting feedstock, active compost, and stabilized compost, which shall not be for sale but shall be for use on-site.

landscape waste composting facilities from their waste regulations (e.g., Florida, New Hampshire, Michigan) or to exempt landscape waste compost facilities below a set volume from the regulations (Exhibits 1-16, 1-19, 1-21, 1-22, 1-24, 1-25 and 1-27). For example, Maine exempts operations that compost less than 75 cubic yards of landscape waste annually, Wisconsin exempts facilities that compost no more than 50 cubic yards of landscape waste annually, and New York allows a facility to compost up to 3,000 cubic yards of landscape waste before becoming subject to regulation as a solid waste management facility. In most states, landscape waste composting is not regulated as a solid waste management activity. (Exhibit 1-16).

In regard to Mr. Freeland's concern about controlling the operations that will not be subject to these regulations, there are usually local ordinances that regulate these smaller operations. For example, the Village of Orland Park has an ordinance addressing the management of backyard composting operations (Exhibit 1-103).

In addition, many federal and state programs are encouraging backyard composting by providing demonstrating sites at public locations (Exhibits 1-12 and 1-36). IEPA believes the

legislature intended to allow these types of composting activities to operate without being subject to regulation.

Section 830.104(b) sets forth the exemption from testing requirements contained in Sections 22.33, 22.34 (organic waste end-product compost quality standards) and 22.35 (mixed municipal waste end-product compost quality standards) of the Act. During our discussion with the CQSTAC (Exhibit 1-28), as well as in written comments received by IEPA (Exhibit 1-108), the concern was raised that end-product compost used as a daily cover or vegetative amendment in the final layer of a landfill could be malodorous, as well as harmful to human health and the environment (especially with respect to end-product compost derived from mixed municipal waste). The Board note is included here, as well as at the end of Sections 830.501, 830.502 and 830.508 of this Part, to clarify the restriction that a landfill must obtain IEPA approval (possibly requiring physical, chemical and biological testing) prior to using end-product compost for such a purpose.

830.105 COMPLIANCE TIMEFRAME FOR EXISTING FACILITIES

Section 830.105 addresses the date for coming into compliance

with Part 830, paralleling the landfill rules by providing for a transitional period for existing facilities to come into compliance. The intent of this provision is to establish a reasonable timeframe within which existing facilities can comply or retrofit with any new and different requirements imposed pursuant to Part 830.

Section 830.105(a) states that upon the effective date of these regulations, all facilities subject to this Part must comply with the minimum performance standards and recordkeeping requirements in Section 830.202. Mr. Cima of the IEPA will be explaining these standards and requirements in his testimony.

Section 830.105(b) states that within one year of the effective date of these regulations, existing permitted facilities must certify to IEPA, by completing and filing with IEPA forms provided by IEPA, that they have developed and implemented an operating plan, a personnel training program, a recordkeeping system, and an end-product testing program and secured a financial assurance mechanism that meets the requirements of proposed Part 830. Mr. Cima of the IEPA will explain in his testimony the points a permitted landscape waste compost facility operator must address in an operating plan, personnel training

program, recordkeeping system and end-product testing program (Subpart B); Mr. Taylor will explain what types of mechanisms would fulfill the financial assurance requirements for permitted landscape waste compost facilities (Subpart F).

Section 830.105(c) states that existing permitted facilities must remain in compliance with all of the conditions in their current permit until either:

1) the permit expires; or
2) the permit is specifically modified for one or more of the following reasons:
   a) to authorize construction;
   b) to increase the facility's operating capacity;
   c) to transfer ownership of the facility; or
   d) to extend the permit term.

Section 830.105(d) states that a facility must demonstrate compliance with all provisions of Part 830 upon application either for permit renewal or for any of the modifications mentioned specifically above. Currently there are 72 permitted landscape waste compost facilities with 4 or 6% scheduled to expire by December 1, 1994. Exhibit 1-57 is a list of permitted

landscape waste compost facilities and the dates their permits are scheduled to expire. A pie graph, showing a breakdown of the permit expiration dates for Illinois compost facilities, is provided.

Ed Bakowski of IEPA will be providing, in his testimony, additional justification for the compliance dates being proposed for existing permitted facilities.

830.106 SEVERABILITY

Section 830.106 is the severability provision for this Part. This Section is necessary in order to maintain the validity of these regulations in the event that any subpart, section, subsection, sentence or clause is adjudged unconstitutional, invalid or otherwise not effective for any reason. This provision parallels a similar provision in the landfill rules.

SUBPART E

End-product compost derived from landscape waste must be of consistent quality, composted to maturity and free of hazardous material in order to compete with other soil amendments (e.g.,

organic peat, humus products, mushroom compost, sludge compost products) and to preclude injury from its use (Exhibits 1-48, 1-61 and 1-71). For most end-users, product quality is dependent on appearance, consistency, amount of impurities, chemical composition and maturity of the end-product compost (Exhibit 1-71). Part of the mission of IEPA is to promote recycling and reuse as an alternative to waste disposal. As mentioned earlier in my testimony, composting is a form of recycling and reuse. In order for the composting industry to survive, it must produce a high quality product consistently. Therefore, it is the focus of Subpart E to establish uniform compost standards and requisite testing to ensure the quality of end-product compost derived from landscape waste.

830.501 SCOPE AND APPLICABILITY

Section 830.501 sets forth the scope and applicability of Subpart E.

Section 830.501(a) restates the statutory exemption[16] from testing and meeting quality standards for end-product compost when used as daily cover or in the final layer of a landfill. As mentioned

[16]Sections 22.33(c), 22.34(c) and 22.35(c) of the Act.

previously in my testimony, a Board note has been added to clarify that end-product compost cannot be utilized at a landfill unless such use is approved in the landfill's permit.

Section 830.501(b) specifies that the provisions in Sections 830.502 (compost classification), 830.503 (quality performance standards) and 830.507 (sampling methodology) apply to all end-product compost regardless of the source from which it was derived.

Section 830.501(c) specifies that the provisions in Sections 830.504 (testing requirements for end-product compost) and 830.508 (management of off-specification compost) apply only to end-product compost derived from landscape waste. IEPA intends to propose testing requirements for organic and mixed municipal waste end-product compost, to be located in Sections 830.505 and 830.506, respectively.

830.502 COMPOST CLASSES

Section 830.502 contains the classification scheme governing end-product compost.

Classification of compost, in the documents reviewed by IEPA, has been based on either: (1) the materials from which the end-product compost was derived; (2) the targeted use; or (3) a combination of the above (Exhibits 1-5, 1-61 and 1-94). I would like to point out that most states and other countries do not have classification requirements for end-product compost derived from landscape waste (Exhibit 1-16). Some states and countries classify their compost based on the type of waste processed (Exhibits 1-16, 1-19 and 1-72).

During the development of this proposal, ENR recommended that the quality of end-product compost be regulated by (1) classifying the compost based on its "best" use (e.g., food crops, horticultural crops, land reclamation sites); and (2) labeling the end-product compost to identify that use. Originally, ENR had proposed three classes of end-product compost derived from waste (Exhibit 1-28D):

Class I - compost that may be utilized for any purpose including in the cultivation of crops.

Class II - compost that may be utilized to cultivate horticultural or agricultural products not intended for human

consumption, roadway construction and land reclamation.

Unclassified - compost that is suitable for either daily cover or final vegetative cover for landfills.

ENR suggested that the end-product compost be tested for maturity, pathogen concentration, pH range, percentage of inerts (e.g, man-made inerts and film plastics), concentration of pesticides and concentration of heavy metals (Exhibit 1-51). Testing would verify whether the end-product compost was Class I or Class II quality.

The composting industry generally accepts that end-product compost should be classified based on its marketable use and, consequently, labeled to promote fair and truthful representation of this claim (Exhibits 1-13, 1-20, 1-28E, 1-34, 1-62, 1-71 1-87 and 1-107). However, during our discussion with the CQSTAC, it became apparent that the Act did not grant IEPA the authority to: (1) regulate the user[17] of the compost material; and (2) control the labeling of a "recycled" product (Exhibits 1-28F, 1-28G and 1-108). A commercial product derived or recycled from a waste is

[17]A user could be a subsequent processor of the compost (e.g., baggers, soil blending operations), in addition to final end-user of the compost (e.g., home gardeners and agricultural operations).

no longer under the jurisdiction of IEPA. For example, recycled used oil is regulated not by IEPA or U.S. EPA but by the Federal Trade Commission as a commercial product. Therefore, labeling of end-product compost was deemed by IEPA to be beyond the scope of this proposal[18].

Classification of end-product compost based on "best" use was also eliminated. The differences between class I and class II end-product compost, as proposed by ENR, were insignificant (Exhibits 1-28F, 1-28G and 1-51). Instead IEPA has elected to adopt the classification scheme drafted by the Composting Council (Exhibit 1-15) whereby all compost falls under two classes: (1) General Use Compost, which complies with all regulatory standards to protect public health, safety and the environment, and is suitable for distribution and use as a soil amendment; or (2) Designated Use Compost, which fails to comply with all regulatory standards and therefore its use is restricted.

General use compost could be further divided into subclasses or grades based on user needs; however, it was the consensus of the CQSTAC that grading end-product compost for marketability is

[18]End-product compost claiming to be mixed fertilizer or fertilizer material must meet the labeling requirements of the Illinois Fertilizer Act (505 ILCS 80/3)(Exhibit 1-59). The enforcing agency is the Illinois Department of Agriculture.

unnecessary and would be economically burdensome for operators. It was recommended by Mr. Johnson and Mr. DeGarmo that the commercial use of general use compost should be market-driven (i.e., let the commercial sector set up the additional standards for marketability). (Exhbits 1-28D and 1-28F). Mr. DeGarmo urged IEPA to leave the imposition of any additional end-product compost performance standards (e.g., soluble salts, particle size) to the user (e.g., landscapers, horticulturists) and the composting operator. Mr. DeGarmo pointed out that many greenhouse operators and compost distributors set up their own testing program to verify that the quality of the end-product compost meets their specifications (Exhibits 1-13B and 1-28F). IEPA recommends that grading of end-product compost be left to the marketplace.

Section 830.502(a) states that meeting the performance standards set forth in Section 830.503 qualifies end-product compost to be classified as general use compost.

Section 830.502(b) states that all other end-product compost (i.e., that which does not qualify as general use compost) shall be designated use compost. As previously mentioned in my testimony, end-product compost used as daily cover or vegetative

amendment in the final layer at a landfill is exempted by the Act from testing and performance standards required in this proposal. Again a Board note has been added to clarify that end-product compost cannot be utilized at a landfill unless such use is approved in the landfill's permit.

830.503 PERFORMANCE STANDARDS FOR GENERAL USE COMPOST

The performance standards contained in this Section are applicable to general use compost. The standards cover the presence and concentration of physical hazards, man-made materials, pathogens and inorganics in general use compost, as well as the pH and stability standards for general use compost. At the September 21, 1993 CQSTAC meeting, Ms. Hoelscher recommended that the standards assure that compost: (1) is safe to use on croplands without adverse cumulative effects when applied over the long term; and (2) does not pose a hazard as a result of its application in areas of public access (Exhibit 1-28). IEPA contends that these standards adequately protect human health and the environment in the context of compost distributed as a soil amendment. As mentioned earlier in my testimony, the establishment of market quality "user" standards (e.g., particle size, moisture content, nutrients, cation exchange capacity) for

general use compost is not within the scope of this rulemaking.

An end-product compost which does not meet the performance standards in this Section is deemed off-specification compost that must be managed in accordance with Section 830.508 of this Subpart, which can include: (1) reprocessing or composting the off-specification compost to meet the performance standards; or (2) marketing the off-specification compost as designated use compost. IEPA pointed out to the CQSTAC that a person can utilize off-specification compost for other purposes (e.g., reclamation projects, roadway construction) by either: (a) petitioning the Board for an adjusted standard; or (2) obtaining a solid waste determination (Exhibit 1-28F).

Section 830.503(a) states that general use compost shall be free of any material which can pose a physical hazard. The subsection lists glass or metal shards as examples of material that could be potentially injurious.

This is one of the performance standards proposed by ENR at the September 21, 1993 CQSTAC meeting (Exhibit 1-51). ENR, as well as the composting industry, recognized that certain materials can pose a risk to human and animal health through unprotected

exposure or through direct ingestion (Exhibits 1-15 and 1-71). It was the consensus of the CQSTAC that a performance standard for potentially injurious materials be included (Exhibit 1-28D). Mr. Duer recommended that a physical dimension be used to identify what constitutes a hazard (Exhibit 1-28D). IEPA maintains that this standard is analogous to the standards in other Board rules[19] - this is a performance standard. It is inappropriate to identify any specification because, for example, a small piece of glass has the same potential to cause harm as a large piece; it is the responsibility of operators to recognize and remove from the end-product compost any material they deem a hazard (Exhibit 1-28F). Florida, New Hampshire and California have similar performance standards (Exhibits 1-16, 1-17, 1-19 and 1-24).

IEPA contends that such hazards can be avoided through proper management and quality control at the landscape waste compost facility. Quality control begins "at the gate" by not allowing objectionable waste to be unloaded (Exhibit 1-42).

Section 830.503(b) states that general use compost shall not

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[19] 35 Ill. Adm. Code Part 1420 requires that PIMW packages to be leak-resistant; however they no package construction specifications to meet (e.g., container wall thickness, dart tests, container material, etc.)

contain man-made materials larger than four millimeters in size exceeding one percent of the end-product compost, on a dry weight basis. Man-made materials, such as plastic, can be a potential hazard to small animals through direct ingestion, as well as adversely affect soil drainage by becoming a moisture barrier (Exhibit 1-15).

ENR, as well as the composting industry, recognized that man-made materials or foreign bodies ("FBs") should be addressed in these regulations since FBs or man-made materials lower the quality (and therefore the public's image) of general use compost (Exhibits 1-15, 1-71 and 1-91), and would be a source of litter where end-product compost is unloaded or land applied.

At the September 21, 1993 CQSTAC meeting, ENR proposed that man-made inerts or materials greater than four millimeters be prohibited in end-product compost (Exhibit 1-51). This standard was taken from the standards recommended by the Composting Council (Exhibit 1-15). Several states limit the amount of man-made materials based on the particle size of the materials and/or percent dry weight. Florida, New Hampshire and Canada set the limit of man-made materials to two percent on a dry weight basis (Exhibits 1-17, 1-18 and 1-24); Germany has a 1/2 percent limit.

It was the consensus of the CQSTAC that man-made materials should be limited to one percent for the purpose of protecting the environment. The percentage of man-made materials acceptable to consumers (i.e., for aesthetic purposes) has been left for the marketplace to determine (Exhibits 1-28F and 1-108).

Similar to materials causing physical hazards, the presence, size and amount of man-made inerts or materials in end-product compost is dependent on the amount present in the raw landscape waste used and the level of processing conducted (e.g., sorting by the generator and compost facility, grinding, etc.) (Exhibit 1-71).

Section 830.503(c) states that general use compost shall have a pH between 6.5 and 8.5.

pH is a measure of the concentration of hydrogen ions in solution based on a logarithmic scale in which each unit represents a hydrogen ion concentration ten times more, or less, than the next unit. The pH scale ranges from 0 (extremely acidic) to 14 (extremely alkaline), with pure water having a pH equal to 7 (neutral).

The pH or acidity of end-product compost can affect the physical

properties of the soil, the availability to plants of certain minerals, and the biological activity in the soil (Exhibit 1-15). IEPA notes that acceptable pH levels will vary according to the end-user application (Exhibit 1-15). Most plants grow best in soils near neutrality; however, certain plants such as azaleas, camellias, and cranberries grow best in acid soils, while a few plants grow well in slightly alkaline soils (Exhibit 1-82). Therefore a range of pH is proposed for general use application.

At the September 21, 1993 CQSTAC meeting, ENR proposed a pH range between 5.5 and 8.5 for general use compost (Exhibit 1-51). This range is identical to the pH range permissible for organic compost in Canada (Exhibit 1-18). Mr. DeGarmo noted that an immature compost could have a pH value of 5.5 (Exhibit 1-28D); while Dr. Cole recommended that the compost pH not be allowed to exceed 8.5, otherwise there would be problems in neutralizing calcium and magnesium ions (Exhibit 1-28E). Based on these comments, IEPA has chosen a pH range between 6.0 and 8.5 as an acceptable standard for general use compost to meet.

Section 830.503(d) states that general use compost shall be stabilized, as demonstrated by one of the methods prescribed in Section 830.Appendix B.

Stability refers to a stage in the composting process characterized by nearly complete[20] utilization of energy-bearing carbon compounds in the original waste and no inhibition of seed germination or plant growth (Exhibits 1-15 and 1-18). Microbiological activity is reduced due to the lack of a carbon energy source, with decomposing microorganisms being the major energy source for the remaining microorganisms. Although oxygen is still required by mature compost, the rate of oxygen use levels off and mature compost is less likely to become anaerobic (Exhibit 1-15).

The degree of stability of end-product compost is a factor in determining its appropriate use. This factor becomes especially important when composts are applied immediately before planting or when they are used in potting mixes[21] (Exhibits 1-10 and 1-60). Raw or semi-composted wastes may cause a problem when used because they induce high microbial activity in soil for some time after incorporation, potentially causing oxygen deficiency and a variety of indirect toxicity problems to plant roots (e.g., removing nutrients as the decay process continues, carryover of

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[20]Complete stabilization is not readily attainable and not likely desirable since there would be no soil amendment value due to low or non-existent organic content.

[21] Composts utilized on croplands may be applied weeks or months before planting and have time to "stabilize" in the soil.

plant pathogens, etc.). Improperly composted wastes can also be malodorous, causing problems during utilization (Exhibits 1-5, 1-10, 1-18, 1-60, 1-71, 1-76, 1-89, 1-100 and 1-109). In contrast, properly stabilized end-product compost can contribute to soil fertility and structure, and may in some cases counteract root-rot and damping-off problems with seedlings and plants (Exhibits 1-5, 1-61 and 1-110).

There are widely divergent and contradictory views concerning the period of composting necessary to attain the proper degree of stability. The usual soil analysis (e.g., moisture, organic matter, nutrients, pH, etc.) does not provide enough information to determine the degree of stability (Exhibit 1-66). Over the past decade, several methods have been proposed to measure the degree of stability: (1) by observation (i.e., odor, structure, color); (2) by the course of decomposition (i.e., curing period following rapid decomposition of the waste); and (3) by chemical analyses. It is generally agreed in the composting industry that no universal method or test can be used as a stability index for all compost and that a combination of methods should be used (Exhibits 1-10, 1-61, 1-66, 1-85 and 1-87).

As mentioned earlier in my testimony, compost maturity may be

determined by observation. End-product compost has been defined in Section 830.202 of this Part as organic material processed to "maturity". For purposes of this Part, maturity has been defined as "a state which is characteristically: generally dark in color; humus like; crumbly in texture; not objectional in odor; resembling rich topsoil; and bearing little resemblance in physical form to the waste from which derived". This language is currently being used by IEPA in determining when composting material[22] is no longer a waste (Exhibit 1-56). Florida and New Hampshire have a standard similar to the one proposed (Exhibits 1-19 and 1-24). As mentioned earlier in my testimony, the definition of maturity was developed in cooperation with the CQSTAC.

Ms. Disbrow suggested that stability be linked to the compost curing process, through the adoption of a minimum 30 day curing time for landscape waste, as is required in New Jersey (Exhibit 1-108). IEPA would like to point out that determination of stability based on a specific composting schedule would be difficult; it would be impossible to establish a precise time when the waste has been converted into end-product compost, due

[22]Section 830.202 of this Part defines "composting material" to mean "solid wastes that are in the process of being composted".

to the variability of composting systems and materials (i.e., biodegradability of the waste) being composted. Some systems produce compost that must be cured in windrows for months. Others, because their system design meets optimum process parameters, produce compost that requires curing only for a short period (Exhibits 1-60 and 1-87). Ultimately, it was the consensus of the CQSTAC to provide operators the flexibility to measure stability based on their operations. Therefore the introduction of new composting techniques and equipment to be utilized in Illinois, that could differ significantly from currently accepted practices and processes, is possible, so long as the operations are consistent with the overall intent of the legislation (Exhibit 1-28). Landcape waste compost facility operators required to have a permit will be proposing composting systems and schedules in their operating plans as part of their permit applications, pursuant to Part 831, for approval by IEPA. Therefore, a processing schedule will be required for each permitted facility; approval will be on a case-by-case basis by IEPA. This approach provides the flexibility to accommodate the operation of a variety of viable composting systems in Illinois.

Various chemical analytical methods were proposed by CQSTAC members to establish the degree of stability: the C/N ratio,

cation exchange capacity ("CEC") and adenosine triphosphate ("ATP") measurements, organic acids and humus composition, ash content, respiratory activity and phytotoxicity tests (Exhibits 1-5, 1-10, 1-15, 1-32, 1-46, 1-47, 1-49, 1-60, 1-61, 1-62, 1-66, 1-82, 1-85, 1-87, 1-89, 1-106, 1-107, 1-108, 1-109 and 1-110). These methods rely on the fact that the degree of decomposition of the organic fraction in waste, a measure of stability, can be characterized using the respiration rate of aerobic microorganisms in end-product compost (Exhibits 1-50, 1-64, 1-76, 1-101, 1-106 and 1-108). An aerobic microorganism's heat production, carbon dioxide production, and oxygen consumption are all proportional to its respiration rate. Consequently, measurement of any of these variables can serve as an indicator of an aerobic microorganism's respiration rate and, in turn, of the level of stability of end-product compost (Exhibit 1-106).

Dr. Cole recommended that oxygen uptake rates in the range of 0.75 to 1.0 milligram $O_2$ per gram volatile suspended solids per hour be used to establish compost stability (Exhibit 1-108). Oxygen uptake tests are relatively simple and routine tests used to determine the stability of activated sludge (Exhibits 1-35 and 1-64). However, oxygen uptake studies are expensive and require specialized equipment (Exhibit 1-75B). In addition, semi-skilled

personnel would be needed to conduct the tests and evaluate the results (Exhibit 1-64). Finally, the studies published to date have not adequately demonstrated any specific procedure compatible with a variety of composting materials. Therefore, IEPA is reluctant to propose an oxygen uptake test in Section 830.Appendix B that would be applicable to all general use end-product compost.

IEPA has proposed, in Section 830.Appendix B, a self-heating test performed in a Dewar vessel or flask as an acceptable method of determining stability - a simple, reliable, inexpensive means to characterize the composting process and verify compost stability (Exhibits 1-64 and 1-75B). A Dewar flask is an insulated container normally used to store and maintain the temperature of liquid gases (Exhibits 1-33A and 1-75B); however, since 1977 scientists have been using these flasks to measure the heat production of end-product compost (Exhibit 1-75B). Heat production and reheating upon standing are currently being used in Florida and New Hampshire to determine the stability of end-product compost (Exhibits 1-19 and 1-24). I will go into details regarding the self-heating test when I discuss Section 830.504 of this Part.

At the August 3, 1993 CQSTAC meeting, Mr. Robert Gillespie of DK Recycling and Dr. Cole pointed out that the ultimate test of the quality of compost is its effect on plants (Exhibit 1-28B). In other words, does the compost sustain or harm plant life? Originally IEPA had drafted a standard for phytotoxicity, requiring a demonstration of seed germination within the compost (Exhibit 1-28G). It was recommended by Ms. Kaar, Mr. DeGarmo and Mr. Pick that quality (i.e., phytotoxicity) be viewed as a product liability issue, to be dealt with in the marketplace, rather than as a waste issue (Exhibits 1-28G and 1-108). Ms. Hoelscher has maintained that testing of end-product compost is needed: (1) to improve public confidence in composting wastes; and (2) to provide an enforceable standard distinguishing waste from end-product compost (Exhibits 1-28 and 1-108). To address these concerns, and to stay within the realm of environmental concerns and out of the realm of commerce, IEPA has dropped its proposed phytotoxicity standard, but includes a seed germination test in Section 830.Appendix B as an acceptable means to determine compost stability (Exhibits 1-10 and 1-106). I will go into details regarding the seed germination test when I discuss Section 830.504 of this Part.

Section 830.503(e) states that general use compost shall not

contain fecal coliform populations exceeding 1000 MPN per gram of total solids (dry weight basis), or Salmonella species populations that exceed 3 MPN per 4 grams of total solids (dry weight basis). This standard addresses pathogens.

Pathogens are organisms that have the potential to cause an infection or disease in a susceptible host (Exhibit 1-15). U.S. EPA has established a pathogen reduction standard for sewage sludge that it has determined adequately reduces any risks to public health and the environment (Exhibit 1-39). California has established the same pathogen reduction standard for "green material[23]" (Exhibit 1-17). IEPA has elected to propose this pathogen reduction standard. Later in my testimony, I will describe how a person demonstrates compliance with this standard.

Section 830.503(f) states that general use compost shall not exceed, on a dry weight basis, the inorganic concentrations set forth in Section 830.Table A. IEPA relied on USEPA in identifying inorganics of concern, as discussed below. Exhibit 1-3D is a table prepared by IEPA summarizing the basis for including these inorganics on the list.

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[23]California defines "green material" to mean any wastes, separated at the source of generation, derived from plant material, including but not limited to leaves, grass clippings, weeds, tree trimmings, untreated wood waste, and shrubbery cuttings.

During our discussions with the CQSTAC, Ms.Hoelscher urged IEPA to examine and compare the analytical data on raw landscape and mature compost generated by a recent ENR study with the standards from other states and countries[24] (Exhibits 1-4, 1-17, 1-18, 1-19, 1-20, 1-21, 1-22, 1-23, 1-24, 1-25, 1-26, 1-27, 1-28D, 1-29, 1-31, 1-63, 1-72, 1-102 and 1-108). In addition to examining these standards, IEPA chose to examine standards proposed by the composting industry (Exhibits 1-14 and 1-15), background soil concentrations for inorganic constituents in Illinois and other states (Exhibit 1-58), and both Illinois and Federal pollutant concentrations for sewage sludge (35 Ill. Adm. Code Part 391, Exhibits 1-8, 1-39, 1-96, 1-98 and 1-99). Exhibit 1-93 is a table prepared by IEPA that compares guidelines and standards from regulatory agencies of other states and countries.

ENR proposed to the CQSTAC the use of inorganic limits adopted by U.S. EPA and recommended by the Composting Council (Exhibits 1-15, 1-28D, 1-39 and 1-51). Those are the limits proposed by IEPA in Section 830.Table A, for the following reasons.

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[24]Section 22.33(a) of the Act directs the CQSTAC to evaluate the composting regulations adopted in other states and countries in the development of regulations addressing landscape waste composting. IEPA has reviewed several state regulations that have adopted compost regulations: California, Florida, Maine, Michigan, Minnesota, New Hampshire, New York, Ohio and Wisconsin. In regards to composting requirements in foreign counties, IEPA examined guidance documents in Canada and Germany, as well as articles that described the composting requirements in Great Britain, Italy, Holland and the Netherlands.

These standards were based on the results of the largest (and most expensive) risk assessment ever conducted by U.S. EPA (Exhibits 1-9 and 1-65). This comprehensive assessment[25] included ecological as well as human health effects, utilizing 14 pathway models, as well as field data, to evaluate contaminant loading limits for agricultural land application, non-agricultural land application and retail distribution. Exhibit 1-74 is a table of the pathways models utilized by U.S. EPA. In developing the standards for the utilization of sewage sludge, U.S. EPA defined risk in terms of the risk a contaminant may pose to the most exposed individual[26] ("MEI").

U.S. EPA concluded from their aggregate risk analysis that then-current non-agricultural land application practices were environmentally safe, and that, possibly, no regulation would be necessary (Exhibits 1-9, 1-39, 1-98 and 1-99). Recognizing that the absence of any regulatory limitation would encourage

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[25]Section 405(d) of the Clean Water Act directed U.S. EPA to conduct such the risk assessment.

[26]The MEI may be a human being, plant, animal, or any living organism. The MEI represents a certain segment of general populations, information or assumptions with respect to dietary habits, exposure duration, fraction of diet derived from animals grazing on or food grown on lands on which sludge has been applied, etc. In the case of a human MEI, the U.S. EPA assumed: (a) a 70 year duration of exposure; (b) water consumption of 2 liters per day; (c) a dietary intake equal to the composite of the highest consumption of each food group; (d) 2.5% to 60% of the MEI's diet comes from foods grown on sludge-treated soils; (e) 34 to 48% of the MEI's dietary animal products were from animals raised on feed produced from sludge-treated land and/or grazed on sludge-treated land; and (f) a respiration rate of 20 $m^3$/day.

utilization of highly contaiminated sludges in non-agricultural situations, and that at some future time non-agricultural land may be converted to agricultural land, U.S. EPA elected to base limits on either the 98th percentile approach (98th percentile concentrations of each contaminant found in a survey of sludges from 40 cities conducted in 1979 and 1980) or limits calculated from the agricultural land application pathways m dels, whichever resulted in the higher number for each contaminant[27] (Exhibits 1-8, 1-39, 1-74, 1-86, 1-98 and 1-99). U.S. EPA has thus provided cumulative loading limits for the beneficial use of sludge.[28,29] In addition, U.S. EPA has established limits identifying sludge of exceptional quality, allowing general distribution of such sludge as a product considered safe, with no long term adverse effects when used on croplands. The limits for general distribution, referred to as Alternate Pollution Limits ("APL"), were incorporated following a technical review of the proposed rule by the Peer Review Committee ("PRC")[30] (Exhibit 1-96).

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[27]Twenty-three contaminants were identified by U.S. EPA from a larger list of potentially harmful metals and organic compounds, including known or suspected carcinogens (Exhibits 1-8, 1-39 and 1-86).

[28]U.S. EPA and IEPA's Bureau of Water regulate the beneficial reuse of sludge, by controlling the quantity and frequency of land application of the sludge, the soil type, metal concentrations in the sludge, soil pH, and site concerns (i.e., odor problems, potable water supplies, runoff, groundwater protection, animal/plant toxicity, etc.).

[29]Federal and Illinois sludge permitting programs are separate and distinct programs.

[30]The committee, formed by the U.S. Department of Agriculture, was composed of 35 recognized experts on sludge risk analysis from academia, government and private industry.

Ms. Hoelscher has gone on record opposing the standards because she feels that the limits are not protective of croplands. She pointed out that European and Ontario, Canada standards are considerably lower and therefore would be more protective of soils intended for agricultural use (Exhibits 1-4, 1-18, 1-20, 1-28D, 1-29, 1-31, 1-63, 1-93, 1-102 and 1-108).

IEPA agrees that the European and Canadian standards are considerably more restrictive. However, they are not necessarily more protective of the environment, for the following reasons:

1. Although European countries have had a longer history of operating mixed municipal waste compost facilities, it is recognized by the composting industry that it would be inappropriate to set the same limits everywhere, because many factors are involved concerning the transferability of heavy metals into the food chain (e.g., climate, soil organic matter, soil pH, soil type, etc.) (Exhibits 1-28D, 1-29 and 1-75).

2. Most of the standards proposed by foreign countries are guidelines without regulatory enforceability. Also, none of the foreign regulations reviewed by IEPA identifies

specific, statistically validated, analytical methods to accurately determine the inorganic concentrations in general use compost. For example, the Ontario Ministry of the Environment does not require that a specific method be used, only that the method analyze for the inorganics in the compost. Without using standardized[31], statistically validated methods[32] to determine the concentration of each inorganic in end-product compost, the standards recommended by Ms. Hoelscher cannot be compared scientifically to the U.S. EPA standards (Exhibits 1-29, 1-35A and 1-108). As an illustration, total concentration of contaminants and toxicity concentration are different. For example, in a recent IEPA waste stream application, the lead concentration reported in a waste oil sample was 1,300 parts per million ("PPM") when analyzed with U.S. EPA Method 7421 for total concentration, and 0.1 PPM when analyzed with U.S. EPA Method 1310 for toxicity concentration (Exhibit 1-3D).

I would like to point out that if any of the standards

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[31]The results are collaborated by a number of laboratories that verify the method's bias and precision as would occur in normal practice.

[32]Validation is usually a three-step process: (1) Determination of single-operator precision and bias, (2) Analysis of independently prepared unknown samples; and (3) Determination of method ruggedness.

proposed in Ontario, Canada and European countries were to be adopted, there would be no validated U.S. EPA method available to determine accurately whether the inorganics concentrations in end-product compost would meet those standards.

3. All metals occur in small amounts in all soils, whether contaminated or not. The background soil concentrations for inorganics in Illinois would exceed a majority of the German, Dutch and Canadian compost quality standards (Exhibits 1-4, 1-29, 1-31, 1-58, 1-63, 1-93, 1-102 and 1-108). In discussing this problem with me, Neal Ahlberg of the Ontario Ministry of the Environment noted that in some cases compost derived from urban organic waste may not pass the inorganics standards because the standards used were based only on a limited number of background inorganics levels and derived from rural, rather than urban, soil samples (Exhibit 1-75C). In such cases, Canadian authorities have allowed the general use of such compost in urban areas with additional reporting requirements. I would like to point out that the Ontario Ministry of the Environment is still evaluating additional soil background samples from rural areas to determine

whether the proposed standards need to be adjusted.

4. The Composting Council believes that, until there is additional data to prove otherwise, the U.S. EPA's APLs serve as an appropriate set of standards for general use compost. I would like to point out that the Composting Council is conducting its own research to support the use of these limits for compost derived from organic waste and mixed municipal waste as well (Exhibit 1-14).

5. Ms. Hoelscher contends that the U.S. EPA's APLs are not restrictive enough (Exhibits 1-28D and 1-108). I would like to point out that, on the contrary, the U.S. EPA's APLs were based on a series of worst case scenarios. The PRC critized the U.S. EPA's proposed sludge rule[3] during the development of the risk assessment models for taking an extreme approach when defining the MEI in terms of risk (i.e., low probability, as well as low consequence risk). That is, in all probability an MEI as defined was unlikely to exist, having been identified by compounding a worst case situation upon another worst case situation. For example, the probability of the MEI identified for pathway

[3]February 6, 1989, Federal Register pp. 5746-5902. U.S. EPA proposed rule 40 CFR Parts 257 and 503.

1F (home gardening) existing is less than 1%, and therefore statistically meaningless. In other words, the risk associated with exposure of this group to the contaminant is irrelevant, as no one would fall within the group (Exhibits 1-8, 1-39, 1-86, 1-96, 1-98 and 1-99).

The PRC criticized the standards proposed in the sludge rules as too stringent and inflexible, precluding local communities from beneficial use options considered protective of public health and the environment under local conditions (Exhibit 1-96). U.S. EPA responded in the notice of final rulemaking by providing more realistic application limits for beneficial sludge use (exhibit 1-39). These revised limits include the AFLs sewage sludge must meet before it can be utilized in lawns and home gardens.

6. Clay soils and humic substances in the end-product compost would bind up most of the metals, thereby protecting against plant uptake (Exhibits 1-12, 1-28 and 1-71).

7. Inorganics standards for end-use compost in other states are comparable to the U.S. EPA sludge standards, rather

than any of the standards proposed for foreign countries (Exhibit 1-16).

8. Quality control at the source is employed. Lead, cadmium, zinc and copper can be introduced into landscape waste from pesticides, wood preservatives, or soil-bound forms (Exhibits 1-11 and 1-68). At the landscape waste compost facilities IEPA visited, operators used a combination of public education (e.g., site tours by local schools, flyers, etc.) and gate control measures (e.g., inspection of trucks for inerts, pulling out treated lumber from the material received, etc.) to improve the quality of the landscape waste received prior to processing (Exhibit 1-91).

For all of these reasons, IEPA feels that the U.S. EPA sludge APL standards are appropriately applicable for general use compost.

Regarding organics, ENR originally proposed standards for pesticides potentially present in landscape waste. The standards were derived from the U.S.D.A.'s tolerances for pesticide chemicals in or on hay crops (40 CFR Part 180; Exhibit 1-38), because the consistency of such crops closely corresponds with

the consistency of compost. ENR contends that these limits provide a conservative indicator of the compost's safety for general use (Exhibits 1-28D, 1-72 and 1-84).

Recently, ENR sampled and tested raw landscape waste and end-product compost from eleven landscape waste compost facilities situated in Illinois for inorganics and pesticides (Exhibit 1-72). Six of the sites were situated in heavily urbanized areas and five in primarily rural areas. Samples were collected in the winter, spring, summer and fall of 1990 in order to account for any possible seasonal variability.

The average levels of pesticides detected in the end-product compost samples were "well below the allowable levels" specified by U.S.D.A. In fact, only one out of 44 samples contained a pesticide, atrazine[14], at a concentration above the U.S.D.A. tolerance limit for the pesticide.

Ms. Hoelscher contends that pesticide testing should be required until research data supports removal of such a requirement. Ms. Hoelscher contends that not requiring such testing would be a

[14] Atrazine is a triazine herbicide used for pre- and post-emergence control of annual grass and broad-leaved weeds in agricultural crops.

disservice to farmers and the composting industry. Based on one discussion with a farmer, she was disturbed by the ENR finding of atrazine in an amount exceeding the U.S.D.A. limit (Exhibit 1-108).

IEPA has examined Ms. Hoelscher's concerns regarding pesticide testing of end-product compost derived from landscape waste. We feel this requirement is not necessary at this time for the following reasons:

1. Pesticides will break down into simpler products as a result of the composting process (elevated temperatures, microbial activity, sunlight, etc.) The concentrations of pesticides in compost derived from landscape waste have been demonstrated to be low relative to background soil levels (Exhibits 1-3B, 1-3C, 1-28D, 1-45, 1-47, 1-53, 1-71, 1-72, 1-73 and 1-84). Exhibits 1-3B and 1-3C are analytical laboratory results showing that pesticide levels in end-product compost screened for pesticides were far below the U.S.D.A. limits, and in most cases not detected. I would like to point out that in collecting end-product compost from sites, ENR failed to have a standardized method to establish the stability or maturity

of the end-product compost. Thus, the sample containing the atrazine with a concentration above the U.S.D.A. tolerance level could have been derived from compost that had not completely stabilized.

2. Although atrazine was detected in exceedance of the U.S.D.A. limit in one out of 44 end-product compost samples, in 19 samples (more than half of the samples taken by ENR) atrazine was not detected at all (i.e., less than 1 X $10^{-4}$ parts per million atrazine).

3. The analytical method utilized by ENR is questionable. ENR has failed to confirm to IEPA whether the test method utilized in its study is the method required by U.S.D.A. to verify pesticide concentrations. As mentioned earlier, without using identical, statistically validated methods to determine the concentration of contaminants in end-product compost, one cannot scientifically compare the results obtained with the U.S.D.A. standards (Exhibits 1-29, 1-35B and 1-108).

4. In order to test precisely and accurately for contaminants, it is necessary to have a statistically

validated analytical method. At this time, U.S. EPA has not approved an analytical method to test for atrazine (Exhibit 1-92). Dr. Cole has suggested that the atrazine measured in the ENR study may not be atrazine, but rather compounds that resemble atrazine incorrectly identified as atrazine (Exhibit 1-28D).

5. The concentration of pesticides in compost derived from landscape waste is related to the application rate. There has been some concern that overapplication or excessive use of pesticides by homeowners could increase the potential for pesticide residues in yard wastes (Exhibits 1-46 and 1-68). However, shrubbery, trees and lawns would seldom be sprayed with pesticides prior to pruning and mowing. Rather, they would be sprayed after pruning or mowing, and there would be sufficient time for the pesticides to degrade or be washed off of the vegetation (Exhibit 1-73). In addition, residual pesticides in the end-product compost will be further degraded when applied to the soil (Exhibits 1-47 and 1-53).

6. In regard to the concern expressed by the one farmer, the highest concentration of atrazine detected (i.e., 28 parts

per million) in the ENR study is equivalent to 1.1 pounds per acre, or 45 percent of the manufacturer's recommended application rate for atrazine. Also, the organic material in the compost will bind up the atrazine. Therefore this level in organic compost will have no measurable effect in preventing plant growth (Exhibit 1-6). Mr. Dunker and ENR agree that the source of the atrazine detected in end-product compost derived solely from landscape waste would probably be the surrounding farmlands rather than waste accepted at the gate (Exhibits 1-28 and 1-72).

7. There is some question as to whether the limits proposed by ENR are too restrictive, since these limits are for crops to be eaten by humans or livestock (Exhibits 1-28D). Consumption of end-product compost by humans or animals would be non-existent or incidental.

8. The cost of testing end-product compost derived from landscape waste for pesticides could be prohibitive (Exhibit 1-73). The cost would be around $1,000 to conduct the tests originally proposed by ENR (Exhibit 1-33B). As already stated, all tests to date have demonstrated that pesticides are not a problem in end-product compost

derived from landscape waste.

9. All CQSTAC members except Ms. Hoelscher felt that pesticide testing should not be required (Exhibits 1-28G and 1-108).

10. No other state or foreign country has established pesticide standards for end-product compost derived from landscape waste (Exhibit 1-16). Also, the Composting Council has recommended that no pesticide standard be imposed for end-product compost (Exhibit 1-14).

Based on the above reasons (i.e., precedent, literature review, field data, and discussions with CQSTAC members) IEPA has chosen not to establish pesticide standards for compost derived from landscape waste.

I would like to point out that IEPA may add new general use compost quality performance standards when the organic and mixed municipal waste composting rules are proposed. At this time, IEPA has not fully reviewed the literature regarding the quality of the compost derived from such wastes.

## 830.504 TESTING REQUIREMENTS FOR END-PRODUCT COMPOST DERIVED FROM LANDSCAPE WASTE

The performance standards applicable to general use compost are to be verified by standard sampling and analytical methods. Section 830.504 provides testing requirements applicable to general use compost produced by landscape waste compost facilities. The contaminants for which to test depend on the source of the material.

Section 830.504(a) states that operators of landscape waste compost facilities shall do testing to demonstrate compliance with the standards for man-made materials, pH and stability set forth in subsections (b) - (d), respectively. Test methods to be used are described in Section 830.Appendix B, unless an alternative method(s) is approved in writing by IEPA.

Man-made materials: IEPA has elected to use the method proposed by ENR, derived from methods recommended by the National Composting Council, to determine the percent man-made materials relative to the dry weight of end-product compost (Exhibits 1-15, 1-28D and 1-51). This method involves taking four oven-dried 250 gram samples and passing them through a four millimeter screen to

separate the man-made materials, from which the percentage of man-made material is to be calculated.

pH: IEPA has elected to allow the use of one of the two methods proposed by ENR (which were derived from methods recommended by the National Composting Council) to measure the pH of solids (Exhibits 1-15, 1-28D and 1-51). These methods are Method 14 from the North Central Regional Publication 221 and EPA Method 9045 from SW-846. Both documents have been incorporated by reference at 35 Ill. Adm. Code 830.103. This is an inexpensive test that can be conducted by most analytical laboratories for $10 (Exhibit 1-33B).

Stability: IEPA has elected to allow either of two methods to demonstrate the stability of end-product compost.

The first method is a self-heating test developed by Woods End Research Laboratory (Mt. Vernon, Maine). This method can be purchased either as a kit for $325 or separately from a number of companies (Exhibits 1-33A and 1-75B). The procedures are very specific to prevent false positives for stability due to an improper sample size, improperly sized Dewar flask or improper moisture levels (Exhibits 1-75B and 1-108). The test requires at

The procedure requires a person to combine a soil-less medium (i.e., vermiculite) and soil mixture with a specific quantity of compost. The vermiculite provides structural support for root development. The soil, which represents a small fraction of the mixture, is a source of soil microorganisms to break down the organic material as they would in-situ. The soil-vermiculite mixture is blended with different amounts of end-product compost to produce different compost:soil-vermiculite ratios. The ratios or blends on a weight basis are: 75 percent compost, 50 percent compost and 0 percent compost. Due to the low density of vermiculite, this correlates on a volume basis with approximately 50 percent compost, 30 percent compost and 0 percent compost, respectively. For each blend, four 4-inch pots are started with 10 seeds of each test species. Fertilizer is added, so that plant nutrients are not a limiting factor[25]. The procedure requires that the pots be monitored and maintained (i.e., watered, properly illuminated, etc.) daily for seven days. After seven days, visual observations of relative plant conditions and percent germination of plants relative to the control should be recorded in accordance with Section 830.Table C.

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[25]As mentioned earlier in my testimony, compost is a soil amendment, and is usually not marketed as a fertilizer.

I would like to point out that there were several "minor" changes made to the test procedure originally proposed by Dr. Cole, based on my experience in performing his test. For example, we have elected to specify the weight of end-product compost required not in terms of dry weight, but moist weight, because the process of drying could destroy some of the beneficial properties of the end-product compost. Also, the amount of compost to be utilized represents common ratios recommended by the gardening community (Exhibit 1-44). The proposal also specifies the size of the flower pot to be utilized.

Mr. Daniel Fiedler of Land Treatment Alternatives recommended that a rating system to record visual observations be included in the regulations (Exhibit 1-108). IEPA feels that this would be helpful and has incorporated the ratings system proposed by Mr. Fielder into Section 830.Table C.

This test is inexpensive to perform and requires no special equipment. This procedure could be conducted for the landscape waste operator by local schools, garden clubs, or youth organizations and serve to demonstrate the proper use and beneficial properties of compost. In the test I performed, the soil-vermiculite-compost blends out-performed the control in

terms of percent germination and plant growth. This is consistent with what gardening experts have known all along about end-product compost, i.e., end-product compost improves the physical, chemical and biological properties of soils and potting mixes, which is conducive to plant growth (Exhibits 1-44, 1-61, 1-71, 1-81, 1-87, 1-94 and 1-100).

Seed germination is a direct measurement of the quality of the compost and was recommended by some CQSTAC members as a parameter to judge stability (Exhibits 1-28B and 1-108).

Section 830.504(b) states that, if required by permit, operators of landscape waste compost facilities must test for pathogens by using the method set forth in Section 830.Appendix B, unless an alternative method(s) is approved in writing by IEPA. As mentioned earlier in my testimony, there was some concern by some of the CQSTAC regarding the use of animal waste/animal bedding as an additive due to the potential for introduction of pathogens (Exhibit 1-28E).

The proposed method to determine the MPN[36] is utilized by

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[36]The Most Probable Number (MPN) technique is a method to estimate the number of organisms in low-bacterial density situations.

regulatory agencies, as well as the food industry, to determine bacterial contamination. IEPA has selected procedures found in Parts 9221 E and 9222 D Standard Methods for the Examination of Water and Wastewater for fecal coliform and Part 9260 D Standard Methods for the Examination of Water and Wastewater for Salmonella. These methods were incorporated by reference in Section 830.103 of this Part and are currently utilized by our IEPA Bureau of Water ("BOW") in monitoring water quality.

I would like to point out that alternatives to demonstrate compliance with the pathogen standard set forth in Section 830.503(e) of this Part are allowed, if approved in writing by IEPA. For example, an operator could demonstrate that this standard is met by showing that the composting process passes the thermal processing requirements set forth in Section 830.205(a)(4) of this Part.

Section 830.504(c) states that end-product compost derived from landscape waste need not be tested for inorganics, unless required by IEPA to demonstrate compliance with the standards set forth in Section 830.Table A (i.e., pursuant to subsection (e) of this Section). It was the majority view of the COSTAC that end-product compost derived solely from landscape waste need not be

tested for inorganic constituents, based on the analytical data generated by ENR, compost operators and other compost distributors (Exhibits 1-3A, 1-3B, 1-3C, 1-28D, 1-72 and 1-108). In all cases, the concentrations of the inorganics listed in the ENR study and other analytical reports reviewed by IEPA were far below the standards set forth in Section 830.Table A. Most CQSTAC members felt that since inorganics of concern are present, if at all, in concentrations substantially lower than the standards, the cost to analyze, approximately $150 - $225 (Exhibit 1-33B), would not offset the benefit gained from this information (Exhibits 1-28D and 1-108). Although some operators do test their end-product compost for inorganics, the general recommendation was that inorganic testing remain their option rather than being made a requirement in this proposal (Exhibits 1-28D and 1-108).

In a recent study conducted by ENR, eleven landscape waste composting facilities situated throughout Illinois were selected for seasonal testing of raw and mature compost to determine the presence of 25 elements as well as three types of pesticides. The inorganics and pesticides analyzed were those most likely to be of interest from an environmental and public health standpoint. (Exhibit 1-9). Based on the results, ENR concluded that the

compost sampled in their statewide testing program was reasonably safe and appropriate for any foreseeable soil amendment application. This conclusion is consistent with observations made by other investigators (Exhibits 1-15, 1-28D, 1-29 and 1-45).

Ms. Hoelscher argued that testing should be conducted to provide assurances that Illinois soils will be protected from contamination or degradation. However, Ms. Hoelscher also recommended that inorganic testing not be applicable to small noncommercial composting operations (e.g., community gardens or backyard composting) since they will not have the same environmental impact as large commercial landscape waste compost facilities. IEPA contends that if inorganics are a major concern in any waste material composted, then all end-product compost offered for use off-site should be tested, regardless of the size of the composting operation.

Most states do not have inorganics standards for compost derived from landscape waste. Of those states that have established standards, only California requires that end-product compost derived from landscape waste be tested on a periodic basis[37]

[37]Every 5,000 cubic yards of green compost produced.

(Exhibit 1-17). Since end-product compost derived from landscape waste in Illinois has been demonstrated not to exceed (or even come close to) inorganic concentrations that would harm the environment, IEPA is proposing that inorganic testing not be required.

Section 830.504(d) states the frequency at which end-product compost must be tested for the parameters set forth in Section 830.503.

It is important to test the end-product compost as often as financially possible (Exhibit 1-2). At the September 21, 1993 CQSTAC meeting, ENR recommended that end-product derived from landscape waste be tested every 5,000 cubic yards or annually (Exhibit 1-51). ENR compared the size (i.e., landscape waste accepted during 1992) and the number of permitted landscape waste compost facilities in Illinois to calculate the frequency (Exhibit 1-52). There were no objections from the CQSTAC (Exhibit 1-28).

As mentioned earlier in my testimony, most states do not require compost derived from landscape waste to be tested. States and countries which do require such testing have established the

frequency of sampling based on either the amount of compost produced (e.g., cubic yards or tons) or a minimum periodic sampling interval (monthly, quarterly or annually). Some states and countries have a provision to allow for a reduction in testing frequency based on the consistency of the compost quality (Exhibits 1-16, 1-17, 1-18 and 1-26). Currently, permitted landscape waste compost facilities are not required to test their end-product compost; however, many operators test their end-product compost as a marketing tool. Mr. Karl Dunker of Laidlaw Waste and Mr. Duer have their end-product compost analyzed by a laboratory four times a year and twice a year, respectively (Exhibits 1-28D, 1-91A and 1-91D). Ms. Kaar and Mr. Pick have periodically analyzed the end-product compost produced at their sites (Exhibits 1-3A, 1-3C and 1-91E). The Composting Council has recently recommended that end-product compost be tested, at a minimum, once a year (Exhibit 1-14). Finally, many end-users (e.g., landscape business, compost blending and distributing operation) test the end-product compost to determine if it meets their criteria and specifications for quality (Exhibits 1-3B, 1-14 and 1-28G).

Based on these facts, IEPA feels that the proposed testing frequency is appropriate to verify the safety of general use

compost and is not unduly economically burdensome for landscape waste compost operators.

Section 830.504(e) provides IEPA the authority to required additional testing. This can include, but is not limited to: (1) more frequent testing of end-product compost; (2) conducting additional types of analysis (e.g., inorganics, pathogens) pursuant to permit; and (3) repeating a test to verify the quality of the end-product compost (e.g., demonstrate that the operator has corrected problem(s) that caused off-specification compost to be produced).

830.505 TESTING REQUIREMENTS FOR END-PRODUCT COMPOST DERIVED FROM ORGANIC WASTE

As previously mentioned by Ms. Dyer in IEPA's December 29, 1993 Statement of Reasons, Section 830.505 is reserved for testing requirements applicable to organic waste compost facilities.

830.506 TESTING REQUIREMENTS FOR END-PRODUCT COMPOST DERIVED FROM MIXED MUNICIPAL WASTE

As previously mentioned by Ms. Dyer in IEPA's December 29, 1993

Statement of Reasons, Section 830.506 is reserved for testing requirements applicable to mixed municipal waste compost facilities.

830.507 SAMPLING METHODS

Section 830.507 sets forth two acceptable methods for preparing a composite sample of end-product compost to be used in testing.

Section 830.507(a) is a description of the first sampling method acceptable for preparing a composite sample of the end-product compost. The sampling protocol first proposed by ENR (Exhibit 1-51) was a hybrid of the sampling method recommended by the Composting Council and the sampling method utilized in the 1992 Illinois compost study conducted by ENR (Exhibits 1-15, 1-28D and 1-72).

Mr. Pick pointed out that most landscape waste compost facility operators place mature end-product compost into piles, rather than windrows, and recommended that this protocol be also applicable to "other piles". To be consistent with the language in Subpart B, the sampling protocol in this subsection is applicable to both windrows and "other piles".

minimum, each grab sample should be 505 milliliters. To allow for errors in sampling and testing, we are proposing that each grab sample be 550 milliliters in size.

Section 830.Table B specifies the sample holding times, sample container types and minimum collection volumes to be used by those following the first method provided. These sampling and handling requirements were derived from the Standard Methods for Examination of Water and Wastewater, 18th edition, incorporated by reference in Section 830.104.

Section 830.507(b) is an alternative to the sampling protocol specified in subsection (a). The option to propose one's own sampling procedure is allowed, if it is performed in accordance with the procedures in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), incorporated by reference in Section 830.104. This document describes how to develop and implement a sampling plan that accurately represents the material being sampled. The methodology described in this document is utilized to developing sampling plans to satisfy special waste requirements in state and federal environmental programs (e.g., RCRA and CERCLA).

Dr. Cole noted that the sampling depth in ENR's proposal (i.e., 10 centimeters) was too shallow and recommended the use of the dimension of the curing pile to set the sampling depth (Exhibit 1-28D). Mr. DeGarmo pointed out that a specific sampling depth (e.g., greater than one meter) might be too restrictive for some operators, specifically when sampling at the perimeter of some curing piles (Exhibits 1-28F and 1-108). In response to these comments, IEPA adopted the sampling depth recommended by Canada, which addresses the concerns raised, for the location of the four grab samples required in subsection (a)(1) (Exhibits 1-16 and 1-18). For the location of the grab samples required in subsections (a)(2) and (a)(3), the minimum sampling depth was set at " not less than half the distance between the surface and the bottom of the windrow or other pile".

Finally, Mr. DeGarmo recommended that the volume of each grab sample be adequate to form the composite sample for the requisite testing in Section 830.504. The sample size needed to verify all the performance standards spelled out in Section 830.503, using test methods identified in Section 830.504, would be, at a minimum, 6,050 milliliters of end-product compost[38]. Thus, at a

[38]Man-made materials test + pH test + self-heating test + pathogen test + inorganic test = 1,000 ml + 50 ml + 4,000 ml + 500 ml + 500 ml) = 6,050 ml.

gaining approval either from: (1) the Board for an adjusted standard; or (2) the IEPA as part of a solid waste determination (Exhibit 1-28F).

## 830.508 OFF-SPECIFICATION COMPOST

Section 830.508 requires that off-specification compost derived from landscape waste be further managed as landscape waste (e.g., recomposting the off-specification compost, shipping the off-specification compost to another landscape waste compost facility, land application of the off-specification compost) or be used as designated use compost if it meets the definition of end-product compost. Again, a Board note has been included to point out that use of designated use compost will require approval by IEPA through a landfill's operating permit.

Production of off-specification compost may require an operator to track the problem back through the composting process to determine the conditions that created the problem and rectify it (Exhibit 1-2). Subsection 830.504(e) provides IEPA the authority to require an operator to conduct additional testing of the end-product compost to demonstrate compliance with the performance standards in this Subpart.

As I pointed out earlier in my testimony, a person can utilize off-specification compost or designated use compost for other purposes (e.g., reclamation projects, roadway construction) upon

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1-23 Compost Regulations in Minnesota

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1-25 Compost Regulations in New York

1-26 Compost Regulations in Ohio

1-27 Compost Regulations in Wisconsin

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