

Meeting Minutes

Advanced Recycling Study Group
DEQ Central Office, 14th Floor Conference Room
1111 East Main Street, Richmond, Virginia
Friday, October 15, 2021

Members Present: Debbie Spiliotopoulos, Tad Phillips, Glen Besa, Connor Kish, Anikka Moore, Kevin Kaurich, Travis Kever, and Andrew Parker.

Members Absent: Phillip Musegaas and Jesse Goellner.

Other Attendees: Ray Crabbs, Alex Justus, and Jim Taylor.

DEQ Staff Attendees: Jeff Steers, Angie Jenkins, Kathryn Perszyk, Tamera Thompson and Gary Graham.

The meeting convened at 9:05 a.m. The meeting adjourned at 2:59 p.m.
A quorum of the study group members was present for this meeting.

1. Introductions [Jeff Steers, DEQ]. Mr. Steers welcomed the members and the other attendees, had the attendees introduce themselves, explained the public meeting FOIA requirements, and reviewed the general building logistics. The agenda for the meeting had been previously emailed to members (Attachment 1).
2. Meeting Objectives, Definitions, and Current Regulatory Landscape [Jeff Steers, DEQ].
 - a. Mr. Steers presented information relevant to advanced recycling study group: the legislative mandate for the study group, the applicable statutory and regulatory definitions, some current applicable exemptions and regulatory requirements, the current national statutory and regulatory landscape, and a list of questions for members to address at the meeting (attachment 2). Copies of the Virginia legislative mandate for the study group, applicable statutory definitions, guidelines for discussions, and the study group member list (attachments 3 through 6) had been previously emailed to members.
 - b. Member comments:
 - i. May need a clear definition of “renewables” (as in renewable feedstocks).
 - ii. Permitting may be required if feedstocks are solid waste or hazardous solid wastes.
 - iii. How should mixed solid wastes be handled as feedstocks?
 - iv. May need some additional regulation to address solid wastes created by advanced recycling processes.

- v. There may be a facility in Bend, Oregon that could be reviewed. There may be another facility in Utah that was not successful that could be reviewed for lessons learned.
- vi. Is there a net energy and environmental gain or are these advanced recycling processes just combusting solid wastes?
- vii. There is a net gain to the environment when combusting methane into CO₂ because the CO₂ equivalence of methane is so high.
- viii. Air emissions, process water, and noncontact cooling water can be handled under current regulations, but air emissions and process water outflows may need additional monitoring because so little is known about what comes out of advanced recycling facilities.
- ix. As of June 2021, there are 14 states (including Virginia) that passed the American Chemistry Council's advanced recycling legislation.

3. Around-the-table Questions and Group Discussion [Jeff Steers, DEQ].

- a. Identify one or more benefits of advanced recycling.
 - i. It is a possible solution for wastes that are difficult to deal with.
 - ii. There is benefit to removing plastics to create new products, but it does not prevent the creation of new plastics from petroleum.
 - iii. Repurposing carbon molecules to make fuels and products (carbon life cycle) lowers the carbon loading in the atmosphere.
 - iv. It may be a better option for dealing with category 3 – 7 plastics.
 - v. Advanced recycling may be more sustainable.
 - vi. The resulting product is fuel or products with fewer impurities.
- b. What barriers exist in siting and operating advanced recycling?
 - i. Need incentives to assist and sustain the collection infrastructure.
 - ii. Need more certainty in siting suitability, especially with respect to environmental justice.
 - iii. Need facility siting in near proximity to collection, transportation, and energy infrastructure.
 - iv. Need access to secure and sustainable feedstock streams.
 - v. Need better public education about this technology.
 - vi. Need feedstock concentration facilities when transportation over distance is necessary.
 - vii. Need lists of local concerned groups to facilitate education and outreach.
 - viii. Need a database of suitable sites that could become facilities.
 - ix. Need a better permit pre-application process that allows the community to participate more fully.
 - x. Need better communications between DEQ and local governments.
 - xi. Need extended producer responsibility programs.
 - xii. Need access to STEM sources for education of prospective employees.

- c. What adverse environmental impacts potentially exist from advanced recycling?
 - i. Like other manufacturing facilities, it will produce increased local traffic and have environmental concerns with stockpiles.
 - ii. Like other types of facilities, there are increased air and wastewater impacts that must be addressed.
 - iii. There are process safety management, hazard mitigation, and security concerns, e.g. what happens in an emergency?
 - iv. Impacts are different for different end products.
 - v. There may be odor issues to address.
 - vi. Air toxics monitoring may be necessary.
 - vii. Greenhouse gas monitoring and balance calculation should be required to ensure there is a net GHG benefit.
 - viii. There will be adverse waste residual impacts – where to put it.
 - ix. There should be a calculation methodology used for moderating emissions.
 - x. What is left behind if the process is unsuccessful and is abandoned?
- d. What regulatory changes are needed?
 - i. Incentive programs are needed to facilitate the infrastructure of transportation of feedstock.
 - ii. Regulatory support is needed for the process of collecting/sorting/concentrating the recycling feedstocks.
 - iii. A carbon tax and trading system would help.
 - iv. Enhanced monitoring and stack testing would be required, at least until the emissions are better known.
 - v. An Enhanced Manufacturer Responsibility Program would help.
 - vi. Every Bottle Back initiative.
 - vii. Enhanced reporting of recycling input/output.
 - viii. Life cycle analysis (LCA) on greenhouse gases (GHG).
 - ix. A better pre-application process to involve community before the draft permit is presented.
 - x. Increased funding for DEQ for technical assistance.
 - xi. Use of a Product Stewardship Council.
 - xii. An ongoing Advanced Recycling Study Group process to update or refine recommendations.
- e. What currently available technical references can be used in considering future regulatory action?
 - i. The Florida statutory provision that guarantees that anything that goes into the furnace is defined as recycling.
 - ii. Oregon statutes and regulations as a good example.
 - iii. Utah statutes and regulations as a bad example.
 - iv. Global Alliance for Incinerator Alternatives (GAIA).

- v. The Eastman LCA.
- f. Other questions we should be asking.
 - i. Who are the customers for the advanced recycling end products and will anyone be buying it?
 - ii. Is advanced recycling upcycling or downcycling?
 - iii. Is it economically feasible?
 - iv. What will be the impact of advanced recycling on local communities (e.g., if the impacts are great, will they need some assistance)?
- 4. Next Steps [Jeff Steers, DEQ].
 - a. If members have additional input to provide to DEQ, submit that input no later than close of business on Monday, November 1, 2021.
 - b. No additional meetings of this study group are planned.
 - c. DEQ's report to the General Assembly is due December 31, 2021.

Attachments:

1. Agenda.
2. Meeting Presentation Slides.
3. Acts of Assembly 2021, Special Session I, Chapter 552, Item 376.
4. Acts of Assembly 2021, Special Session I, Chapter 375.
5. Guidelines for Discussions.
6. Study Group Member List.

Attachment 1

Advanced Recycling Study Group
Input Meeting
Virginia Department of Environmental Quality
October 15, 2021

Introductions

Include brief description of your background and why this issue is important to you

Meeting Objectives

Common understanding of the definition of advanced recycling

Current regulatory landscape across the US and in Virginia

Around the Table Questions:

1. Identify one or more benefits of advanced recycling
2. What barriers exist in siting and operating advanced recycling?
3. What adverse environmental impacts potentially exist from advanced recycling?
4. What regulatory changes do you feel are needed to address questions 2 and 3?
5. What currently available technical references can be used in considering future regulatory action?
6. Other questions we should be asking.

Next Steps

Attachment 2

Meeting Presentation Slides.

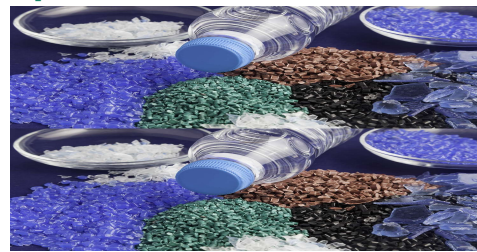


Advanced Recycling Study Stakeholder Meeting

October 15, 2021
Virginia Department of Environmental Quality

Advanced Recycling Study Group

Manufacturing process for conversion of post-use polymers & recovered feedstocks into basic hydrocarbon raw materials & other materials



Aykuteri/Adobe Stock

Pyrolysis

Gasification

Depolymerization

Solvolyis

Post-use polymers & recovered feedstocks:

- Do not include (& are not mixed with) unprocessed MSW
- Are not considered SW when processed through advanced recycling



Budget Item 376 paragraph C. Advanced recycling.

This budget amendment directs DEQ to study the chemical conversion process referred to as Advanced Recycling, which includes the processes of pyrolysis, gasification, depolymerization and other processes which convert certain plastic waste into hydrocarbon raw materials. The study would include a survey of other states' approaches to regulation of Advanced Recycling, review of the operational history and environmental impacts of the industry, and recommendations for regulation of the industry in Virginia to ensure that the Commonwealth's air, water, land and other natural resources are fully protected. DEQ would include recommendations as to whether the Commonwealth's Solid Waste Management laws and Department regulations pursuant to 9VAC20-81-410 and relevant air and water permitting regulations would provide adequate regulation of the industry, or would require revision. The study would also invite input from a stakeholder advisory group convened by the agency, comprised of representatives of the chemical conversion industry, recycling industry, environmental organizations and community representatives. The Department is directed to provide a summary of its study and make recommendations on the regulation of the advanced recycling industry within a report submitted to the Chair of the House Agriculture Chesapeake and Natural Resources Committee and the Chair of the Senate Agriculture Conservation and Natural Resources Committee by December 31

DEQ

Advanced Recycling Definitions

- "*Advanced recycling*" means a manufacturing process for the conversion of post-use polymers and recovered feedstocks into basic hydrocarbon raw materials, feedstocks, chemicals, liquid fuels, waxes, lubricants, or other products through processes that include pyrolysis, gasification, depolymerization, reforming, hydrogenation, solvolysis, catalytic cracking, and similar processes. "Advanced recycling" produces recycled products, including monomers, oligomers, plastics, plastics and chemical feedstocks, basic and unfinished chemicals, crude oil, naphtha, liquid transportation fuels, coatings, waxes, lubricants, and other basic hydrocarbons.
- "*Advanced recycling facility*" means a facility that, using advanced recycling, receives, stores, and converts post-use polymers and recovered feedstocks that it receives. An "advanced recycling facility" shall be subject to all applicable federal and state environmental laws and regulations.

DEQ

Advanced Recycling Definitions - Technologies

- "*Depolymerization*" means a manufacturing process in which post-use polymers are broken into smaller molecules, including monomers and oligomers; raw, intermediate, or final products; plastics and chemical feedstocks; basic and unfinished chemicals; crude oil; naphtha; liquid transportation fuels; waxes; lubricants; coatings; and other products.
- "*Gasification*" means a manufacturing process through which recovered feedstocks are heated and converted in an oxygen-deficient atmosphere into a fuel and gas mixture that is then converted to crude oil, diesel fuel, gasoline, home heating oil, ethanol, transportation fuel, other fuels, chemicals, waxes, lubricants, chemical feedstocks, diesel and gasoline blendstocks, or other valuable raw, intermediate, or final products that are returned to economic utility in the form of raw materials, products, or fuels.
- "*Pyrolysis*" means a manufacturing process through which post-use polymers are heated in the absence of oxygen until melted and thermally decomposed and are then cooled, condensed, and converted to crude oil, diesel fuel, gasoline, home heating oil, ethanol, transportation fuel, other fuels, chemicals, waxes, lubricants, chemical feedstocks, diesel and gasoline blendstocks, or other valuable raw, intermediate, or final products that are returned to economic utility in the form of raw materials, products, or fuels.
- "*Solvolyis*" means a manufacturing process through which post-use polymers are purified with the aid of solvents, allowing additives and contaminants to be removed. The products of solvolysis are polymers capable of being recycled or reused without first being reverted to a monomer. "*Solvolyis*" includes hydrolysis, aminolysis, ammonolysis, methanolysis, and glycolysis.

DEQ

Advanced Recycling Definitions - Feedstocks

"*Post-use polymer*" means a plastic polymer that:

1. Is derived from any industrial, commercial, agricultural, or domestic activity.
2. Is processed at an advanced recycling facility or held at such facility prior to processing.
3. Is used or intended for use as a feedstock to manufacture crude oil, fuels, feedstocks, blendstocks, raw materials, or other intermediate products or final products, using advanced recycling.
4. Is not mixed with solid waste or hazardous waste on site or during processing at the advanced recycling facility at which it is processed.
5. Has been sorted from solid waste and other regulated waste but may contain residual amounts of (i) solid wastes, such as organic material, and (ii) incidental contaminants or impurities, such as paper labels or metal rings.

DEQ

Advanced Recycling Definitions – Feedstocks cont'd

"Recovered feedstock" means one or more of the following materials that has been processed so that it can be used as feedstock in an advanced recycling facility:

1. Post-use polymers.
2. Materials for which the U.S. Environmental Protection Agency has made a nonwaste determination under 40 C.F.R. § 241.3(c) or has otherwise determined are feedstocks and not solid waste.

"Recovered feedstock" does not include unprocessed municipal solid waste and is not mixed with solid waste or hazardous waste on site or during processing at an advanced recycling facility.

DEQ

Advanced Recycling Definitions – Solid Waste Changes

- "*Solid waste*" means any garbage, refuse, sludge, and other discarded material, including solid, liquid, semisolid, or contained gaseous material, resulting from industrial, commercial, mining, and agricultural operations, or community activities, but does not include (i) solid or dissolved material in domestic sewage; (ii) solid or dissolved material in irrigation return flows or in industrial discharges ~~which~~ *that* are sources subject to a permit from the State Water Control Board; ~~or~~; (iii) source, special nuclear, or by-product material as defined by the Federal Atomic Energy Act of 1954, as amended; or (iv) post-use polymers or recovered feedstocks that are (a) processed at an advanced recycling facility or (b) held at or held for the purpose of conversion at such advanced recycling facility prior to conversion.
- "*Waste management*" means the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of waste or resource recovery. "Waste management" does not include pyrolysis, gasification, depolymerization, solvolysis, or any other advanced recycling process if the source materials used in such process are composed of post-use polymers or recovered feedstocks.

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Statutory Permit Exemption for Recycling

- 10.1-1408.1 J
- No permit shall be required pursuant to this section for recycling or for temporary storage incidental to recycling.
- As used in this subsection, "recycling" means any process whereby material which would otherwise be solid waste is used or reused, or prepared for use or reuse, as an ingredient in an industrial process to make a product, or as an effective substitute for a commercial product.

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Virginia Solid Waste Requirements

- These exemptions, however, do not preclude the facility from adequately managing wastes created by their advanced recycling process.
 - Rejected Feedstocks (e.g. unwanted plastic type, contamination that is removed, etc.) would need to be otherwise recycled or managed as solid waste
 - If the process creates char, carbon black or other wastes, the appropriate HW determination would need to be made. A beneficial use determination may also be required from the solid waste program if existing solid waste exemptions/exclusions don't apply.
- Alternatively, facilities employing pyrolysis or gasification technologies to manage solid wastes would need a solid waste Permit-by-Rule under the waste to energy / thermal treatment / incineration category of facilities.

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Virginia Regulatory Exemption for Recycling

- 9VAC20-81-95.F.
- The following solid wastes are exempt from this chapter provided that they are reclaimed or temporarily stored incidentally to reclamation, are not accumulated speculatively, and are managed without creating an open dump, hazard, or a public nuisance:
 1. Paper and paper products;
 2. Clean wood waste that is to undergo size reduction in order to produce a saleable product, such as mulch;
 3. Cloth;
 4. Glass;
 5. Plastics;
 6. Tire chips, tire shred, ground rubber; and
 7. Mixtures of above materials only. Such mixtures may include scrap metals excluded from regulation in accordance with the provisions of subsection C of this section.

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Virginia Air Permit Requirements

- Pollutants of Concern
 - Particulates (PM, PM10, PM2.5) from handling operations (e.g., shredding)
 - By-products of combustion similar to natural gas (Particulates, NOx, CO, VOC, HAPs)
 - Additional considerations possible due to feedstock and facility size
 - PVC
 - Major stationary source considerations
- Possible Permit Requirements (case-by-case)
 - Same basic list as with any source
 - Requirements for particulate controls such as enclosure, filters, etc.
 - Requirements for CO, VOC, HAP controls such as thermal oxidizer
 - Pollutant emissions limitations including visible emissions
 - Requirements for sorting of feedstock
 - Requirements for process control (e.g., condenser temperature, throughput limits)
 - Compliance demonstrations - Stack testing, monitoring, etc.

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National Perspective

- **EPA Considering Regulation of Pyrolysis and Gasification**

- Advanced Noticed of Intended Rulemaking Issued on September 8, 2021
- Accepting public comment until November 8, 2021

- **Information from the American Chemistry Council**

- As of June 2021, the American Chemistry Council reports that 14 states have adopted their advanced recycling legislation (e.g. labeling advanced recycling facilities as manufacturing / exempting them from solid waste). These states include: Florida, Wisconsin, Georgia, Iowa, Tennessee, Texas, Illinois, Ohio, Pennsylvania, Virginia, Oklahoma, Arizona, Arkansas, and Louisiana.

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National Perspective

- **Washington State Bill:**

Prior to program use of any advanced technology for conversion of post-use plastic polymers for the purpose of producing recycled material to be counted toward reuse and recycling performance targets, the producer responsibility organization must provide the department with a third-party assessment prepared to examine the impact of the advanced technology on the following: (i) Air and water pollution and release or creation of any hazardous pollutants; and (ii) The greenhouse gas emissions resulting from products and processes of the advanced technology facility, taking into account the full life cycle including final use of products.

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Questions for Consideration

Identify one or more benefits of advanced recycling

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Questions for Consideration

What barriers exist in siting and operating advanced recycling?

DEQ

Questions for Consideration

What adverse environmental impacts potentially exist from advanced recycling?

DEQ

Questions for Consideration

What regulatory changes do you feel are needed to address questions 2 and 3?

DEQ

Questions for Consideration

What currently available technical references can be used in considering future regulatory action?

DEQ

Questions for Consideration

Other questions we should be asking.

DEQ

**2021 RECONVENED SPECIAL SESSION I
VIRGINIA ACTS OF ASSEMBLY
CHAPTER 552**

Item 376

[H. B. 1800]

c. The Department of Environmental Quality (DEQ) is directed to study the chemical conversion process referred to as Advanced Recycling, which includes the processes of pyrolysis, gasification, depolymerization and other processes which convert certain plastic waste into hydrocarbon raw materials. The study would include a survey of other states' approaches to regulation of Advanced Recycling, review of the operational history and environmental impacts of the industry, and recommendations for regulation of the industry in Virginia to ensure that the Commonwealth's air, water, land and other natural resources are fully protected. DEQ would include recommendations as to whether the Commonwealth's Solid Waste Management laws and Department regulations pursuant to 9VAC20-81-410 and relevant air and water permitting regulations would provide adequate regulation of the industry, or would require revision. The study would also invite input from a stakeholder advisory group convened by the agency, comprised of representatives of the chemical conversion industry, recycling industry, environmental organizations and community representatives. The Department shall provide a summary of its study and make recommendations on the regulation of the advanced recycling industry within a report submitted to the Chair of the House Agriculture Chesapeake and Natural Resources Committee and the Chair of the Senate Agriculture Conservation and Natural Resources Committee by December 31, 2021.

Attachment 4

Acts of Assembly 2021, Special Session I (SB1164), Chapter 375

VIRGINIA ACTS OF ASSEMBLY -- 2021 SPECIAL SESSION I

CHAPTER 375

An Act to amend and reenact § 10.1-1400 of the Code of Virginia, relating to advanced recycling; definition.

[S 1164]

Approved March 25, 2021

Be it enacted by the General Assembly of Virginia:

1. That § 10.1-1400 of the Code of Virginia is amended and reenacted as follows:

§ 10.1-1400. Definitions.

As used in this chapter, unless the context requires a different meaning:

"Advanced recycling" means a manufacturing process for the conversion of post-use polymers and recovered feedstocks into basic hydrocarbon raw materials, feedstocks, chemicals, liquid fuels, waxes, lubricants, or other products through processes that include pyrolysis, gasification, depolymerization, reforming, hydrogenation, solvolysis, catalytic cracking, and similar processes. "Advanced recycling" produces recycled products, including monomers, oligomers, plastics, plastics and chemical feedstocks, basic and unfinished chemicals, crude oil, naphtha, liquid transportation fuels, coatings, waxes, lubricants, and other basic hydrocarbons.

"Advanced recycling facility" means a facility that, using advanced recycling, receives, stores, and converts post-use polymers and recovered feedstocks that it receives. An "advanced recycling facility" shall be subject to all applicable federal and state environmental laws and regulations.

"Applicant" means any and all persons seeking or holding a permit required under this chapter.

"Board" means the Virginia Waste Management Board.

"Composting" means the manipulation of the natural aerobic process of decomposition of organic materials to increase the rate of decomposition.

"Department" means the Department of Environmental Quality.

"Depolymerization" means a manufacturing process in which post-use polymers are broken into smaller molecules, including monomers and oligomers; raw, intermediate, or final products; plastics and chemical feedstocks; basic and unfinished chemicals; crude oil; naphtha; liquid transportation fuels; waxes; lubricants; coatings; and other products.

"Director" means the Director of the Department of Environmental Quality.

"Disclosure statement" means a sworn statement or affirmation, in such form as may be required by the Director, which includes:

1. The full name and business address of all key personnel;
2. The full name and business address of any entity, other than a natural person, that collects, transports, treats, stores, or disposes of solid waste or hazardous waste in which any key personnel holds an equity interest of five percent or more;
3. A description of the business experience of all key personnel listed in the disclosure statement;
4. A listing of all permits or licenses required for the collection, transportation, treatment, storage, or disposal of solid waste or hazardous waste issued to or held by any key personnel within the past 10 years;
5. A listing and explanation of any notices of violation, prosecutions, administrative orders (whether by consent or otherwise), license or permit suspensions or revocations, or enforcement actions of any sort by any state, federal, or local authority, within the past 10 years, ~~which that~~ are pending or have concluded with a finding of violation or entry of a consent agreement, regarding an allegation of civil or criminal violation of any law, regulation, or requirement relating to the collection, transportation, treatment, storage, or disposal of solid waste or hazardous waste by any key personnel, and an itemized list of all convictions within 10 years of key personnel of any of the following crimes punishable as felonies under the laws of the Commonwealth or the equivalent thereof under the laws of any other jurisdiction: murder; kidnapping; gambling; robbery; bribery; extortion; criminal usury; arson; burglary; theft and related crimes; forgery and fraudulent practices; fraud in the offering, sale, or purchase of securities; alteration of motor vehicle identification numbers; unlawful manufacture, purchase, use or transfer of firearms; unlawful possession or use of destructive devices or explosives; violation of the Drug Control Act, ~~Chapter 34~~ (§ 54.1-3400 et seq.) of Title 54.1; racketeering; or violation of antitrust laws;
6. A listing of all agencies outside the Commonwealth ~~which that~~ have regulatory responsibility over the applicant or have issued any environmental permit or license to the applicant within the past 10 years, in connection with the applicant's collection, transportation, treatment, storage, or disposal of solid waste or hazardous waste;
7. Any other information about the applicant and the key personnel that the Director may require that

reasonably relates to the qualifications and ability of the key personnel or the applicant to lawfully and competently operate a solid waste management facility in Virginia; and

8. The full name and business address of any member of the local governing body or planning commission in which the solid waste management facility is located or proposed to be located, who holds an equity interest in the facility.

"Disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste into or on any land or water so that such solid waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

"Equity" includes both legal and equitable interests.

"Federal acts" means any act of Congress providing for waste management and regulations promulgated thereunder.

"Gasification" means a manufacturing process through which recovered feedstocks are heated and converted in an oxygen-deficient atmosphere into a fuel and gas mixture that is then converted to crude oil, diesel fuel, gasoline, home heating oil, ethanol, transportation fuel, other fuels, chemicals, waxes, lubricants, chemical feedstocks, diesel and gasoline blendstocks, or other valuable raw, intermediate, or final products that are returned to economic utility in the form of raw materials, products, or fuels.

"Hazardous material" means a substance or material in a form or quantity ~~which~~ that may pose an unreasonable risk to health, safety, or property when transported, and which the U.S. Secretary of Transportation of the United States has so designated by regulation or order.

"Hazardous substance" means a substance listed under ~~United States Public Law 96-510~~, entitled the federal Comprehensive Environmental Response Compensation and Liability Act, P.L. 96-510.

"Hazardous waste" means a solid waste or combination of solid wastes ~~which~~, that because of its quantity, concentration or physical, chemical, or infectious characteristics, may:

1. Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating illness; or
2. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

"Hazardous waste generation" means the act or process of producing hazardous waste.

"Household hazardous waste" means any waste material derived from households (including single and multiple residences, hotels, motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas) which, except for the fact that it is derived from a household, would be classified as a hazardous waste, including ~~but not limited to~~, nickel, cadmium, mercuric oxide, manganese, zinc-carbon or lead batteries; solvent-based paint, paint thinner, paint strippers, or other paint solvents; any product containing trichloroethylene, toxic art supplies, used motor oil and unusable gasoline or kerosene, fluorescent or high intensity light bulbs, ammunition, fireworks, banned pesticides, or restricted-use pesticides as defined in § 3.2-3900. All empty household product containers and any household products in legal distribution, storage, or use shall not be considered household hazardous waste.

"Key personnel" means the applicant itself and any person employed by the applicant in a managerial capacity, or empowered to make discretionary decisions, with respect to the solid waste or hazardous waste operations of the applicant in Virginia, but ~~shall~~ does not include employees exclusively engaged in the physical or mechanical collection, transportation, treatment, storage, or disposal of solid or hazardous waste and such other employees as the Director may designate by regulation. If the applicant has not previously conducted solid waste or hazardous waste operations in Virginia, ~~the term~~ "key personnel" also includes any officer, director, *or* partner of the applicant, or any holder of five percent or more of the equity or debt of the applicant. If any holder of five percent or more of the equity or debt of the applicant is not a natural person, ~~the term~~ "key personnel" includes all key personnel of that entity, provided that where such entity is a chartered lending institution or a reporting company under the Federal Securities Exchange Act of 1934, ~~the term~~ "key personnel" does not include key personnel of such entity. Provided further that ~~the term~~ "key personnel" means the chief executive officer of any agency of the United States or of any agency or political subdivision of the Commonwealth; and all key personnel of any person, other than a natural person, that operates a landfill or other facility for the disposal, treatment, or storage of nonhazardous solid waste under contract with or for one of those governmental entities.

"Manifest" means the form used for identifying the quantity, composition, origin, routing, and destination of hazardous waste during its transportation from the point of generation to the point of disposal, treatment, or storage of such hazardous waste.

"Mixed radioactive waste" means radioactive waste that contains a substance ~~which~~ that renders the mixture a hazardous waste.

"Open dump" means a site on which any solid waste is placed, discharged, deposited, injected, dumped, or spilled so as to create a nuisance or present a threat of a release of harmful substances into the environment or present a hazard to human health.

"Person" includes an individual, corporation, partnership, association, a governmental body, a municipal corporation, or any other legal entity.

"Post-use polymer" means a plastic polymer that:

1. *Is derived from any industrial, commercial, agricultural, or domestic activity.*
2. *Is processed at an advanced recycling facility or held at such facility prior to processing.*
3. *Is used or intended for use as a feedstock to manufacture crude oil, fuels, feedstocks, blendstocks, raw materials, or other intermediate products or final products, using advanced recycling.*
4. *Is not mixed with solid waste or hazardous waste on site or during processing at the advanced recycling facility at which it is processed.*
5. *Has been sorted from solid waste and other regulated waste but may contain residual amounts of (i) solid wastes, such as organic material, and (ii) incidental contaminants or impurities, such as paper labels or metal rings.*

"Pyrolysis" means a manufacturing process through which post-use polymers are heated in the absence of oxygen until melted and thermally decomposed and are then cooled, condensed, and converted to crude oil, diesel fuel, gasoline, home heating oil, ethanol, transportation fuel, other fuels, chemicals, waxes, lubricants, chemical feedstocks, diesel and gasoline blendstocks, or other valuable raw, intermediate, or final products that are returned to economic utility in the form of raw materials, products, or fuels.

"Radioactive waste" or "nuclear waste" includes:

1. *"Low-level radioactive waste" material that:*
 - a. *Is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or by-product material as defined in section § 11(e)(2) of the Atomic Energy Act of 1954 (42 U.S.C. § 2014(e)(2)); and*
 - b. *The Nuclear Regulatory Commission, consistent with existing law, classifies as low-level radioactive waste; or*
2. *"High-level radioactive waste," which means:*
 - a. *The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and*
 - b. *Other highly radioactive material that the Nuclear Regulatory Commission, consistent with existing law, determines by rule requires permanent isolation.*

"Recovered feedstock" means one or more of the following materials that has been processed so that it can be used as feedstock in an advanced recycling facility:

1. *Post-use polymers.*
2. *Materials for which the U.S. Environmental Protection Agency has made a nonwaste determination under 40 C.F.R. § 241.3(c) or has otherwise determined are feedstocks and not solid waste.*

"Recovered feedstock" does not include unprocessed municipal solid waste and is not mixed with solid waste or hazardous waste on site or during processing at an advanced recycling facility.

"Recycling residue" means the (i) nonmetallic substances, including but not limited to plastic, rubber, and insulation, which that remain after a shredder has separated for purposes of recycling the ferrous and nonferrous metal from a motor vehicle, appliance, or other discarded metallic item and (ii) organic waste remaining after removal of metals, glass, plastics, and paper which that are to be recycled as part of a resource recovery process for municipal solid waste resulting in the production of a refuse derived fuel.

"Resource conservation" means reduction of the amounts of solid waste that are generated, reduction of overall resource consumption, and utilization of recovered resources.

"Resource recovery" means the recovery of material or energy from solid waste.

"Resource recovery system" means a solid waste management system which that provides for collection, separation, recycling, and recovery of solid wastes, including disposal of nonrecoverable waste residues.

"Sanitary landfill" means a disposal facility for solid waste so located, designed, and operated that it does not pose a substantial present or potential hazard to human health or the environment, including pollution of air, land, surface water, or ground water.

"Sludge" means any solid, semisolid, or liquid wastes with similar characteristics and effects generated from a public, municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, air pollution control facility, or any other waste producing waste-producing facility.

"Solid waste" means any garbage, refuse, sludge, and other discarded material, including solid, liquid, semisolid, or contained gaseous material, resulting from industrial, commercial, mining, and agricultural operations, or community activities, but does not include (i) solid or dissolved material in domestic sewage; (ii) solid or dissolved material in irrigation return flows or in industrial discharges which that are sources subject to a permit from the State Water Control Board; or; (iii) source, special nuclear, or by-product material as defined by the Federal Atomic Energy Act of 1954, as amended; or (iv) post-use polymers or recovered feedstocks that are (a) processed at an advanced recycling facility or (b) held at or held for the purpose of conversion at such advanced recycling facility prior to conversion.

"Solid waste management facility" means a site used for planned treating, long term long-term storage, or disposing of solid waste. A "solid waste management facility" may consist of several

treatment, storage, or disposal units.

"Solvolyis" means a manufacturing process through which post-use polymers are purified with the aid of solvents, allowing additives and contaminants to be removed. The products of solvolyis are polymers capable of being recycled or reused without first being reverted to a monomer. "Solvolyis" includes hydrolysis, aminolysis, ammonolysis, methanolysis, and glycolysis.

"Transport" or "transportation" means any movement of property and any packing, loading, or unloading or storage incidental thereto.

"Treatment" means any method, technique, or process, including incineration or neutralization, designed to change the physical, chemical, or biological character or composition of any waste to neutralize it or to render it less hazardous or nonhazardous, safer for transport, amenable to recovery or storage, or reduced in volume.

"Vegetative waste" means decomposable materials generated by yard and lawn care or land-clearing activities and includes, but is not limited to, leaves, grass trimmings, and woody wastes such as shrub and tree prunings, bark, limbs, roots, and stumps.

"Waste" means any solid, hazardous, or radioactive waste as defined in this section.

"Waste management" means the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of waste or resource recovery. *"Waste management" does not include pyrolysis, gasification, depolymerization, solvolyis, or any other advanced recycling process if the source materials used in such process are composed of post-use polymers or recovered feedstocks.*

"Yard waste" means decomposable waste materials generated by yard and lawn care and includes leaves, grass trimmings, brush, wood chips, and shrub and tree trimmings. "Yard waste" ~~shall~~ does not include roots or stumps that exceed six inches in diameter.

GUIDELINES FOR DISCUSSIONS

1. Listen actively with an open mind.
2. Speak from your own experience instead of generalizing.
3. Be respectful and focus on the issue or the idea, not the speaker. Refrain from personal attacks.
4. Be concise and speak only once on a particular issue. Weigh in with new or different information to share *after* everyone else has had an opportunity to speak.
5. Simply note your agreement with what someone else has said if you feel that it is important to do so; it is not necessary to *repeat* it.
6. Present options or alternatives at the same time you present the problems you see.
7. Be courteous and speak one at a time; interruptions and side conversations are distracting and disrespectful to the speaker. "Caucus" or private conversations between a group member and an audience member may take place during breaks or at lunch, not during the work of the group and be mindful that this is an open public meeting.
8. Come prepared.
9. Turn off all devices.
10. Stay positive; a negative attitude hinders the group's ability to reach agreement.

Attachment 6

Advanced Recycling Study Group Membership

Debbie Spiliotopoulos - Northern Virginia Regional Commission

Tad Phillips- TFC Recycling

Glen Besa - Citizen

Connor Kish - VA Chapter Sierra Club

Phillip Musegaas - Potomac Riverkeeper Network

Anikka Moore - Dominion Energy

Kevin Kaurich - DuPont Spruance

Travis Keever - Eastman Chemical

Jesse Goellner - Braven Environmental

Andrew Parker - Advansix