# Questions for Paradigm BioAviation LLC

**PROPOSAL BASICS**

[If the plan is to build one stage of the process, then another, or at one scale, then to expand, please provide numbers for the initial plan and the maximum future stage foreseen.]

1. What is the total capacity of the proposed plant in tons/day of incoming waste or other feedstock to the dirty material recovery facility (MRF)?

2. What is the total capacity of the proposed plant in tons/day of feedstock to be fed into the gasifier? (This should be the answer to #1 minus recyclables or other material to be diverted.)

3. What is the total capacity of the proposed plant in gallons/day of fuel produced?

4. What is the gross and net capacity in electricity production of the proposed plant, in megawatts (MW)?

**PERMITTING & ZONING**

5. What permits are needed from the Illinois EPA?

6. How soon does Paradigm BioAviation plan to submit permit applications for these permits?

7. What other permits are needed from any government agencies?

8. What property does Paradigm BioAviation plan to use for this proposed facility? In what municipal jurisdiction is the property located?

9. Does Paradigm BioAviation own, lease or have an option or other property interest in any property proposed to be used for this facility?

10. Is the property proposed to be used zoned to allow this facility, or are any zoning changes, special exceptions, variances or conditional uses required to build and operate such a facility?

11. If any zoning changes are necessary, please explain what they are and when they have been (or will be) applied for.

**OWNERSHIP**

12. Would Paradigm BioAviation be the long-term owner of the plant?

13. Would Paradigm BioAviation be the long-term operator of the plant?

14. Paradigm BioAviation LLC is a registered corporation in Delaware, but is not licensed to do business in Illinois under that name. Does Paradigm BioAviation have an incorporated entity or a certificate of authority to do business in Illinois? If so, under which exact name?

**TECHNOLOGY**

15. Would the facility use a gasification process?

16. Would the syngas from the gasification process be burned for power (electricity)?

17. What type of combustor would be used for electricity production?

18. Is the plan still to burn for electricity for at least 12 months before the facility would be ready to produce liquid fuels? If so, how many months after the facility starts is this fuel production reasonably expected to be operating?

19. Are additional permits needed to go from electricity production to fuel production? If so, which permits, from where?

20. Once fuel production commences, should the process work, is the intent to continue to produce electricity?

21. If the facility is only producing fuel and not electricity, will there be any sort of combustion on-site at the facility?

22. Please explain what temperatures will be reached throughout the process and how long the residence time will be for any gases or solid wastes at the 350-800o F range. While in this temperature range, will syngas, other gases or solid wastes be in the presence of oxygen, halogens, copper, iron or zinc? What efforts will be made to minimize the residence time at this temperature range?

**TERMINOLOGY & LEGAL DEFINITIONS**

23. Is a "municipal waste combustor" the same thing as a "municipal waste incinerator," according to the U.S. EPA?

24. What are EPA's definitions of "municipal waste combustor" and "pyrolysis/combustion unit" under 40 CFR 60.51a?

25. Is waste gasification acceptable or not acceptable under the only international peer-reviewed definition of Zero Waste and the Zero Waste Hierarchy, as developed by the Zero Waste International Alliance?

26. Is trash incineration/gasification considered "renewable" in Illinois' Renewable Portfolio Standard law?

27. Paradigm BioAviation claims that "The EPA has, however, now recognized the advanced Gasifier of the type Paradigm BioAviation will employ, as a distinct environmentally superior and a different process to incineration for the conversion of biomass to Syngas." Please provide documentation of this claim.

**TECHNOLOGY DEMONSTRATION**

28. Is there any facility exactly like the one proposed operating anywhere in the world at commercial scale?

29. Has this exact technology been demonstrated at a pilot scale anywhere in the world?

30. Has Paradigm BioAviation ever built this same type of facility before (with the same feedstock, technology and on the same scale)?

31. Has Paradigm BioAviation ever built anything, anywhere, ever?

32. Have the principals, investors or licensees involved in Paradigm BioAviation or this proposed facility ever built anything remotely akin to what is proposed?

33. If answering "YES" to any of the five previous questions, please explain:

    a. Exactly where each plant is located
    b. Who owned and operated them when they first started operation
    c. Who currently owns/operates them
    d. How long they have been in operation
    e. Whether they operate continuously or in batch modes, and how long the longest continuous run of the facility has been
    f. What feedstock(s) are used and how much of each
    g. The ton/day capacity of the facility
    h. The actual average tons/day processed during normal facility operation
    i. The plant's capacity in gallons/day of fuel produced
    j. What sort of fuel is produced
    k. The plant's capacity factor
    l. What permits were issued for the facility, and by which agencies
    m. When the facility started operation
    n. Whether the facility is currently operating (and if not, when it stopped and why)
    o. Which air pollutants are tested for and how frequently
    p. Whether Paradigm BioAviation will make the air monitoring data available
    q. Whether Paradigm BioAviation will help interested parties get a tour of the plant
    r. How many tons/day of solid wastes are produced
    s. What is done with the solid wastes produced by the process
    t. What testing has been done for contaminants in the solid residuals, and of leaching from them
    u. How many tons/day of liquid wastes / effluents are produced
    v. What is done with the liquid wastes / effluents produced by the process

**POWERING THE PROPOSED FACILITY**

34. How much energy is needed to power the process? Please describe the expected power sources, including amounts of electricity and the types and amounts of any fossil fuel inputs or other fuel sources.

35. Are any off-site steam sources being considered? If so, which one(s)?

**AIR EMISSIONS**

36. Would the facility require an Illinois EPA air pollution permit?

37. What air pollution control devices will be used to clean the syngas prior to its use?

38. How many smokestacks would the proposed facility have?

39. Other than burning syngas for energy production, will any solid, liquid or gaseous streams produced by the gasification process be combusted on-site? If so, please explain which process effluents would be used and what the combustion method would be. If there are multiple sources, please explain each one.

40. If the number of smokestacks and combustion processes described in the previous two questions don't correlate, please explain in enough detail so that we can understand the process enough to have an understanding of what would come from each air emissions point source.

41. Will there be any metals or halogens in the gases or other materials to be burned?

42. Will oxygen be present during any part of the gasification process and any subsequent combustion processes?

43. Will there be any pressure relief valves or emergency / bypass vents that could cause airborne releases at a point in the process prior to the last air pollution controls in the train?

44. Please list all air pollutants for which monitoring will take place and the frequency of monitoring (i.e. continuously, quarterly, annually, once at startup, never). If emissions of a pollutant will be calculated, rather than directly monitored, please denote the difference.

45. Will Paradigm BioAviation commit to continuous emissions monitoring and real-time web-based public disclosure of the following air pollutants, for which the technology is available? If yes, to some, but not others, please specify.

    a. Carbon Dioxide ($CO_2$)
    b. Carbon Monoxide (CO)
    c. Hydrochloric Acid (HCl)
    d. Hydrofluoric Acid (HF)
    e. Nitrogen Oxides (NOx)
    f. Sulfur Oxides (SOx)
    g. Particulate Matter (PM)
    h. Dioxins & furans (at least using long-term samplers, like AMESA)
    i. Volatile Organic Compounds (VOCs)
    j. Polycyclic Aromatic Hydrocarbons (PAHs)
    k. Ammonia (if used in air pollution controls)
    l. Arsenic
    m. Cadmium
    n. Chromium
    o. Lead
    p. Manganese
    q. Mercury
    r. Nickel
    s. Selenium
    t. Zinc

**WASTE FEEDSTOCK**

46. Which of the following feedstocks are possible to process in your proposed facility, and which are being considered? If we missed anything being considered, please spell it out in the "other" space at the bottom.

| Feedstock | Possible to Process | Being Considered |
|---|---|---|
| Municipal Solid Waste (household and commercial trash) | | |
| Source-separated recyclable paper | | |
| Source-separated recyclable plastics | | |
| Source-separated food waste | | |
| Scrap tires | | |
| Plastics | | |
| Sewage sludge | | |
| Construction / Demolition Wood Waste | | |
| Paper Mill Waste | | |
| Other Wood Wastes | | |
| Animal Wastes | | |
| Electronic Wastes | | |
| Agricultural Crop Residue | | |
| Leaf waste and grass clippings | | |
| Waste from land clearing, grubbing and excavation, including trees, brush, stumps and vegetative material | | |
| Medical Waste / Infectious & Chemotherapeutic Wastes | | |
| Waste Coal | | |
| Coal | | |
| Other fossil fuels | | |
| Radioactive Waste | | |
| Hazardous Waste | | |
| Pharmaceutical Wastes | | |
| Dredge Spoils | | |
| Trees or Dedicated Energy Crops | | |
| Waste Paper | | |
| Other (please explain) | | |
| | | |
| | | |

47. Paradigm BioAviation representatives have claimed that McLean County generates over 900 tons/day of waste. Does this number include all or some source-separated recyclables and compostables? Does it include business and commercial waste? Construction/demolition waste?

48. Will Paradigm BioAviation's contracts promise not to use any source-separated recyclables and compostables?

49. Will Paradigm BioAviation promise not to discourage source-separation?

50. How will waste be transported to the facility site? How will fuels and waste be transported away from the facility? Will any be by rail? All by truck? How many truck or train loads are expected per day during full-scale operation? Please break down truck/train numbers by trips to/from the facility and by whether they're bringing in waste, or bringing out recyclables, fuel or wastes.

51. Will any waste be shredded on-site? Will any be pre-shredded before being transported to the site?

52. Will any on-site shredding be done indoors, in an enclosed facility?

53. How much waste storage capacity will be on-site? What are the maximum and average amounts of waste (in tons) expected to be stored on site?

54. How will PVC / vinyl plastics be completely removed from the feedstock prior to processing? Where will that separated plastic be shipped?

55. What other measures will be taken to remove non-PVC plastics or other materials contaminated with metals or halogens?

56. Paradigm BioAviation's presentation states: "The advanced MRF process proposed for BNI will separate all recoverable recyclable materials from the dirty MSW stream and leave an organic biomass material in a processed form which can be converted into syngas or used as Specified Recovered Fuel ("SRF") for mixing with coal in cement kilns and power station to significantly reduce carbon emissions." Will recoverable recyclable paper and plastics be removed for recycling, or used for combustion and fuel production?

57. Does Paradigm BioAviation intend to produce "SRF" or any other sort of solid fuel pellet produced from waste, for marketing to coal power plants, cement kilns or other combustion facilities?

    a. If so, will Paradigm BioAviation commit to only marketing such fuel pellets to facilities permitted under municipal solid waste combustor regulations?
    b. If so, will Paradigm BioAviation commit to public notification of communities where pellets are sold, to Bloomington-Normal officials and to self-identified interested parties?

58. What are the average unadjusted CO2 emissions per megawatthour of coal?

59. What are the average unadjusted CO2 emissions per megawatthour of the Specified Recovered Fuel ("SRF") Paradigm BioAviation might produce? What are the average CO2 emissions per megawatthour just from the plastic portion of the SRF?

**SOLID WASTES**

60. How many tons of solid wastes (gasification slag, etc.) will the process produce per day? Per year? How many tons of solid waste will be produced per ton of MSW and other feedstocks fed into the gasification process?

61. Where will these solid wastes go? Will they be disposed of in a municipal solid waste landfill?

62. Will this solid waste be in the form of slag, ash or some other form (or forms)?

63. Which toxic substances will be tested for in the solid wastes produced?

64. How often will this testing occur?

65. What sorts of tests will be used? Will they be only leaching tests (like TCLP or SPLP) or will total content tests be used as well?

66. Is there a market for these solid wastes? In an interview, Paradigm BioAviation representatives stated that they'd be used for building materials. Is there any company that has expressed interest in using this waste for building material? Is there any example in the country where gasification slag has been successfully used as building material?

67. A Paradigm BioAviation representative stated in an interview that only 1% of the waste being gasified would come out as solid waste. Is this by volume or tonnage? Please provide the data to support this claim.

68. Paradigm BioAviation claims that the gasification slag is "Bio-Char" that would be used "for agriculture." Are there any farmers, informed that it's trash gasification slag, willing to use this on their farms?

**LIQUID WASTES**

69. How much wastewater will be produced per day? Per year? How many gallons per ton of feedstock coming into the plant?

70. Will wastewater from the plant be discharged to the public sewer system or will wastewater be trucked away or discharged into a local water body?

71. Will wastewater be pre-treated prior to disposal?

72. Which toxic substances will be tested for in the wastewater produced?

73. How often will this testing occur?

**WATER USE**

74. Will the production process require water?

75. If water will be needed for the process, how much water will be required per day? per year? Per ton of feedstock? Per gallon of fuel produced?

76. Where will the water come from?

**PROCESS INPUTS / OUTPUTS**

77. In addition to any feedstocks or fuels described above, please list any other inputs to the process (acids, catalysts, etc.) and the approximate amounts needed per year.

78. In addition to jet fuel, what other marketable chemicals or products will be produced by the process? Please list approximate amounts to be produced per year.

**CHEMICAL STORAGE**

79. How many storage tanks will be on-site?

80. How many will be above ground? How many below ground?

81. Please list which chemicals will be stored in each tank and what the capacity of each tank will be.

82. What are the estimated fugitive emissions of VOCs or other compounds that will leak from these storage tanks into the air per year?

83. Will chemicals be stored in transport cars on the railroad tracks?

84. Will chemicals be trucked in or out?

85. In the case of an explosion or fire, how much liability insurance will Paradigm BioAviation carry?

86. Will liability insurance for explosions, fires, or leaks cover:

- Illness, injury, or death to workers or nearby residents, resulting from an explosion or fire?
- Replacement of damaged homes or vehicles?
- Clean-up of soil and/or groundwater contamination?
- Clean-up of contaminated water bodies?
- Damage from fires or explosions in trucks or trains transporting the fuel produced at the Paradigm BioAviation facility?
- Would injury or death of a HazMat worker be covered by the company's liability insurance?

87. Will security guards be in place at all times?

88. How many HazMat teams and fire departments are available in the area for an explosion and/or fire? Would the public be required to pay for HazMat or fire responses to this facility?

**ECONOMICS**

89. How much is it currently projected to cost to build this plant? If the plan is still to build the gasification and electricity production part first, then gas-to-liquids later, please provide numbers for both phases.

90. Will public subsidies of any sort be sought to finance or cover any cost of the plant (or to procure the fuel produced)? If so, please explain which sources of public funds are being considered? Public subsidies include tax credits, government mandated purchases of renewable electricity credits or renewable fuel credits (RINs), government purchasing of fuel, research grants, loans, etc.

91. What price will the petroleum fuel be able to sell for without subsidies (in dollars per barrel, wholesale)?

92. Paradigm BioAviation representatives have claimed that the synthetic jet fuel to be produced will sell for less than the normal price of jet fuel. How is this claim substantiated when no one has done this process yet?

93. Does Paradigm BioAviation have adequate investors to fund the project? Are investors still being sought?

94. Paradigm BioAviation's presentation states "What is also becoming clear is that old style incineration plants will not be relicensed or replaced with new incineration plants once their 20+ year lifespan expires, and that is starting to cause the very companies who have profited greatly from constructing and/or operating incineration plants to start to talk about moving into true gasification." Please provide any evidence that this is true in the United States.

95. Paradigm BioAviation's presentation states: "With greater public awareness to these environmental problems restrictions placed on landfill disposal of MSW in European countries has increased significantly, to the point where a total ban on landfills now exists in many countries including Japan, where some 42 "Zero waste" plants operate." Please provide documentation of any nations with a "total ban on landfills" and of where these supposed 42 "zero waste" plants are in Japan. Are trash incineration/gasification facilities being considered "zero waste" plants?

96. In the chart titled "Comparative Analysis of Financial Benefits to BNI with operation of Paradigm IBR Facility," what is the "additional cost to BNI post landfill closure" and why does it not apply if Paradigm BioAviation is chosen to manage BNI's waste?

97. In that same chart, what is the duration (in years) of the contract from which the per-ton rate for landfilling with Republic is drawn? What is the duration (in years) of the contract from which the per-ton rate for PBA is drawn?

**WASTE SUPPLY AGREEMENT / CONTRACT**

98. Which public officials in Bloomington-Normal is Paradigm BioAviation negotiating with for a waste supply contract?

99. Will a draft of any proposed waste supply contract be publicly available for public comment before officials are to decide on it?

100. For how many years would the agreement / contract last?

101. Will Paradigm BioAviation commit to not entering into any waste supply contracts that contain "put-or-pay" clauses, or any such clause that requires a minimum payment or guarantee of waste supplied?

102. Will waste supply contracts be sought from any other governmental or quasi-governmental bodies outside of Bloomington-Normal?

103. Will waste supply contracts be sought from McLean County?

104. Will waste from anywhere outside of McLean County be accepted?

**JOBS / LABOR**

105. Paradigm BioAviation representatives have claimed that there will be over 100 jobs in the plant and 760 produced "direct, indirect and induced" by the project. Where do these job numbers come from and how are they substantiated? How many and what type are direct, indirect or induced? How many are displaced?

106. Is Paradigm BioAviation committed to using union labor in both construction and operation of the proposed facility?

107. How many jobs would be created during construction?

108. How many long-term jobs would be created?

109. How many of the long-term jobs require advanced degrees?

110. Will Paradigm BioAviation commit to hiring some minimum number of its employees from local residents within McLean County?