



**DENVER**  
THE MILE HIGH CITY

**Denver Environmental Health Department**

Division of Environmental Quality

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June 17, 2014

Ms. Jennifer Hale  
Denver Zoological Foundation, Inc.  
2300 Steele Street  
Denver, Colorado 80205

Dear Ms. Hale:

Pursuant to Solid Waste regulations (6 CCR 1007-2), the City and County of Denver (Denver) received and referred the Certificate of Designation (CD) application to the Colorado Department of Public Health and Environment (CDPHE) on behalf of the Denver Zoological Foundation (DZF) to operate a Waste to Energy System. Denver also requested CDPHE's review of the CD and a recommendation of approval, approval with conditions, or denial from CDPHE.

Pursuant to Sec. 48-103 of Denver's Revised Municipal Code, in determining whether to approve a certificate of designation, the City Council must consider the following:

- 1) The effect on the surrounding properties;
- 2) The convenience and accessibility of the facility to potential users (not applicable in this instance);
- 3) "The ability of the proposed facility to comply with the health standards and operating procedures required by state law and such rules and regulations as may be prescribed by the state department of health and by the department of environmental health;" and
- 4) "Consistency of the proposed facility with the comprehensive plan of the City and County of Denver."

Based on these criteria, Denver has conducted its review of the CD application "Engineering Design and Operations Plan (EDOP), Denver Zoological Foundation, Waste to Energy System" dated February 6, 2014 and finds that additional information is needed before it makes its recommendation to City Council, as detailed below.

Overall comments:

- 1) Denver will need to review the Confidential Business Information (CBI) so that it may conduct a complete application review.
- 2) The EDOP mentions that a) permit applications are in progress, b) the need for additional permits will be evaluated, and c) permits will be obtained as needed. Denver will need to be informed of pending permits, and provided the associated analytical, process change information, other pertinent information, and the final permits on an ongoing basis. All final

permits will need to be sent to the Denver Department of Environmental Health (DEH) for filing in the facility file.

- 3) The EDOP states that source material will come primarily from the DZF, and may include outsourcing paper, cardboard, and dry wood waste. DEH understands that onsite Zoo wastes and possibly green waste from Denver Parks and Recreation will be used as source material. DEH notes that outsourcing of materials from private business or non-Denver agencies is not approved under this CD; however, amendments to the EDOP to include additional waste types may be submitted to DEH for approval.
- 4) Denver will be notified of a) any planned changes to source material type, and b) the associated analytical data for each waste type including process water, ash concentrations, and ash management. The Zoo will be responsible for collecting analytical results on ash as source material and fuel blend may vary, which will, at least initially, include radioactive analyses to address the potential for Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM). Analytical results conducted on ash material will be shared with DEH to ensure proper waste characterization and ultimate proper disposal.
- 5) On a minimum of an annual basis, the Zoo staff and DEH will meet to ensure requirements of the CD are being met. Meetings may include tours/inspections of the waste to energy facility.

Specific comments:

- 1) 11.2.1 (F). Please address construction storm water permits and whether they were obtained, or the rationale if not needed. Similarly, please address the need, or lack thereof, for permanent dewatering and an industrial permit for water. Please include Denver within table 11.2.1(F) Air, Regulatory agency.
- 2) 11.2.2 (A). Drawing C-1 shows that the Waste Management Building is located directly adjacent to Duck Lake and that topography on the Duck Lake side of the building is to be graded towards Duck Lake. The Porous Landscape Detention basin (PLD) along Duck Lake as shown in Drawing C-2 is adjacent to the Waste Management Building for less than one quarter of the length of the building. Table 11.2.3 indicates that rapeseed oil and other oils to be determined (TBD), tars, acids, and glycol mixtures will be handled in the Waste Management Building as part of the waste to energy system. Handling of these materials will occur in close proximity to Duck Lake. Please include the following for review:
  - A Spill Prevention, Control and Countermeasure (SPCC) plan; and
  - Engineering controls within or outside of the Waste Management Building to minimize the possibility that spills or releases will reach Duck Lake.
- 3) 11.2.2 (B).
  - a. Drawing C-2 indicates that routine maintenance of the PLDs, including replacement of soil media, will be necessary. Please include a maintenance plan for PLDs that includes roles and responsibilities. It is the policy of Denver that water quality Best Management Practices (BMP) installed by developers must be maintained by the property owner.
  - b. Please define/identify the following on drawing C-2: contents of the piles, meaning of 'STM' and 'RW', location/outline of the outside waste storage area and drainage from that area, and flow path of water from the floor drains. Please include the Federal Emergency Management Agency (FEMA) definition for the floodplain within the EDOP.
  - c. Please document within the EDOP where the waste management building vault discharges and the associated permits.
- 4) 11.2.3 (C).
  - a. Please also include a planned area for hazardous ash should it be generated; or specify that it will only be stored within the building vault. Please also specify whether ash

would be transported directly offsite from the vault, or if it would ever be moved and stored onsite temporarily (and the location of any such storage).

- b. Please note that universal and hazardous waste collection containers range in size from 14 gallon buckets to 55 gallon drums.
  - c. Please state whether the timeframes listed in table 11.2.3 (C1) are planned or operational.
  - d. Within table 11.2.3 (C2), please list the type of containment and whether there is secondary containment for 'tar/acids/particulates', 'water/rapeseed oil/TBD oil', '50% glycol, 55% (sic) water mix' (listed twice), and 'ash created from gasifier operation'.
  - e. Within table 11.2.3 (C2), please add a column indicating whether the material will be stored inside or outside and the type of containment. Also show this information/location on the drawing.
- 5) 11.2.3 (J).
- a. Please complete the last sentence of the first paragraph.
  - a. Denver requests including the ash analytical results from the prototype equipment since this is basic information in determining the waste type and how it will be managed and whether the EDOP properly addresses waste management. Please include analytical results for the ash that has been collected to date.
  - b. Additionally, given the potential for other source materials and the potential for hazardous waste generation, at a minimum, the EDOP will identify a hazardous waste storage area(s) on the EDOP map(s), and explain how hazardous ash will be managed so that it will not enter surface water or become airborne. If analysis of waste ash demonstrates that it meets limits to deem it a Resource Conservation and Recovery Act (RCRA) Hazardous Waste, the DEH must be notified, and Denver may re-evaluate approval of the CD at that time. In addition, the Zoo shall be responsible for proper management and disposal of RCRA Hazardous Waste ash.
  - c. Denver also suggests that the EDOP contain a discussion of whether, and at what volumes, additional hazardous waste would increase DZF's generator status and associated regulatory requirements.
- 6) 11.2.3 (K).
- a. Since the DZF is on Denver property, DZF will be required to obtain Denver's approval prior to using of ash as a soil amendment, which will require that results of analyses be released to Denver. CDPHE approval may also be required.
  - b. The EDOP notes that the ash will be removed approximately once per month and that the ash vault can store up to approximately 60,000 pounds. Please add procedures to address or minimize the potential for the ash to approach or exceed levels that deem the ash hazardous for metals due to the cumulative volume/concentration of metals in the stored ash. Please include analytical sampling frequency, rationale, and Colorado Department of Transportation (CDOT) transportation considerations. Please plan on analyzing ash anytime there is a change in formulation and providing analytical results to DEH.
- 7) 11.2.3 (N).
- a. Please confirm whether the exhaust from the ventilation fans is included in the pending air permit.
  - b. Please provide additional information regarding the gas detector sensor such as reading intervals, alarms, calibration.
  - c. Per the EDOP, dust explosivity is still under evaluation. Denver will need to be notified of the test results prior to approval if the data are available and once the unit is operational, ongoing monitoring, and operations and maintenance of the material.

- 8) 11.2.3 (O).
  - a. Closure will also need to include removal of all wastes, such as ash.
  - b. Financial assurance will need to be modified if ash material is determined to be hazardous.
- 9) 11.2.4 (A).
  - a. As stated in the EDOP, "The exhaust from the dryers is mechanically pulled through an air filtration system which includes carbon filtration. Any moisture in the exhaust that may condense out in the filter system, we are able to collect and divert into the building sanitary drains." Please state how the carbon will be disposed and who will be performing this maintenance, the anticipated potential volume of condensate, and confirmation testing before the condensate is discharged to the sanitary drains.
  - b. Please provide additional information regarding the gasification and energy generation, specifically: the length of time for the system to come back up to operational temperature; whether the system runs at peak efficiency during this warm up time; and a discussion of the possibility that there could be releases, for example due to incomplete combustion of fuel, during warm up period because the system is not running within design parameters.
  - c. Please confirm that the gasifier (equipment #8-1) will run for about two weeks (100 hours) before it is assessed.
  - d. Please send the schedule and maintenance checklist to Denver for the start up phase of the project and any updates if the process changes.
- 10) 11.2.4 (C).
  - a. Please discuss the potential, or lack thereof, for dust fire hazard when the ash is removed from the ash pit with a vacuum truck.
  - b. Please confirm how the material from the non-operational feed auger (equipment #5-0) and pelletized material feeder (equipment #7) will be disposed.
  - c. Denver will need to be notified of the scrubbing liquid (equipment #9) test results, ongoing monitoring, and operations and maintenance, and planned disposal of the liquid.
- 11) 11.2.4 (F). Please include personnel responsibilities and availability (24-7) to address responses to alarms, upsets, etc.
- 12) 11.2.4 (G). Please send the procedures and documenting/setting operational parameters document to Denver for the start-up phase of the project and updates as the process changes.
- 13) 11.2.4 (H). Please discuss how the carbon filters and carbon media will be managed/disposed. If this service is contracted out, include who will be performing this service for the Zoo.
- 14) 11.2.4 (J). Records will also be submitted to Denver yearly.

Thank you for your attention to this matter.

Sincerely,



Diane DeLillio

Department of Environmental Health  
City and County of Denver

cc: Zachery Clayton, CCoD  
Jessica Brody, CCoD  
Larry Bruskin, CDPHE  
Kelly Mathews, RWO Law