

Beneficial Use of Solid Waste Determination Evaluation Form



Applicant: NW Processing Solar and Microelectronics LLC

BUD#: 20141107

Solid Waste: Used garnet tailings, the fine fraction of garnet used in water-jet cutting

Summary of Proposed Beneficial Use: The used garnet tailings will be used for mine reclamation fill in the Portland metropolitan area.

Reviewer: Bill Mason/DEQ-Eugene

Date: 12/9/2014 and updated May 11, 2014

Tier: One Two Three

Beneficial Use of Solid Waste

Beneficial use of solid waste is a sustainability practice that may involve using an industrial waste in a manufacturing process to make another product or using a waste as a substitute for construction materials.

The environmental benefits of substituting industrial waste materials for virgin materials includes conserving energy, reducing the need to extract natural resources and reducing demand for disposal facilities.

Oregon Administrative Rules (OAR) 340-093-0280 - 0290 establish standing beneficial uses and a process for DEQ review of case-specific beneficial use proposals. Under these rules, DEQ may issue a beneficial use determination as an alternative to a disposal permit for proposals that meet the rule criteria. If approved, once a beneficial-use determination is issued, DEQ no longer regulates the waste as a solid waste as long as the waste is used in accordance with the approved beneficial use determination.

Beneficial Use Determination Evaluation Summary

Yes, the Beneficial Use of this solid waste meets all the case-specific performance criteria listed below and is approved.

No, the Beneficial Use of this solid waste does not meet all the case-specific performance criteria listed below and is not approved.

Notes: Based on the information by the applicant, NW Processing (NWP), they have met the 3 performance criteria established in OAR 340-093-0280, Case-Specific Beneficial Use Performance Criteria). Details on how NWP has met these criteria are provided below.

Case-Specific Beneficial Use Performance Criteria:

DEQ may approve an application for a case-specific beneficial use of solid waste only if all the following performance criteria are addressed: 1) Characterization of the Solid Waste; 2) Productive Beneficial Use of the Solid Waste; and, 3) The effect of the Proposed Beneficial Use on Public Health, Safety, Welfare and/or the Environment.

1) Characterization of the Solid Waste

Did the applicant characterize the solid waste and proposed beneficial use sufficiently to demonstrate compliance with the rules for case-specific beneficial use determinations (OAR 340-093-0280) by submitting required information for the appropriate tier? (See tier sections below for detailed characterization information.)

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Yes No

Notes: The applicant met this criterion by testing the used garnet waste for a series of total metals. Using "knowledge of process," no other potential contaminants of concern are likely to be present in the waste. Garnet is a very stable mineral that's not prone to weathering or chemical degradation.

Was the following information submitted for DEQ review and how adequate was it?

Tier 1 Applicable Not applicable

- Did the applicant provide an adequate description of the material proposed for beneficial use, the manner of generation and the estimated quantity to be used beneficially each year? Yes No

Notes: The applicant receives used garnet from water jet cutting facilities. Virgin garnet is added to high-pressure water jets as a cutting abrasive agent. Materials cut with water jets that qualify customers for recycling through NWP include steel, stainless steel, aluminum, titanium and other metal alloys, granite, glass and other stone or ceramic materials. During the cutting process the work part and the supporting structures, usually wood or plastic, release fine kerf. The kerf and unused garnet fall out in the water jet table and fill the table over time. Once full, the sediment is removed from the table and delivered to NWP. Upon receiving, NWP screens the incoming sediment and separates waste metals, plastic and wood particles above 1 /4 inch size from the used garnet. The next processing step consists of a hydrosizer separation at a particle size of about 100µ. The fine tailings are then separated from the process water through a filter press and are deposited in 35 cubic foot big bags as filter cake. Target quantities of used garnet tailings material at peak production will be about 750-800 metric tons per month or 9,000 to 10,000 metric tons per year.

- Did the applicant provide an adequate description of the proposed beneficial use and justify how the proposed use is beneficial? Yes No

Notes: Of the used garnet received by the applicant, roughly 25-30% will be recovered and refined to be used as water jet cutting abrasive equal to virgin garnet. The remaining 70-75% will be used for mine reclamation. The environmental benefit of processing and reclaiming used garnet as opposed to the current state of the art - sending 100% of the material to landfill - lies in a reduction of waste through re-use of the useable fraction and a significant rinse of the tailings prior to the use for mine reclamation.

- Did the applicant provide a sufficient comparison of the chemical and physical characteristics of the material proposed for beneficial use with the material it will replace? (Note: As applicable, the analysis must provide chemical, physical, and biological characterization of the material proposed for beneficial use and identify potential contaminants in the material or the end product.) Yes No

Notes: The largest source of abrasive garnet today is garnet-rich beach sand, which is quite abundant on Indian and Australian coasts. Beach sand has similar chemical (e.g., fairly inert) and physical (e.g., grain size) characteristics to the used garnet material. NWP also analyzed the used garnet material for metals, and compared these concentrations to DEQ's clean-fill criteria. Chromium, copper, molybdenum, and nickel concentrations exceeded clean-fill criteria, but were below DEQ and EPA risk-based concentrations for residential soils. The garnet waste is inert so no additional evaluation is needed.

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- Did the applicant successfully demonstrate compliance of the proposed beneficial use with the performance criteria in OAR 340-093-0280 based on knowledge of the process that generated the material, properties of the finished product, or testing? Yes No

Notes: NWP tested the used garnet material for metals, which met relevant human-health screening levels for residential soil.

- If required, did the applicant provide any other DEQ required information to evaluate the proposal? Yes No

Notes: At DEQ's request, NWP also provided a description of a sampling and analysis approach in order to ensure that metals contaminants will remain below relevant risk criteria. They also provided an operations plan that outlines generator, delivery, screening, processing, and testing procedures.

Tier 2 Applicable Not applicable

- Did the applicant submit all the information required for a Tier 1 application? Yes No
- Did the applicant submit adequate sampling and analysis to make a determination of suitability for beneficial use? Yes No

Notes: NWP also analyzed the used garnet material for metals, and compared these concentrations to DEQ's clean-fill criteria. Chromium, copper, molybdenum, and nickel concentrations exceeded clean-fill criteria, but were below DEQ and EPA risk-based concentrations for residential soils.

- When applicable, did the applicant provide a risk screening comparing the concentration of hazardous substances in the material to existing, DEQ approved, risk-based screening level values, and demonstrate compliance with acceptable risk levels? Yes No

Notes: NWP provided a comparison to DEQ's clean-fill criteria, and DEQ compared metals exceedances of those criteria to risk-based concentration tables.

- When applicable, did the applicant supply the location or type of land use where the material will be applied, consistent with the risk scenarios used to evaluate risk? Yes No

Notes: NWP provided the land use of the sites on which they plan to use the material beneficially (mine reclamation sites in the Portland area), and provided land-use compatibility statements for the Baker Rock and the Tigard Sand and Gravel mine-reclamation sites.

- When applicable, did the applicant supply contact information of property owner(s) if this is a site-specific land application proposal, including name, address, phone number, e-mail, site address and site coordinates (latitude and longitude)? Yes No
- Did the applicant supply an adequate description of how the material will be managed to minimize potential adverse impacts to public health, safety, welfare, or the environment? Yes No

Notes: NWP provided an operations plan that outlines generator, delivery, screening, processing, and testing procedures that will minimize potential adverse impacts to health or the environment.

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Tier 3 Applicable Not applicable

- Did the applicant submit all the information required for a Tier 1 & Tier 2 application? Yes No
- Did the applicant provide an adequate discussion of the justification for the proposal? Yes No
- Is there an estimated length of time that would be required to complete the project, if it is a demonstration? Yes No
- If it is a demonstration project, are their methods proposed to ensure safe and proper management of the material? Yes No

2) Productive Beneficial Use of the Solid Waste

Has the applicant demonstrated that the proposed beneficial use is a productive use of the material by providing information substantiating the criteria listed below?

Yes No

Notes: Of the used garnet received by the applicant, roughly 25-30% will be recovered and refined to be used as water jet cutting abrasive equal to virgin garnet. The remaining 70-75% will be used for mine reclamation. The environmental benefit of processing and reclaiming used garnet tailings as mine reclamation fill as opposed to the current state of the art - sending 100% of the material to landfill - lies in a reduction of waste through re-use of the useable fraction and a significant rinse of the tailings prior to the use for mine reclamation. The reuse is not speculative as roughly 25 to 30% of the garnet will be reused in water-jet cutting operations from which the used garnet is generated, and the mine-reclamation sites have capacity to accept the material and an interest in reclaiming their mines in accordance with their DOGAMI mining permit.

- Did the applicant successfully identify or demonstrate a reasonably likely proposed beneficial use for the material that is not speculative? Yes No

This criterion consists of three parts.

1. Identified Use:

Has the applicant clearly stated what the waste is going to be used for, that the waste is compatible with that use and the proposed quantity is necessary?

Yes No

2. Reasonably Likely Use:

Has the applicant identified, with supporting documentation, the timeframe within which this use is likely to occur (e.g., zoning info, master plan for development, letters from local jurisdictions, etc.)?

Yes No

3. Not Speculative:

For Land application - has this material been used at other sites for the same purpose, is the material feasible for use at this site for this purpose, or has the applicant identified a known potential for this use at this site?

Yes No N/A

For uses other than land application - has the material been used in a product before, is the material feasible for use in a product, or has the applicant identified a known potential for use in this product?

Yes No N/A

Notes: Of the used garnet received by the applicant, roughly 25-30% will be recovered and refined to be used as water jet cutting abrasive equal to virgin garnet. The remaining 70-75% will be used

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for mine reclamation. The environmental benefit of processing and reclaiming used garnet as mine reclamation fill as opposed to the current state of the art - sending 100% of the material to landfill - lies in a reduction of waste through re-use of the useable fraction and a significant rinse of the tailings prior to the use for mine reclamation. The reuse is not speculative as roughly 25 to 30% of the garnet will be reused in water-jet cutting operations from which the used garnet is generated, and the mine-reclamation sites have capacity to accept the material and an interest in reclaiming their mines in accordance with their DOGAMI mining permit. In addition, the used garnet waste is similar in characteristics to beach and river sand, which has been historically used to reclaim mines in Oregon. DOGAMI has reviewed the beneficial use application and determined that use of garnet waste as mine-reclamation material can be done in accordance with the DOGAMI permit and the DOGAMI-approved fill/reclamation plan and operating plan.

- Is the use a valuable part of a manufacturing process, an effective substitute for a valuable raw material or commercial product, or otherwise authorized by the Department and does not constitute disposal?
 Yes No

Notes: The reclaimed garnet will be reused as a substitute virgin material in water-jet cutting and the used garnet tailings waste will be used in mine reclamation instead of using virgin material for fill.

- Is the use in accordance with applicable engineering standards, commercial standards, and agricultural or horticultural practices?
 Yes No

Notes: The reclaimed garnet will be sized to meet engineering standards for water-jet cutting, and the mine reclamation will meet the requirements of the DOGAMI mining permit and fill/reclamation plan and operating plan.

3) Effect of Proposed Beneficial Use on Public Health, Safety, Welfare and/or the Environment

Has the applicant demonstrated the proposed beneficial use will **not** create an adverse impact to public health, safety, welfare, or the environment, by providing information substantiating compliance with the criteria listed in the bullet list below?

Yes No

Notes: NWP also analyzed the used garnet material for metals, and compared these concentrations to DEQ's clean-fill criteria. Chromium, copper, molybdenum, and nickel concentrations exceeded clean-fill criteria, but were below DEQ and EPA risk-based concentrations for residential soils.

- Has the applicant demonstrated that the material is not a hazardous waste under ORS 466.00?
 Yes No

Notes: Based on knowledge of process, garnet is fairly inert, and testing for total metals indicates that the material is not a hazardous waste.

- Has the applicant demonstrated that until the time this material is used according to a beneficial use determination, the material will be managed, including any storage, transportation, or processing, to prevent releases to the environment or nuisance conditions?

Yes No

Notes: NWP provided an operations plan that outlines generator, delivery, screening, processing, and testing procedures that will minimize potential adverse impacts to health or the environment.

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- Has the applicant demonstrated that hazardous substances in the material, if any, meet one of the criteria in the bulleted list below? Yes No
 - Hazardous substances do not significantly exceed the concentration in a comparable raw material or commercial product;
 - Hazardous substances do not exceed naturally occurring background concentrations; or
 - Hazardous substances will not exceed acceptable risk levels, including persistence and potential bioaccumulation, when the material is managed according to a beneficial use determination.

Notes: NWP tested the garnet waste and the metal concentrations are higher than background values for metals but lower than residential screening criteria so can be used for reclamation fill at DOGAMI-permitted reclamation sites.

- Has the applicant demonstrated that the proposed beneficial use will not result in the increase of a hazardous substance in a sensitive environment, such as a park, wildlife refuge or wetland? Yes No

Notes: A mine reclamation site is not a sensitive environment such as a park, wildlife refuge, or wetland. If wetlands had existed previously, DOGAMI may require wetland mitigation as a part of the mine reclamation. However, all the used garnet material will be in the subsurface and will not be left uncovered.

- Has the applicant demonstrated that the proposed beneficial use will not create objectionable odors, dust, unsightliness, fire, or other nuisance conditions? Yes No

Notes: The material is odor free, and will not be likely to generate dust during transport due to the moisture content of the material following screening and rinsing the material.

- Has the applicant indicated that the proposed beneficial use will comply with any other applicable federal, state, and local regulations? Yes No

Notes: NWP will be taking the material to DOGAMI-permitted mine reclamation sites. The operator must comply with the conditions of the DOGAMI permit and fill/reclamation plan and operating plan.

4) Public Involvement Evaluation (Note: this is not a Beneficial Use evaluation criterion) Determine a public involvement recommendation using the current, **Guidance to DEQ Solid Waste Program Staff and Managers on Public Notice & Participation.**

- Is public notice and participation being recommended for this application? Yes No

Notes: DEQ will provide a two week notice of intent to approve the requested beneficial use.