



COLUMBIA STEEL CASTING CO., INC.

Phone 503-286-0685
Toll Free 800-547-9471
Customer Service Ext. 257
Fax 503-286-1743

P.O. Box 83095
Portland, OR 97283-0095
U.S.A.

service@columbiasteel.com
www.columbiasteel.com

July 13, 2017

DEQ Northwest Region
Solid Waste Programs
700 NE Multnomah St., Suite 600
Portland, OR 97232

RE: Beneficial Use Application for Sand Fines as an admixture for solidification of liquid or semi-liquid materials

Dear Sir/Madam,

Enclosed is a Tier 2 application for Beneficial Use Determination, in duplicate. Also enclosed is our check for the \$2000.00 application review fee.

The systems we have in place here at Columbia Steel Casting Co., Inc. for recycling our foundry molding sand include multiple fabric filter dust collectors. The sand fines collected in the dust filters, is the same as our regular foundry sand, but with finer particle sizes. The spent sand is already covered by Beneficial Use approvals.

Columbia Steel Casting Co. contracted with SLR International Corp (SLR) to do a detailed evaluation of the fines to better determine how it can be used beneficially. A copy of SLR's November 15, 2012 fines evaluation report is included in this application as Attachment 1. Multiple samples were collected and analyzed to characterize the stockpile. Samples were taken from various locations to enable comparison of new and aged material. Laboratory analyses were conducted to determine physical as well as chemistry properties. Apex Labs was used to evaluate the chemical properties. Professional Service Industries Labs (PSI) was used to evaluate the mechanical and structural properties. A & L Western Agricultural Laboratories was used to characterize it compared to standard soil types. Full copies of the lab reports and summary tables of the results are included in Attachment 1.

The study confirms that there are no significant differences between "sand" and "fines", in terms of chemistry and other factors customarily used to determine risk to human health and the environment. The notable differences are about the physical properties that are important to architects, structural engineers, and geotechnical soils engineers. It has economic value as a substitute for other materials commonly being used as thickening agents for certain applications.

With this Beneficial Use application, DEQ is being asked to evaluate the potential risks to human health and the environment from the proposed uses.

We will be looking forward to your prompt response, so we can move forward with expanded beneficial uses for these materials. Thank you for your consideration of this important issue.

Sincerely,



Bruce Schacht
Environmental Engineer
Columbia Steel Casting Co Inc.

CC: Schwabe
SLR
Mgmt File
Faust

SOLIDIFICATION



State of Oregon
Department of
Environmental
Quality

Application for a
**Solid Waste
Beneficial Use
Determination**

DEQ USE ONLY - BUSINESS OFFICE

Date Received: _____

Amount Received: _____

Check No.: _____

Deposit No.: _____

Forward confirmation of fee payment for:
Eastern Region to DEQ, The Dalles
Northwestern Region to DEQ-NWR, Portland
Western Region to DEQ, Salem

A. REFERENCE INFORMATION *(Please type or print clearly.)*

Columbia Steel Casting Co., Inc.

Legal name of applicant

Business name of applicant if different

PO Box 83095

Portland

OR

97283

Mailing address

City

State

Zip

503-286-0685

bruce_s@columbiasteel.com

503-286-3028

Phone

Mobile

E-mail

Fax

same as applicant

Generator of solid waste (may be same as applicant)

Mailing address

City

State

Zip

Phone

Mobile

E-mail

Fax

B. TYPE OF BENEFICIAL USE DETERMINATION REQUESTED Beneficial Use Determination applications are categorized based on the type of information and potential amount of work required by DEQ staff to review application materials and render a decision. A tiered review and fee system has been established in rule. The tiers are:

- Tier 1 For a beneficial use of a solid waste that does not contain hazardous substances significantly exceeding the concentration in a comparable raw material or commercial product and that will be used in a manufactured product;

- Tier 2 For a beneficial use of a solid waste that contains hazardous substances significantly exceeding the concentration in a comparable raw material or commercial product, or involves application on the land;
- Tier 3 For a beneficial use of a solid waste that requires research, such as a literature review or risk assessment, or for a demonstration project to demonstrate compliance with this rule.

I am applying for a ☐ Tier 1 ☒ Tier 2 ☐ Tier 3 determination.

C. DOES THIS PROPOSED BENEFICIAL USE INVOLVE LAND APPLICATION OF ANY MATERIAL?

☒ Yes ☐ No

D. SIGNATURE I hereby certify by my signature below that the information contained in this application, and the documents I have attached, are true and correct to the best of my knowledge and belief.

	BRUCE SCHACHT	ENVIRONMENTAL ENGINEER	7/13/17
Signature of legally authorized representative	Print name	Title	Date

E. REQUIRED ATTACHMENTS TO THIS APPLICATION *(For an application to be complete, it must provide the required information for each listed item of the tier which is being applied for.)*

Tier 1

- ☒ A description of the material, manner of generation, and estimated quantity to be used each year;
- ☒ A description of the proposed use;
- ☒ A comparison of the chemical and physical characteristics of the material proposed for use with the material it will replace;
- ☒ A demonstration of compliance 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; and
- ☐ Any other information that DEQ may require to evaluate the proposal.

Tier 2

- ☒ The information required for a Tier 1 application;
- ☒ Sampling and analysis that provides chemical, physical, and biological characterization of the material and that identifies potential contaminants in the material or the end product, as applicable;
- ☒ A risk screening comparing the concentration of hazardous substances in the material to existing, DEQ approved, risk-based screening level values, and demonstrating compliance with acceptable risk levels;
- ☒ Location or type of land use where the material will be applied, consistent with the risk scenarios used to evaluate risk;
- ☐ 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); and
- ☒ A description of how the material will be managed to minimize potential adverse impacts to public health, safety, welfare, or the environment.

Tier 3

- ☐ The information required for a Tier 1 & 2 application;
- ☐ A discussion of the justification for the proposal;
- ☐ An estimate of the expected length of time that would be required to complete the project, if it is a demonstration; and
- ☐ If it is a demonstration project, the methods proposed to ensure safe and proper management of the material.

F. PERFORMANCE CRITERIA *(For all tiers - An application for a beneficial use determination must demonstrate satisfactory compliance with the following performance criteria.)*

The use is productive, including:

- ◆ There is an identified or reasonably likely use for the material that is not speculative;
- ◆ The use is a valuable part of a manufacturing process, an effective substitute for a valuable raw material or commercial product, or otherwise authorized by DEQ, and does not constitute disposal; and
- ◆ The use is in accordance with applicable engineering standards, commercial standards, and agricultural or horticultural practices.

The use will not create an adverse impact to public health, safety, welfare, or the environment, including:

- ◆ The material is not a hazardous waste under ORS 466.005;
- ◆ Until the time the material is used in accordance with a beneficial use determination, the material will be managed, including any storage, transportation, or processing, to prevent releases to the environment or nuisance conditions;
- ◆ Hazardous substances in the material do not significantly exceed the concentration in a comparable raw material or commercial product, or do not exceed naturally occurring background concentrations, or do not exceed acceptable risk levels, including evaluation of persistence and potential bioaccumulation, when the material is managed according to a beneficial use determination.

The use will not result in the increase of a hazardous substance in a sensitive environment.

The use will not create objectionable odors, dust, unsightliness, fire, or other nuisance conditions.

The use will comply with all applicable federal, state, and local regulations.

G. FEES (Must accompany the application for it to be considered complete)

<input type="checkbox"/>	Tier 1 beneficial use determination	\$1,000
<input checked="" type="checkbox"/>	Tier 2 beneficial use determination	\$2,000
<input type="checkbox"/>	Tier 3 beneficial use determination	\$5,000

Make checks out to: **Oregon DEQ**Total fees included: \$2000**H. APPLICATION PROCEDURE**Step 1

Contact a DEQ staff person for assistance with the preparation of the application. DEQ staff will help with: 1) Determination of the eligibility for a beneficial use determination of a particular waste or process; and, 2) If eligible, establish the tier of beneficial use determination review required and associated fee to submit with the application.

Step 2

Mail the original signed application, all attachments, including the fee payment plus one extra copy to the appropriate regional office (see listing below.) Note that DEQ review work will not begin until a complete application packet is received. Incomplete applications may be returned. DEQ recommends the applicant keep a full copy of all application materials to guard against possible loss in transit.

Step 3

DEQ will contact the applicant, acknowledging receipt of the application, and will identify the staff person assigned to carryout the review. This staff person will contact the applicant if any additional information is needed.

Region	Counties Served	Address & Phone
Eastern Region	Baker, Crook, Deschutes, Gilliam, Grant, Harney, Hood River, Jefferson, Klamath, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and Wheeler	Eastern Region Department of Environmental Quality 400 E Scenic Drive, Ste 2.307 The Dalles, OR 97058 (541) 298-7255 ext. 221
Northwest Region	Clatsop, Clackamas, Columbia, Multnomah, Tillamook, and Washington	Northwest Region DEQ Solid Waste Programs 2020 SW Fourth Ave. Ste 400 Portland, OR 97201 (503) 229-5353
Western Region	Benton, Coos, Curry, Douglas, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Polk, and Yamhill	Western Region DEQ Solid Waste Programs 750 Front St. NE Suite 120 Salem, OR 97301 (503) 378-5047

Application for Solid Waste Beneficial Use Determination

Tier 2 Case Specific determination for Spent Foundry Sand Fines used as an admixture for solidification of liquid or semi-liquid materials.

Tier 1 requirements:

1.1 Material

The material proposed for beneficial use is spent foundry sand fines generated in the production of iron and steel castings, at the Columbia Steel Casting Co. foundry in Portland, Oregon. This material is essentially the same as spent foundry sand already approved by DEQ as a standing beneficial use in OAR 340.093.0270(5)(e). The only significant difference is finer particle sizes.

Columbia Steel Casting Co. contracted with SLR International Corp (SLR) to do a detailed evaluation of the fines to better determine how it can be used beneficially. A copy of SLR's November 15, 2012 fines evaluation report is included in this application as Attachment 1. Multiple samples were collected and analyzed to characterize the stockpile. Samples were taken from various locations to enable comparison of new and aged material. Laboratory analyses were conducted to determine physical as well as chemistry properties. Apex Labs was used to evaluate the chemical properties. Professional Service Industries Labs (PSI) was used to evaluate the mechanical and structural properties. A & L Western Agricultural Laboratories was used to characterize it compared to standard soil types. Full copies of the lab reports and summary tables of the results are included in Attachment 1. This same report has been previously submitted to Dan Hafley at DEQ under the Voluntary Cleanup Program currently underway at the Columbia Steel Casting Co. site.

The sand is natural Olivine rock, mined in Washington state, then crushed and screened and delivered to Columbia Steel. We add small amounts of natural Bentonite clay, corn cereal, and water, to glue it together for making our molds. For small quantities we sometimes substitute inorganic sodium silicate, or modified forms of soybean oil, as binders. We recycle it as much as possible in our processes. The fines are created as a result of mechanical attrition and thermal shock during molding and casting processes. They must be removed from the molding sand mix in order to maintain permeability of the molds. All of the recycling processing equipment is connected to one of the nine fabric filter dust collectors (baghouses) that serve our sand systems. The collected fines emptied from those baghouses are transferred to an outdoor stockpile.

DEQ is being asked to evaluate the potential risks to human health and the environment from the proposed uses. It has economic value as a thickening agent for liquid or semi-liquid materials. The fine particles have a high surface area to volume ratio, so they require a lot of water or other liquid to wet their surfaces. Furthermore, the high clay content absorbs additional water, and swells as a result.

The maximum annual production is estimated at 2600 ton/yr. Current stockpiles are estimated at 48,000 tons. Estimated annual use for off site purposes could vary widely, depending on demand.

1.2 Proposed use

We have just begun to penetrate this market, with one local customer, who uses it for solidifying liquid wastes at the Hillsboro industrial waste landfill. So far they have taken about 1000 tons, and all results are favorable, so they continue to want more. This business is variable but not seasonal, and they seem to be able to use all that we can produce from our most prolific dust collector, about 60 tons/month. The sand fines thus used would be buried in the landfill along with the treated wastes, which would prevent direct contact that might pose an exposure risk to humans or other ecological receptors.

1.3 Comparison with other materials

Few other materials offer the high absorbtivity that is desirable for this purpose. This customer is using it as an economical substitute for manufactured fine perlite. For this purpose, it is a useful raw material, not a waste product.

1.4 Compliance with OAR 340-093-0280

1.4.1 Characterization of material and use

See 1.1 & 1.2 above.

1.4.2 Productive use

See 1.2 & 1.3 above.

1.4.3 No adverse impacts

These materials are not a hazardous waste under ORS 466.005. Samples of the sand system fines were analyzed for total metals and toxicity characteristic leaching procedure (TCLP). Total metals results are given in Table 1, and TCLP results are given in Table 2. Laboratory reports for the total metal analyses are included in the 2012 SLR Fines Report (Attachment 1), and reports for the TCLP analyses are included in Attachment 2.

Concentrations of total metals were compared with DEQ soil risk-based concentrations (RBCs) protective of occupational workers (Table 1). DEQ soil RBCs were not available for a few metals, and in these cases concentrations were compared to EPA regional screening levels (RSLs) protective of workers. The DEQ RBCs and EPA RSLs are calculated using exposure assumptions that are likely to significantly overestimate actual worker exposure to sand system fines in the thickening agent, and are therefore conservative screening values. Concentrations were also compared with DEQ point estimates of the natural background concentrations of metals in soil of the Portland Basin.

As shown in Table 1, with the exception of arsenic, concentrations of metals in fines are below DEQ RBCs and EPA RSLs protective of workers. Concentrations of arsenic were above the DEQ RBC, but estimates of natural concentrations of arsenic in soil of the Portland Basin are also above this RBC. One sample had an arsenic concentration above the DEQ point estimate for soil of the Portland Basin. However, the olivine sand from which the fines are derived were mined from a deposit in the Cascade Mountains of Washington State. Concentrations of arsenic in the fines are below the DEQ point estimate of natural arsenic concentrations in soil from the Cascade Range of 18.6 milligrams per kilogram (mg/kg). As a result, it appears arsenic

concentrations in the fines are consistent with the natural levels that may be found in olivine sand from the Cascades.

As shown in Table 2, TCLP results were compared with criteria used to evaluate Resource Conservation and Recovery Act (RCRA) hazardous waste for the Toxicity Characteristic. The TCLP results for all metals were below their respective toxicity criteria.

The proposed uses will not result in the increase of a hazardous substance in a sensitive environment. The proposed uses will not include placement in waterways, wetlands, or other sensitive environments.

The proposed uses will not create odors, dust, unsightliness, fire hazards, or other nuisance conditions.

The proposed uses will comply with applicable federal, state, and local regulations, as well as standard practices in the construction industry.

Tier 2 requirements:

2.1 Sampling and analysis

The material has been sampled on multiple occasions, and analyzed by EPA certified laboratories, testing for all contaminants of potential concern that might reasonably be expected to be present. Supporting laboratory reports are included as part of Attachment 1.

2.2 Risk screening

As discussed in Section 1.4.3 above, with the exception of arsenic, concentrations of metals in fines are below RBCs and RSLs protective of workers. Concentrations of arsenic in fines are consistent with naturally occurring levels in soil of the Cascades where the olivine sand originates. As a result, worker contact with fines or the thickening agent is not expected to cause unacceptable health risks.

2.3 Location and type of use

The current location of use is the Waste Management special waste landfill in Hillsboro, OR. Other landfills have similar needs, so we may be able to expand the uses if we can resolve transportation logistics. The type of use is well described above, in 1.2 & 1.3.

2.4 Contact information

The site contact information for Columbia Steel Casting Co. is listed in the application form. This is not a site specific proposed use, as it could be repeated in multiple locations. Columbia Steel Casting Co. will maintain records of approximate quantities and locations where the material is placed, according to 340-093-270 (4).

2.5 Material management

Storage and handling of this material for this purpose requires transfer from the sand system baghouse directly to covered roll off dumpsters. The dumpsters are equipped with 50 mil poly liners to prevent leaks during loading and transportation. At the point of use, the material is

transferred from the dumpsters to a large pit where it is mixed with a waste that contains too much free liquid to be allowed for direct burial in the landfill. While waiting for use, it is stored in the covered dumpsters. After use, it is buried in the landfill as a mixture with waste products from other sources.

TABLE 1
FINES ANALYSIS
RCRA TOTAL METALS

COLUMBIA STEEL CASTING CO., INC.

Sample ID #	Unit	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Soil RBCs - Occupational Worker ^a	mg/kg	-	-	1.9	220,000	2,300	1,100	>Max	47,000	800	25,000	350	22,000	-	5,800	-	-
EPA RSL - Composite Worker ^b	mg/kg	-	470	3.6	230,000	2,300	1,200	1,800,000	47,000	-	28,000	350	23,000	5,800	-	12	350,000
Background - Soil ^c	mg/kg	-	0.56	8.8	792	2.0	0.63	76	34	79	1,800	0.23	47	0.71	0.82	5.2	180
FINES																	
Total Metals																	
1	mg/kg	9/11/2006	-	3.36	2,070	-	0.578 <i>U</i>	342	-	19	-	0.0748 <i>U</i>	-	0.578 <i>U</i>	0.578 <i>U</i>	-	-
3	mg/kg	9/11/2006	-	1.15	779	-	0.525 <i>U</i>	92.2	-	4.7	-	0.0876 <i>U</i>	-	0.525 <i>U</i>	0.525 <i>U</i>	-	-
5	mg/kg	9/11/2006	-	13.7	350	-	1.03	2,370	-	3.3	-	0.0587 <i>U</i>	-	4.94 <i>U</i>	0.494 <i>U</i>	-	-
7	mg/kg	9/11/2006	-	3.62	924	-	0.442	217	-	8.0	-	0.0679 <i>U</i>	-	0.566	0.442 <i>U</i>	-	-
9	mg/kg	9/11/2006	-	1.40	1,440	-	0.493 <i>U</i>	89.8	-	10.9	-	0.0585 <i>U</i>	-	0.523	0.493 <i>U</i>	-	-
Fresh-1-061112	mg/kg	6/11/2012	1.08 <i>U</i>	2.01 <i>J</i>	59.1	1.08 <i>U</i>	1.08 <i>U</i>	266	46.2	12.2	1,020	0.0867 <i>U</i>	1,760	2.85	1.08 <i>U</i>	1.08 <i>U</i>	59.6
Fresh-2-061112	mg/kg	6/11/2012	1.18 <i>U</i>	1.91 <i>J</i>	60.9	1.18 <i>U</i>	1.18 <i>U</i>	181	48.9	9.30	1,050	0.0942 <i>U</i>	2,000	2.35 <i>U</i>	1.18 <i>U</i>	1.18 <i>U</i>	55.1
Newer-1-061112	mg/kg	6/11/2012	1.11 <i>U</i>	1.80 <i>J</i>	982	1.11 <i>U</i>	1.11 <i>U</i>	113	127	9.05	1,750	0.0887 <i>U</i>	1,940	2.22 <i>U</i>	1.11 <i>U</i>	1.11 <i>U</i>	75.2
Newer-2-061112	mg/kg	6/11/2012	1.12 <i>U</i>	2.47	1,040	1.12 <i>U</i>	1.12 <i>U</i>	184	164	10.1	1,810	0.0895 <i>U</i>	2,010	2.24 <i>U</i>	1.12 <i>U</i>	1.12 <i>U</i>	65.8
Aged-1-061112	mg/kg	6/11/2012	0.61 <i>J</i>	4.76	1,360	1.10 <i>U</i>	1.10 <i>U</i>	225	191	28.2	7,850	0.0881 <i>U</i>	1,270	1.19 <i>J</i>	1.1 <i>U</i>	1.1 <i>U</i>	104
Aged-2-061112	mg/kg	6/11/2012	1.43 <i>U</i>	2.61 <i>J</i>	1,810	1.43 <i>U</i>	1.43 <i>U</i>	79.6	124	16.6	2,440	0.1150 <i>U</i>	1,690	2.86 <i>U</i>	1.43 <i>U</i>	1.43 <i>U</i>	73.3

NOTES:

All values in milligram per kilogram (mg/kg)

Bold indicates detected above the laboratory reporting limit

Total metals per EPA 6020/7471 methods

U - indicates a value less than the reporting limit

J - Estimated result. Result detected below the lowest point of calibration curve, but above the specified MDL

- indicates not analyzed or data not available

^a = DEQ (2015) soil Risk-Based Concentrations (RBCs).

^b = EPA Regional Screening Level (RSL) for Composite Worker (EPA, 2017)

^c = DEQ (2013) 95% Upper Prediction Limit (UPL) concentration for soil in Portland Basin

TABLE 2
BAGHOUSE FINES ANALYSIS
TCLP METALS

COLUMBIA STEEL CASTING CO., INC.

Sample ID #	Unit	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Max Conc. For Toxicity ^a	mg/L	-	-	5.0	100	-	1.0	5.0	-	5	-	0.20	-	1.00	5	-	-
FINES																	
TCLP Metals																	
National Reclaimer	mg/L	5/14/2003	-	0.02 U	0.70	-	0.010 U	0.02 U	0.05 U	0.10 U	2.10	0.002 U	0.04 U	0.02 U	0.05 U	-	0.10 U
Gp. 8 Collector	mg/L	5/14/2003	-	0.02 U	0.39	-	0.010 U	0.02 U	0.05 U	0.10 U	0.090	0.002 U	0.04 U	0.11	0.05 U	-	0.10 U
Shakeout Collector	mg/L	5/14/2003	-	0.02 U	1.66	-	0.020	0.17	0.11	0.10 U	95.4	0.002 U	1.30	0.02 U	0.05 U	-	1.60
Mill Collector	mg/L	5/14/2003	-	0.02 U	0.70	-	0.010 U	0.02 U	0.05 U	0.10 U	4.70	0.002 U	0.04 U	0.02 U	0.05 U	-	0.10 U
SMS Collector	mg/L	5/14/2003	-	0.02 U	0.33	-	0.010 U	0.02 U	0.05 U	0.10 U	0.22	0.002 U	0.04 U	0.02 U	0.05 U	-	0.10 U
Bldg. 8 Collector	mg/L	5/14/2003	-	0.02 U	4.19	-	0.010 U	0.06	0.05 U	0.10 U	8.29	0.002 U	0.42	0.02 U	0.05 U	-	0.20

NOTES:

All values in milligram per liter (mg/L)

Bold indicates detected above the laboratory reporting limit

Toxicity Characteristic Leaching Procedure (TCLP) per EPA 1311 method

U - indicates a value less than the reporting limit

✓ - Estimated result. Result detected below the lowest point of calibration curve, but above the specified MDL

- indicates not analyzed or data not available

^a = Maximum Concentration of Contaminants for Toxicity Characteristic, per 40 CFR 261

COLUMBIA STEEL CASTING CO., INC.
PORTLAND, OREGON

No. 347695

DATE	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
7/13/17	REVIEW FEE FOR BENEFICIAL USE APPLICATION TIER 2 - SAND SYSTEM	2000.00		2000.00

DETACH THIS STATEMENT BEFORE DEPOSITING CHECK.

No. 347695



COLUMBIA STEEL®

COLUMBIA STEEL CASTING CO., INC.
P.O. Box 83095 Portland, OR 97283-0095 U.S.A.
Phone 503-286-0685 Fax 503-286-1743

WELLS FARGO BANK
Portland, Oregon

11-24
1210(8)

MO. DAY YR.

7/13/17

PAY TO THE
ORDER OF

DEPT OF ENVIRONMENTAL QUALITY
ATTN: ACCOUNTING OFFICE
700 NE MULTNOMAH ST. SUITE 600
PORTLAND. OR 97232

COLUMBIA STEEL
CASTING CO., INC. 2000 DOLS 00 CTS

PAY THIS AMOUNT

\$ 2000.00

By

By

U.S. DOLLARS

TWO SIGNATURES REQUIRED