OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Western Region
750 Front Street N.E., Suite 120
Salem, OR 97310
Telephone: (503) 378-8240

Issued in accordance with the provisions of
ORS 468A.040 and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Glenbrook Nickel Company
P.O. Box 85
Riddle, OR 97469

INFORMATION RELIED UPON:

Application Number: 14809
Received: 03/15/95

PLANT SITE LOCATION:

5093 Riddle By Pass Road
Riddle, OR 97469

LAND USE COMPATIBILITY STATEMENT:

From: Douglas County
Dated: 12/03/96

ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY

Gregory A. Green, Administrator

7/1/97
Date

Nature of Business: Ferronickel mine and smelter

Primary SIC:	3339	Primary Smelting and Refining of Nonferrous Metals
OTHER SIC:	3295	Minerals and Earths, Ground or Otherwise Treated

RESPONSIBLE OFFICIAL:

Name: Art Schweizer
Title: Vice President/General Manager
Name: Eric Norton (alternate)
Title: Operations Manager

FACILITY CONTACT PERSON:

Name: Greg Schoen
Title: Environmental Supervisor
Phone: (541) 874-3171

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LIST OF ABBREVIATIONS USED IN THIS PERMIT

ASTM	American Society of Testing Materials
CFR	Code of federal regulations
CO	Carbon monoxide
DEQ	Oregon Department of Environmental Quality
dscf	dry standard cubic foot
EAF	electric arc furnace
EF	emission factor
EPA	US Environmental Protection Agency
EU	Emissions unit
FCAA	Federal Clean Air Act
gr/dscf	grain per dry standard cubic foot
HAP	Hazardous Air Pollutant as defined by OAR 340-32-0130
ID	Identification number
I&M	Inspection and maintenance
MB	Material balance
MMBtu	Million British thermal units
MM ft^3	Million cubic feet
MSDS	Material safety data sheet
NO_x	Oxides of nitrogen
O_2	Oxygen
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
O&M	Operation and maintenance
PCD	Pollution control device
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in size
PSEL	Plant Site Emission Limit
scf	Standard cubic foot
SO_2	Sulfur dioxide
ST	Source test
TBD	to be determined
VE	Visible emissions
VOC	Volatile organic compound

PERMITTED ACTIVITIES

1. Until such time as this permit expires or is modified or revoked, the permittee is allowed to discharge air contaminants from those processes and activities directly related to or associated with air contaminant source(s) in accordance with the requirements, limitations, and conditions of this permit. [OAR 340-028-2100, 340-028-2200(2), and 340-032-0240]

2. All conditions in this permit are federally enforceable and state enforceable except condition G21 which is enforceable by the state only.

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION[1]

3. The emissions units regulated by this permit are the following [OAR 340-028-2120(3)]:

Emissions Unit	EU ID	Pollution Control Device	PCD ID
Mining Drilling Production Drill and Blast Loading Hauling Road Construction Stockpiling of Ore, Waste, and Lean Ore Crushing Screening Transporting	1.0	None	NA
Drying #3 Dryer	2.0	Wet Scrubber Baghouse	2-DC-001 17-DC-018 — Planned unit
Crush/Screen/Reject Scalping screens (4) Crusher Jaw Vertical Impact	3.0	Rees Baghouse	No. 20E, 2-DC-002

[1]The devices identified in the emissions unit identification table in shaded areas are devices that will be added in the future.

Emissions Unit	EU ID	Pollution Control Device	PCD ID
Ore Storage/Day Bins (6 silos)	4.0	Koppers Baghouse (day bins)	No. 20B, 2-DC-003
		Micro-pulseair Baghouse (transfer points and belts)	No. 20, 2-DC-004
		Micro-pulseair Baghouse (transfer points, belts and #1 and #2 day bins)	No. 20A, 2-DC-007
Coal Addition		Coal Addition Baghouse	2-DC-008
Dumping		Truck unloading baghouse	10-DC-001
Calcining/Melting	5.0		
Calciner #1 2-CA-001		Buell #54 series quad cyclones (2)	2-DC-005
		#1 Melt Furnace Baghouse (controls 2-CA-001, 3-FR-001 and 3-FR-002)	17-DC-001
Nickel Ore Melting Furnace 3-FR-001			
Nickel Ore Melting Furnace 3-FR-002			
Calciner #2 2-CA-002		Buell #54 series quad cyclones (2)	2-DC-006
		#2 Melt Furnace Baghouse (controls 2-CA-002, 3-FR-003 and 3-FR-004)	17-DC-002
Nickel Ore Melting Furnace 3-FR-003			
Nickel Ore Melting Furnace 3-FR-004			
Hot Ore Transfer	7.0	Micro-pulseair Baghouse	No. 1A, 17-DC-011
		Serbaco	No. 1B, 17-DC-012
#3 Skip Hoist		Micro-pulseair Baghouse	17-DC-009
Skip Hoists		Koppers Baghouse	No. 3A, 17-DC-004
		Koppers Baghouse	No. 3B, 17-DC-005
Refining	8.0		
FeNi Refining Furnace 3-FR-005		Koppers Baghouse[2]	No. 4A, 17-DC-006
FeNi Refining Furnace 3-FR-006		Koppers Baghouse	No. 4B, 17-DC-007
Pig Machine		None	NA

[2]The two baghouses are connected in parallel to both refining furnaces.

Emissions Unit	EU ID	Pollution Control Device	PCD ID
Casting/shotting/drying Shotting System Dryer	8.0A	None	NA
Ferrosilicon Production Ferrosilicon Furnace 4-FR-001	9.0	FeSi Baghouse	17-DC-008
Skull Plant Operations Hopper Grizzly Hammermill Belt Magnet Dryer	10.0	Water Sprays	NA
Boilers (2) 2-BO-001, 2-BO-002	11.0	None	NA
By-Product Stockpiles Skull Fines Stockpile Slag Stockpile Reject Stockpile	12.0	Watering	NA
Road Fugitives	13.0	Watering	NA
Skull Fines Treatment Cyclone (1) Dryer	15.0	Baghouse	17-DC-019
Building Fugitives	16.0	None	NA

3.a. The permittee shall begin performing the required monitoring upon construction completion on the devices to be installed in the future.

3.b. The permittee shall notify the Department within thirty (30) days of completion of construction of each device.

3.c. The notice shall include the date of completion of construction and the date the device was or will be put in operation.

EMISSION LIMITS AND STANDARDS

The following tables contain summaries of applicable requirements other than the Plant Site Emission Limits (PSEL), along with the monitoring methods for the emissions units to which those requirements apply.

Facility Wide and Insignificant Activities Emission Limits and Standards

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Monitoring Requirements	
				Method	Condition Number
340-021-0060(2)	4	fugitive dust	NA	I&M Recordkeeping	31, 32
ACDP condition 5	5	fugitive dust	NA	I&M Recordkeeping	31, 32
340-022-0010	6	residual fuel oil	1.75% sulfur	Recordkeeping	33
340-022-0015(1)	7	distillate fuel oil, ASTM Grade 1	0.3% sulfur	Recordkeeping	33
340-022-0015(2)	8	distillate fuel oil, ASTM Grade 2	0.5% sulfur	Recordkeeping	33
340-022-0020(1)	9	coal	1.0% sulfur	Recordkeeping	33
340-028-0640(4)	10	used oil	non-hazardous waste	Recordkeeping	34
340-028-1010, 340-028-1020	11	oil soaked absorbent material	non-hazardous waste	Recordkeeping	35
340-025-0415(1)	12	opacity	20%	none	NA
340-021-0020(1)(b)	13	PM/PM_{10}	0.1 gr/dscf	none	NA
340-021-0030(1)(b)	14	PM/PM_{10}	0.1 gr/dscf	none	NA
40 CFR Part 68	15	accidental release	prevention/emergency response	Recordkeeping	36

4. No person shall cause, suffer, allow, or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne in accordance with OAR 340-021-0060(2) and condition 5.

5. Fugitive emissions from any single emission point or combination of points, including but not limited to mining, crushing and screening operations, and open storage areas, shall be controlled at all times so as not to create a nuisance condition off plant property. The permittee shall also minimize fugitive dust emissions whenever necessary by:

   5.a. treating vehicular traffic areas of the plant site under the control of the permittee by watering;

5.b. storing collected material from air pollution control equipment in covered containers or other method equally effective in preventing the material from becoming airborne during storage and transfer;

5.c. inspecting all hoods and conveyor enclosures for fugitive emissions from emissions units 3.0 and 4.0;

5.d. watering, applying a chemical suppressant to or revegetating the tailings pile; or

5.e. performing housekeeping activities around the day bins.

5.f. If visible emissions are observed, the permittee shall take corrective action to eliminate the visible emissions and record the action in a maintenance log. [11/09/90 ACDP condition 5]

6. The permittee shall not use any residual fuel oil containing more than 1.75 percent sulfur by weight. Sulfur content shall be measured using the test methods identified in condition 33. [OAR 340-022-0010]

7. The permittee shall not use any ASTM Grade 1 distillate fuel oil containing more than 0.3 percent sulfur by weight. Sulfur content shall be measured using the test methods identified in condition 33. [OAR 340-022-0015(1)]

8. The permittee shall not use any ASTM Grade 2 distillate fuel oil containing more than 0.5 percent sulfur by weight. Sulfur content shall be measured using the test methods identified in condition 33. [OAR 340-022-0015(2)]

9. The permittee shall not use any coal containing more than one percent (1.0%) sulfur by weight. Sulfur content shall be measured using the test methods identified in condition 33. [OAR 340-022-0020(1)]

10. The permittee shall not burn any used oil that does not meet the definition in OAR 340-111-0020(2)(c) and 40 CFR 279.1. [OAR 340-028-0640(4)]

11. The permittee is allowed to burn small amounts (15 drums per week) of onsite generated waste material such as oil soaked absorbent materials and contaminated soil. [OAR 340-028-1010 and 340-028-1020]

12. The permittee shall not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is greater than 20% opacity, excluding uncombined water, from any categorically insignificant activity or any activity included in the aggregate insignificant emissions. Opacity shall be measured in accordance with condition 30. [OAR 340-025-0415(1)]

13. The permittee shall not cause or allow the emission of particulate matter in excess of 0.1 grains per dry standard cubic foot, corrected to 12% CO_2 or 50% excess air, from any fuel burning equipment or refuse burning equipment that is a categorically insignificant activity or any activity included in the aggregate insignificant emissions. Particulate matter emissions shall be measured in accordance with condition 30. [OAR 340-021-0020(1)(b)]

14. The permittee shall not cause or allow the emission of particulate matter in excess of 0.1 grains per dry standard cubic foot, from any non-fugitive air contaminant source other than fuel burning or refuse burning equipment that is a categorically insignificant activity or any activity included in the aggregate insignificant emissions. Particulate matter emissions shall be measured in accordance with condition 30. [OAR 340-

021-0030(1)(b)]

15. The permittee shall comply with the applicable requirements of 40 CFR Part 68.

EMISSIONS UNITS

Emissions Unit ID	Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Monitoring Requirements	
					Method	Condition Number
1.0, 12.0, 13.0	340-025-0415(1)	16	opacity	20%	I&M Recordkeeping	31
2.0, 3.0, 4.0, 5.0, 7.0, 8.0, 9.0, 10.0, 11.0, 15.0, 16.0	340-025-0415(1)	16	opacity	20%	VE periodic monitoring	38
11.0	340-021-0020(1)(a)	17	PM/PM_{10}	0.2 gr/dscf	VE periodic monitoring	38
2.0	340-021-0030(1)(a)	18	PM/PM_{10}	0.2 gr/dscf	ST periodic monitoring/ I&M Recordkeeping	29, 40
3.0, 5.0, 7.0, 8.0, 9.0	340-021-0030(1)(a)	18	PM/PM_{10}	0.2 gr/dscf	ST periodic monitoring/ I&M Recordkeeping	29, 42
4.0	340-021-0030(1)(a)	18	PM/PM_{10}	0.2 gr/dscf	I&M Recordkeeping	42
10.0	340-021-0030(1)(a)	18	PM/PM_{10}	0.2 gr/dscf	VE periodic monitoring	38
15.0	340-021-0030(1)(a)	18	PM/PM_{10}	0.2 gr/dscf	I&M Recordkeeping	42
8.0A	340-021-0030(1)(b)	19	PM/PM_{10}	0.1 gr/dscf	VE periodic monitoring	38
2.0, 3.0, 4.0, 5.0, 7.0, 8.0, 9.0, 10.0, 11.0, 15.0	340-025-0415(2)	20	PM/PM_{10}	3.5 lbs/ton	ST periodic monitoring/ Recordkeeping	29, 39, 40, 41, 42
2.0	340-028-0620(2)(d), 340-028-2130(1)	21	scrubber pressure loss	TBD	Recordkeeping	40
2.0	340-028-0620(2)(d), 340-028-2130(1)	22	scrubber liquid flow rate	TBD	Recordkeeping	40

Emissions Unit ID	Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Monitoring Requirements	
					Method	Condition Number
2.0, 3.0, 5.0, 7.0, 8.0, 9.0	340-028-0620(2)(d), 340-028-2130(1)	23	baghouse pressure drop	TBD	Recordkeeping	41
5.0	340-028-0620(2)(d), 340-028-2130(1)	24	fan motor amperes	TBD	Recordkeeping	43

16. The permittee shall not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour from emissions units 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 15.0, and 16.0 which is greater than 20% opacity, excluding uncombined water. Opacity shall be measured in accordance with conditions 30 and 38. [OAR 340-025-0415(1)]

17. The permittee shall not cause or allow the emission of particulate matter in excess of 0.2 grains per dry standard cubic foot, corrected to 12% CO_2 or 50% excess air, from emissions unit 11.0. Particulate matter emissions shall be measured in accordance with condition 30. [OAR 340-021-0020(1)(a)]

18. The permittee shall not cause or allow the emission of particulate matter in excess of 0.2 grains per dry standard cubic foot, from emissions units 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, 9.0, 10.0, and 15.0. Particulate matter emissions shall be measured in accordance with conditions 29 and 30. [OAR 340-021-0030(1)(a)]

19. The permittee shall not cause or allow the emission of particulate matter in excess of 0.1 grains per dry standard cubic foot, from emissions unit 8.0A. Particulate matter emissions shall be measured in accordance with condition 30. [OAR 340-021-0030(1)(b)]

20. The permittee shall not cause or allow the total combined emission of particulate matter from emissions units 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, 9.0, 10.0, 11.0, and 15.0, excluding ore storage areas and mining activities, in excess of 3.5 pounds per ton of dry laterite ore produced, based upon the average dry laterite ore production rate, as calculated in condition 39.b. Particulate matter emissions shall be measured in accordance with conditions 29 and 30. [OAR 340-025-0415(2)]

21. In addition to the limits and standards in conditions 16, 18, and 20, the permittee shall take corrective action to return to highest and best practicable treatment and control if the dryer scrubber, PCD 2-DC-001, pressure loss deviates from an acceptable range, as established by condition 29.j. [OAR 340-028-2130(1) and 340-028-0620(2)(d)]

    21.a. These deviations and the corrective actions shall be recorded in accordance with condition 40.d.

    21.b. The deviation from an action level shall not be considered a violation of an emission standard in this permit.

22. In addition to the limits and standards in conditions 16, 18, and 20, the permittee shall take corrective action to return to highest and best practicable treatment and control if the dryer scrubber, PCD 2-DC-001, liquid flow rates deviate from an acceptable range, as established by condition 29.j. [OAR 340-028-2130(1) and 340-028-0620(2)(d)]

22.a. These deviations and the corrective actions shall be recorded in accordance with condition 40.d.

22.b. The deviation from an action level shall not be considered a violation of an emission standard in this permit.

23. In addition to the limits and standards in conditions 16, 18 and 20, the permittee shall take corrective action to return to highest and best practicable treatment and control if the Rees Baghouse No. 20E, #1 Melt Furnace Baghouse, #2 Melt Furnace Baghouse, Micro-pulseair Baghouse No. 1A, Serbaco Baghouse No. 1B, Micro-pulseair Baghouse 17-DC-009, Koppers Baghouse No. 3A, Koppers Baghouse No. 3B, Koppers Baghouse No. 4A, Koppers Baghouse No. 4B, Ferrosilicon Baghouse 17-DC-008, Dryer Baghouse 17-DC-018 (upon installation), and Skull Fines Treatment Baghouse 17-DC-019 (upon installation) pressure drops deviate from an acceptable range, as established by condition 29.j. [OAR 340-028-2130(1) and 340-028-0620(2)(d)]

23.a. These deviations and the corrective actions shall be recorded in accordance with condition 41.c.

23.b. The deviation from an action level shall not be considered a violation of an emission standard in this permit.

24. In addition to the limits and standards in conditions 16, 18 and 20, the permittee shall take corrective action to return to highest and best practicable treatment and control if the #1 Melt Furnace Baghouse and #2 Melt Furnace Baghouse fan motor amperes deviate from an acceptable range, as established by condition 29.j. [OAR 340-028-2130(1) and 340-028-0620(2)(d)]

24.a. These deviations and the corrective actions shall be recorded in accordance with condition 43.

24.b. The deviation from an action level shall not be considered a violation of an emission standard in this permit.

PLANT SITE EMISSION LIMITS

25. The short term plant site emissions shall not exceed the following [OAR 340-028-1010 and 340-028-1020]:

EU ID	Pollutant	Short Term PSEL	Units	Monitoring Requirements	
				Method	Condition Number
Facility-wide	CO	21,309	lb/day	Recordkeeping	45
	NO_x	23,118	lb/day	Recordkeeping	45
	PM/PM_{10}	9,165	lb/day	Recordkeeping	45
	SO_2	3,308	lb/day	Recordkeeping	45
	VOC	1,027	lb/day	Recordkeeping	45
	Pb	0.1	lb/day	Recordkeeping	45

26. The annual plant site emissions (tons/year) shall not exceed the following [OAR 340-028-1010 and 340-028-1020]:

Facility-Wide Total	CO	NO_x	PM/PM_{10}	SO_2	VOC	Pb
	3,416	3,684	1,574	534	165	0.03
Unassigned PSEL	1,293	5	731	0	23	0

SPECIAL CONDITION

27. The permittee shall complete work to reduce fugitive emissions from the building, emissions unit 16.0, containing emissions units 5.0, 8.0, and 9.0 and reduce particulate matter emissions from the #1 and #2 melt furnace baghouses within three (3) years of permit issuance. The permittee shall submit a detailed report to the Department describing the changes that were made. The report shall include the following information: [OAR 340-028-2130(1)]

    27.a. results of the daily visible emissions observations for emissions unit 16.0 before and after any changes; and

    27.b. changes in air flow and control efficiency for the #1 and #2 melt furnace baghouses.

TEST METHODS AND PROCEDURES [OAR 340-028-2130(1)]

28. Unless otherwise specified in this permit, the permittee shall conduct all testing in accordance with the Department's Source Sampling Manual, the latest Department-approved Quality Assurance Plan, or alternative method approved in writing by the Department.

    28.a. The Department shall be notified, in writing, at least 15 days prior to any source test.

    28.b. Only regular operating staff may adjust the processes or emission control device parameters during a compliance source test and within two (2) hours prior to the tests. Any operating adjustments made during a compliance source performance test, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source performance test invalid.

    28.c. Unless otherwise specified by permit condition, all compliance source tests shall be performed at a minimum operating rate of 90% of device design capacity.

    28.d. Each source test shall consist of at least three (3) test runs, and the emissions shall be reported as the arithmetic average of all valid test runs. There must be at least two valid test runs for a source test to be accepted.

29. The following test methods shall be used to measure particulate matter emissions for certifying compliance

with conditions 18 and 20 at the following emissions units using the minimum test frequencies listed:

Emissions Unit	Monitoring Point	Test Method	Frequency
2.0 Drying	Dryer 3 wet scrubber, 2-DC-001	DEQ Method 7	once/permit term
3.0 Crush/Screen/Reject	Rees Baghouse, No. 20E	DEQ Method 5 or 8	once/permit term
5.0 Calcine/Melt	#1 Melt Furnace Baghouse, #2 Melt Furnace Baghouse	DEQ Method 5 or 8	twice/permit term
7.0 Hot Ore Transfer	Micro-pulseair Baghouse No. 1A, Serbaco Baghouse No. 1B, Micro-pulseair Baghouse 17-DC-009, Koppers Baghouse No. 3A, Koppers Baghouse No. 3B	DEQ Method 5	once/permit term
8.0 Refining	Koppers Baghouse No. 4A, Koppers Baghouse No. 4B	DEQ Method 5	once/permit term
9.0 Ferrosilicon	Ferrosilicon Baghouse 17-DC-008	DEQ Method 5	once/permit term

29.a. The permittee shall use EPA Methods 1 and 2 to determine the volumetric flow rate of the effluent gases from all baghouses.

29.b. If an emissions unit has never been source tested, a source test plan shall be submitted to the Department's Western Region Source Test Coordinator within sixty (60) days after permit issuance.

29.c. The source test shall be conducted at each of the monitoring points for each emissions unit listed in the table above. The initial source test shall be performed within ninety (90) days of permit issuance for emissions units 2.0, 3.0, 7.0, 8.0, and 9.0 or within ninety (90) days of construction completion of the baghouse on emissions unit 2.0. Emissions unit 5.0 shall be source tested within 60 days of completion of the proposed bag replacement project included as part of condition 27 or if no such program is initiated, emissions unit 5.0 will be source tested within 90 days of that decision. The permittee shall promptly notify the Department of the decision to not replace the bags. Successive source tests shall be at least six (6) months apart.

29.d. Source testing that has been performed in 1997 before this permit is issued and that has been approved by the Department may also be used to satisfy conditions 29 and 46.

29.e. The permittee shall calculate an emission factor in units of pounds of particulate per ton of production using the results of the source test data, the production rate of material going through the emissions unit during the time of the source test, and the hours of operation on the day of the source test for all of the emissions units listed in the table above. The emission factor ($ST_{eu} \div P_{eu}$) shall be updated each time a source test is performed on an emissions unit for the calculation required by condition 39.c unless the process is changed and the previous emission factors are no longer applicable.

29.f. The permittee shall record daily average wet scrubber pressure loss of the gas stream and scrubbing liquid flow rate for the dryer scrubber, PCD 2-DC-001, for a period of at least three (3) months prior to the source test required in condition 29.c or after permit issuance if source testing before permit issuance is used to satisfy conditions 29 and 46.

29.g. The permittee shall record daily average baghouse pressure loss of the gas stream for the Rees Baghouse No. 20E, #1 Melt Furnace Baghouse, #2 Melt Furnace Baghouse, Micro-pulseair Baghouse No. 1A, Serbaco Baghouse No. 1B, Micro-pulseair Baghouse 17-DC-009, Koppers Baghouse No. 3A, Koppers Baghouse No. 3B, Koppers Baghouse No. 4A, Koppers Baghouse No. 4B, and Ferrosilicon Baghouse 17-DC-008, for a period of at least three (3) months prior to the source test required in condition 29.c or after permit issuance if source testing before permit issuance is used to satisfy conditions 29 and 46.

29.h. The permittee shall record daily average fan motor amperes for the #1 Melt Furnace Baghouse and #2 Melt Furnace Baghouse for a period of at least three (3) months prior to the source test required in condition 29.c or after permit issuance if source testing before permit issuance is used to satisfy conditions 29 and 46.

29.i. During each test run required by condition 29.c, the permittee shall record the following information that is applicable:

29.i.i. amount of ore dried;

29.i.ii. amount of ore processed;

29.i.iii. amount of ferronickel refined;

29.i.iv. amount of ferrosilicon produced;

29.i.v. fuel characteristics and the amount used;

29.i.vi. visible emissions as measured in accordance with EPA Method 9 within 30 minutes before, during, or within 30 minutes after each ODEQ Method 7 test run, unless weather conditions are such that it is not possible to read opacity;

29.i.vii. wet scrubber pressure loss of the gas stream, scrubbing liquid flow rate;

29.i.viii. baghouse pressure loss of the gas stream on all the baghouses; and

29.i.ix. fan motor amperes for the #1 Melt Furnace Baghouse and #2 Melt Furnace Baghouse.

29.j. A report including the following information shall be submitted to the Department for review and approval within 45 days of completing the source test required by condition 29.c, unless otherwise approved by the Department:

29.j.i. the results of the source test;

29.j.ii. the results of the visible emissions observations;

29.j.iii. measured wet scrubber pressure loss of the gas stream and scrubbing liquid flow rate;

29.j.iv. measured baghouse pressure loss of the gas stream on all the baghouses;

29.j.v. measured fan motor amperes for the #1 Melt Furnace Baghouse and #2 Melt Furnace Baghouse;

29.j.vi. measured wet scrubber pressure loss of the gas stream and scrubbing liquid flow rate during the three months prior to the test or three months after permit issuance;

29.j.vii. measured baghouse pressure loss of the gas stream on all the baghouses during the three months prior to the test or three months after permit issuance;

29.j.viii. measured fan motor amperes for the #1 Melt Furnace Baghouse and #2 Melt Furnace Baghouse during the three months prior to the test or three months after permit issuance; and

29.j.ix. proposed action levels for the wet scrubber pressure loss of the gas stream, scrubbing liquid flow rate, the baghouse pressure losses, and fan motor amperes. The levels will be determined using statistical methods acceptable to both the permittee and the Department.

30. If source testing is conducted in addition to the monitoring specified in this permit, the permittee shall use the following test methods and averaging times to measure the pollutant emissions for the applicable requirements referenced in the table:

Emissions Unit ID	Applicable Requirement Condition	Test Method	Averaging Time	Special Conditions
4.0, 8.0A, 10.0, 11.0, 15.0	17, 18, 19	ODEQ Methods 5, 7, or 8	average of three one-hour test runs	ODEQ Method 8 is for sources with exhaust gases at essentially ambient conditions (e.g. material handling cyclones); ODEQ Method 7 is for direct contact combustion or other heat sources (e.g., particle and veneer dryers); ODEQ Method 5 is for indirect contact fuel burning equipment (e.g., boilers) and any other source.
1.0, 3.0, 4.0, 7.0, 8.0, 10.0, 11.0, 12.0, 13.0, 15.0	16	Modified EPA Method 9 in accordance with the Department's Source Sampling Manual	aggregate of three minutes in any 60 minute period	Each Method 9 observation shall represent a period of 15 seconds for the purpose of determining the aggregate amount of time in a 60 minute period that the visible emissions are greater than the opacity limit. The test duration may be less than 60 minutes if a violation of the standard is documented before the full 60 minute observation period is completed.

MONITORING REQUIREMENTS [OAR 340-028-2130(3)(a)]

Facility-wide Emissions Limits and Standards Monitoring:

31. At least monthly, the permittee shall conduct a six (6) minute visible emission survey of the boundaries of the active portion of the mine and smelter area downwind from the emissions units using EPA Method 22 for monitoring pertaining to conditions 4, 5, and 16. The person conducting this survey does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9 including using the proper location to observe visible emissions. For the purpose of this survey, excess emissions are considered to be any visible emissions that leave the boundaries of the active portion of the mine and smelter area.

    31.a. If sources of excess fugitive emissions are detected for more than 5% (18 seconds) of the survey time, the permittee shall perform one of the following:

        31.a.i. take the necessary corrective action to eliminate the visible emissions which includes the following:

            31.a.i.(1) watering vehicular traffic areas;

            31.a.i.(2) watering by-product stockpiles;

            31.a.i.(3) storing collected material in covered containers;

            31.a.i.(4) performing maintenance on hoods or conveyor enclosures;

            31.a.i.(5) watering, applying a chemical suppressant to or revegetating the tailings piles; or

            31.a.i.(6) performing housekeeping activities around the day bins.

        31.a.ii. conduct an EPA Method 9 test in accordance with the Department's Source Sampling Manual within 24 hours.

    31.b. The permittee shall record the corrective action taken or the results of the EPA Method 9 tests.

32. The permittee shall maintain a log recording all written complaints, or complaints received via telephone or facsimile by the responsible official or a designated appointee, that specifically refer to a complaint of odor or fugitive emissions or opacity from the permitted facility for monitoring pertaining to conditions 4 and 5. Documentation shall include the date of contact, time of observed nuisance condition, description of nuisance condition, location of receptor, and status of the plant operation during the observed period. The log shall also record permittee's actions to investigate, make a determination as to the validity of the complaint, and resolve the problem within two (2) working days of receiving the complaint or within such longer time (not to exceed five (5) working days) as is reasonably necessary. The permittee shall provide a response to the complainant within 24 hours of receipt of the complaint.

33. The permittee shall monitor the sulfur content of each batch (e.g., truck load, etc.) of oil or coal received for monitoring pertaining to conditions 6, 7, 8, and 9 by:

33.a. obtaining a sulfur analysis certificate from the vendor for each batch, if different from the previous batch; or

33.b. analyzing or having analyzed by a contract laboratory a monthly composite of representative samples taken by the permittee from each batch of fuel received. Liquid fuels shall be analyzed using ASTM D129-64, D1552-83, or D4057-81. Solid fuels shall be analyzed using ASTM D3177-75 or D4239-85.

34. The permittee shall monitor the quality of each batch of used oil received for monitoring pertaining to condition 10 by obtaining a certificate from the vendor for each batch or analyzing or having analyzed by a contract laboratory a monthly composite of representative samples taken by the permittee from each batch of fuel received.

35. The permittee shall monitor the number of 35 or 55 gallon drums containing materials from incidental spills by conducting the following sampling and analysis program for monitoring pertaining to condition 11:

35.a. The permittee shall perform a one time analysis of both the oily rags and the contaminated soil to verify that the waste is not a listed and/or characteristic hazardous waste as defined by 40 CFR Part 261. The permittee shall perform or have a contract laboratory perform a Toxic Characteristic Leaching Procedure (TCLP) analysis as specified by 40 CFR Part 261 Sub-part C. In any event, the permittee is ultimately liable for assuring that any waste supplements burned are non-hazardous wastes.

35.b. The permittee shall record the types and amounts of waste materials received.

35.c. Nothing in this permit shall constitute a waiver of any requirements in OAR 340 Divisions 100 through 135.

36. The permittee shall maintain the records required by 40 CFR Part 68 for monitoring pertaining to condition 15.

Emissions Unit Monitoring:

37. The permittee shall perform the emissions unit monitoring requirements for only the emissions units that are in operation. If an emissions unit is not in operation, the permittee shall make a record of the down time in a maintenance log.

38. The permittee shall monitor visible emissions from emissions units 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, 8.0A, 9.0, 10.0, 11.0, 15.0, and 16.0 in accordance with the Department's Source Sampling Manual, and the following procedures, test methods, and frequencies for monitoring pertaining to condition 16, condition 17 for emissions unit 11.0, condition 18 for emissions unit 10.0 and condition 19 for emissions unit 8.0A:

38.a. The permittee shall conduct a six-minute visible emissions test of each monitoring point using EPA Method 9. Condensed water vapor is not considered an emission for the purposes of this method.

38.a.i. The permittee shall conduct the visible emission tests each week day (Monday through Friday) of operation, excluding company work holidays, for the following emissions units:

Emissions Unit	Monitoring Point
2.0 Drying	Dryer 3 Wet Scrubber 2-DC-001
3.0 Crush/Screen/Reject	Rees Baghouse No. 20E
5.0 Calcine/Melt	#1 Melt Furnace Baghouse, #2 Melt Furnace Baghouse
9.0 Ferrosilicon	FeSi Baghouse 17-DC-008
16.0 Building Fugitives	Building doorways

38.a.ii. If the Method 9 tests show opacity within the applicable limits specified in condition 16 for at least 10 consecutive days for only emissions units 2.0, 3.0, and 9.0, the Method 9 tests need only be done once per week.

38.a.iii. If the Method 9 tests show opacity within the applicable limits specified in condition 16 for at least 10 consecutive weeks for only emissions units 2.0, 3.0, and 9.0, the Method 9 tests need only be done once per month.

38.a.iv. If the Method 9 tests show opacity within the applicable limits specified in condition 16 for at least 10 consecutive months for only emissions units 2.0, 3.0, and 9.0, the Method 9 tests need only be done once per quarter.

38.a.v. The frequency for Method 9 tests for emissions units 5.0 and 16.0 shall remain at daily.

38.b. The permittee shall conduct a six-minute visible emission survey of each monitoring point following the general procedures outlined in EPA Method 22. Condensed water vapor is not considered an emission for the purposes of this survey method.

38.b.i. The permittee shall use the following monitoring schedule for conducting the visible emission surveys:

38.b.i.(1) Weekly for the following emissions units:

Emissions Unit	Monitoring Point
7.0 Hot Ore Transfer	Micro-pulseair Baghouse No. 1A
7.0 Hot Ore Transfer	Serbaco Baghouse No. 1B
7.0 Hot Ore Transfer	Micro-pulseair Baghouse 17-DC-009
7.0 Hot Ore Transfer	Koppers Baghouse No. 3A
7.0 Hot Ore Transfer	Koppers Baghouse No. 3B

38.b.i.(2) Monthly for the following emissions units:

Emissions Unit	Monitoring Point
3.0 Crush/Screen/Reject	Rejecting
4.0 Ore Storage	Koppers Baghouse No. 20B, Micro-pulseair Baghouse No. 20, Micro-pulseair Baghouse No. 20A, Coal Addition Baghouse 2-DC-008, Truck Unloading Baghouse 10-DC-001
8.0 Refining	Koppers Baghouse No. 4A, Koppers Baghouse No. 4B

38.b.i.(3) Quarterly for the following emissions units:

Emissions Unit	Monitoring Point
8.0A Casting/Shotting/Drying	Shotting system, Dryer
10.0 Skull Plant Operations	Dryer exhaust
11.0 Boilers	Boiler exhaust
15.0 Skull Fines Treatment	Cyclones, Dryer Baghouse

38.b.ii. If the Method 22 surveys show no visible emissions for at least 10 consecutive days, the surveys need only be done once per week.

38.b.iii. If the Method 22 surveys show no visible emissions for at least 10 consecutive weeks, the surveys need only be done once per month.

38.b.iv. If the Method 22 surveys show no visible emissions for at least 10 consecutive months, the surveys need only be done once per quarter.

38.b.v. If visible emissions are identified for any of the above emissions units for more than 5% of the survey time (18 seconds), the permittee shall do one of the following:

38.b.v.(1) take corrective action. The permittee shall record the corrective action in a maintenance log; or

38.b.v.(2) EPA Method 9 shall be used to determine opacity on the affected monitoring point in accordance with the Department's Source Sampling Manual within 24 hours. Each Method 9 observation period shall be for a minimum of six minutes unless any one reading is greater than 20% opacity, in which case the observation period shall be for a minimum of 60 minutes or until a violation of the emissions standards identified in condition 16 is documented, whichever is a shorter period. The permittee shall record the results of the EPA Method 9 tests.

38.c. All visible emissions tests and surveys shall be conducted during operating conditions that have the potential to create visible emissions (e.g., during mining, crushing, screening, drying, melting, etc.).

38.d. If an exceedance occurs, the test frequency for the affected monitoring point will start over with daily observations. If the Method 9 tests or Method 22 surveys conducted during ten (10) consecutive observation days identify no visible emissions or emissions less than the applicable limit in condition 16, the test frequency can go back to the same frequency as before the exceedance occurred.

38.e. If the observer is unable to conduct the daily Method 9 tests due to visual interferences caused by other visible emissions sources (e.g., fugitive emissions during high wind conditions) or due to weather conditions such as fog, heavy rain, or snow which impair visibility, the observer shall note such conditions on the data observation sheet and make at least three attempts to conduct the tests at approximately 2 hour intervals throughout the day. If the visible emissions test could not be conducted on the regularly scheduled day due to interferences, the observer shall conduct the test on the following day.

38.f. Prior notification and a pre-test plan are not required to be submitted to the Department for each visible emissions survey or Method 9 test.

39. The permittee shall maintain annual records for monitoring pertaining to condition 20:

39.a. The permittee shall calculate an hourly production rate by dividing the total annual production of dry laterite ore by the greater of the total hours of operation of the two calciners, devices 2-CA-001 and 2-CA-002, for the calendar year using the following equation:

dry laterite ore production (tons/yr) ÷ calciner operation (hours/yr) = $P_{\text{dry laterite ore}}$ (tons/hour)

39.b. The following equation shall be used each year to calculate the annual limit, E_{total}:

$$E_{total} \text{ (pounds/hour)} = P_{\text{dry laterite ore}} \text{ (tons/hour)} \times 3.5 \text{ pounds/ton}$$

39.c. The permittee shall calculate emissions of total particulate matter from emissions units 2.0, 3.0, 5.0, 7.0, 8.0, and 9.0, in units of pounds/hour using the following equation with the emission factors calculated from the source test data required in condition 29.e ($ST_{eu} \times P_{eu}$) and the dry laterite ore produced as calculated in condition 39.a ($P_{\text{dry laterite ore}}$).

$$E_{2,3,5,7,8,9} = \Sigma \left(ST_{eu} \div P_{eu} \times C_{eu} \times P_{\text{dry laterite ore}}\right)$$

where:

$E_{2,3,5,7,8,9}$ =	Emissions, pounds/hour
ST_{eu} =	Source test data for each emissions unit, pounds/hour
P_{eu} =	Production through emissions unit during source test, tons/hour
C_{eu} =	Conversion for each emissions unit, tons/ton (see table below)
$P_{\text{dry laterite ore}}$	Dry laterite ore production (tons/hour)

39.d. The permittee shall calculate a conversion factor for each of the following emissions units based on the total annual production through that emissions unit and the total annual dry laterite ore production ($P_{dry\ laterite\ ore}$).

EU ID	Conversion (tons/ton)
2.0	tons ore dried/ton dry laterite ore
3.0	tons ore crushed, screened, rejected/ton dry laterite ore
5.0	tons ore calcined, melted/ton dry laterite ore
7.0	tons hot ore transferred/ton dry laterite ore
8.0	tons ferronickel refined/ton dry laterite ore
9.0	tons ferrosilicon produced/ton dry laterite ore

39.e. The permittee shall calculate emissions of total particulate matter from emissions units 4.0, 10.0, 11.0, and 15.0 in units of pounds/hour using the following equation, the following emission factors and the dry laterite ore produced as calculated in condition 39.a:

$$E_{4,10,11,15} = \Sigma\ (P_{eu} \times EF_{eu})$$

where:

$E_{4,10,11,15}$ = Emissions, pounds/hour
P_{eu} = Dry laterite ore production, tons/hour
EF_{eu} = Emission factor for each emissions unit, pounds/ton

Emissions Unit	Emission Factor (pounds/ton)
4.0	0.006
10.0	1.81E-05
11.0	1.82E-04
15.0	0.002

39.f. Emissions from emissions units 1.0, 12.0, 13.0, and 16.0 will not be included for determining compliance with condition 20.

39.g. The emissions calculated in 39.e ($E_{4,10,11,15}$) shall be added to the emissions calculated in 39.c ($E_{2,3,5,7,8,9}$) for monitoring pertaining to conditions 20 and 39.b (E_{total}).

40. The permittee shall install, calibrate, maintain, and operate the following for the dryer, EU 2.0, for monitoring pertaining to conditions 18, 20, 21, and 22 in accordance with the manufacturer's written instructions:

    40.a. a monitoring device for the continuous measurement of the pressure loss of the gas stream through the dryer scrubber, PCD 2-DC-001.

    40.b. a monitoring device for the continuous measurement of the scrubbing liquid flow rate to the dryer scrubber, PCD 2-DC-001.

    40.c. The pressure loss of the gas stream through the scrubber and the scrubbing liquid supply pressure to the scrubber shall be recorded once per shift. The permittee shall maintain an audible alarm that sounds when the pressure loss of the gas stream through the scrubber or the scrubbing liquid supply pressure to the scrubber falls below the action levels established in condition 29.j.

    40.d. The permittee shall also monitor and record deviations of pressure loss and liquid flow rate action levels for PCD 2-DC-001 and the corrective actions taken, recorded in a maintenance log.

41. The permittee shall install, calibrate, maintain, and operate a monitoring device for the continuous measurement of the pressure loss of the gas stream through the baghouses listed below for monitoring pertaining to conditions 20 and 23 in accordance with the manufacturer's written instructions.

    41.a. The pressure loss shall be recorded once per day for the following baghouses: Koppers Baghouse No. 4A, and Koppers Baghouse No. 4B, Rees Baghouse No. 20E, Micro-pulseair Baghouse No. 1A, Serbaco Baghouse No. 1B, Micro-pulseair Baghouse No. 17-DC-009, Koppers Baghouse No. 3A, Koppers Baghouse No. 3B and Dryer Baghouse 17-DC-018 (upon installation) and Skull Fines Treatment Baghouse 17-DC-019 (upon installation).

    41.b. The pressure loss shall be recorded continuously for baghouses #1 Melt Furnace Baghouse, #2 Melt Furnace Baghouse, and FeSi Baghouse 17-DC-008. The permittee shall maintain an audible alarm on each of these baghouses that sounds when the pressure loss reaches the action levels determined by condition 29.j.

    41.c. The permittee shall also monitor and record deviations of pressure loss action levels for all the baghouses and the corrective actions taken, recorded in a maintenance log.

42. The permittee shall maintain the following records of inspection and maintenance procedures for the baghouses at the frequencies listed below and contained in the latest Department-approved version of Glenbrook Nickel's **Standard Operating Procedures** for monitoring pertaining to conditions 17, 18, and 20. Upon installation, the permittee shall maintain the same records of inspection and maintenance procedures for the Dryer Baghouse 17-DC-018 and Skull Fines Treatment Baghouse 17-DC-019.

    42.a.

Frequency	Baghouse ID	Activity
Daily	#1 Melt Furnace Baghouse	check compressor
	#2 Melt Furnace Baghouse	check dust pump

Frequency	Baghouse ID	Activity
	FeSi Baghouse 17-DC-008	check I.D. fans
		check reverse air fan
		check dust screws
		check operation of all rotary feeders
		check bins for bridging
		check cleaning cycle for proper operation
		check individual compartments for bad bags and repair or replace
		check for any dust leaks and repair if possible

42.b.

Frequency	Baghouse ID	Activity
Daily	Micro-pulseair Baghouse No. 20	check compressor
	Micro-pulseair Baghouse No. 20A	check dust pump
	Truck Unloading Baghouse 10-DC-001	check I.D. fans
	Micro-pulseair Baghouse No. 1A	check reverse air fan
	Serbaco Baghouse No. 1B	check dust screws
	Coal Addition Baghouse 2-DC-008	check operation of all rotary feeders
	Micro-pulseair Baghouse No. 17-DC-009	check bins for bridging
	Dryer Baghouse 17-DC-018	check cleaning cycle for proper operation
	Skull Fines Treatment Baghouse 17-DC-019	check individual compartments for bad bags and repair or replace
		check for any dust leaks and repair if possible

42.c.

Frequency	Baghouse ID	Activity
Daily	Koppers Baghouse No. 3A	check all screws for operation
	Koppers Baghouse No. 3B	check all bearings on each dust screw
	Koppers Baghouse No. 4A	check all dust valves for operation
	Koppers Baghouse No. 4B	check all blowers
	Koppers Baghouse No. 20B	check carriage drive motors and chains for condition and operation
		check house pressure
		check stacks for dust
		check I.D. fans bearings and belts

42.d. For Rees Baghouse No. 20E daily:

42.d.i. check all screws and bearings;
42.d.ii. check dust valve;
42.d.iii. check all gates and air cylinders;
42.d.iv. check oilers, fill if necessary;
42.d.v. blow water out of line;
42.d.vi. check reverse air fan;
42.d.vii. check all shakers for operation;
42.d.viii. check conditions of bags in each compartment as compartment goes on by-pass;
42.d.ix. check I.D. fan belts and bearings; and
42.d.x. check house pressure.

42.e. Inspection records of the date, time, and the baghouse inspected, recorded on inspection forms.

42.f. Maintenance activity records of any preventative or corrective action taken as a result of the daily inspections, recorded in a maintenance log. Maintenance activity records shall also include routine maintenance performed on an annual basis.

43. The permittee shall install, calibrate, and maintain a monitoring device that continuously records the control system fan motor amperes for the #1 Melt Furnace Baghouse and the #2 Melt Furnace Baghouse fan motors in accordance with the manufacturer's written instructions. The permittee shall also monitor and record deviations of fan motor ampere action levels and the corrective actions taken, recorded in a maintenance log.

44. Failure to record specific information required by this permit due to occasional and unintentional loss or omission of records shall not constitute a reportable permit deviation, as required by condition G7, provided the permittee upon discovery of the missing record, is able to reconstruct the required information from other available information or the missing record is otherwise allowed by this permit (e.g., less than 10% of continuous monitoring data).

Plant Site Emission Limits Monitoring

45. The permittee shall determine compliance with the Plant Site Emission Limits established in conditions 25 and 26 of this permit by conducting monitoring in accordance with the following procedures, test methods, and frequencies:

45.a. The permittee shall maintain daily and annual records of the following process parameters:

EU ID	Pollutant	Process Parameter	Units	Short/Annual Term EF	Units	Test Method	Frequency
1.0 drilling	PM/PM_{10}	ore processed	tons	1.0E-4	lb/ton	Not required	
blasting	PM/PM_{10}	ore processed	tons	1.0E-4	lb/ton	Not required	
loading	PM/PM_{10}	ore processed	tons	1.0E-5	lb/ton	Not required	
hauling	PM/PM_{10}	ore processed	tons	1.0E-5	lb/ton	Not required	
stockpile	PM/PM_{10}	ore processed	tons	2.0E-5	lb/ton	Not required	
wobbler	PM/PM_{10}	ore processed	tons	1.0E-5	lb/ton	Not required	
conveying	PM/PM_{10}	ore processed	tons	2.0E-4	lb/ton	Not required	
primary crushing	PM/PM_{10}	ore processed	tons	1.7E-2	lb/ton	Not required	
secondary crushing	PM/PM_{10}	ore processed	tons	1.7E-2	lb/ton	Not required	
screening	PM/PM_{10}	ore processed	tons	1.7E-2	lb/ton	Not required	
loading tram	PM/PM_{10}	ore processed	tons	1.0E-5	lb/ton	Not required	
stockpile fugitives	PM/PM_{10}	ore processed	tons	1.3E-3	lb/ton	Not required	
2.0 Dryer 3	PM/PM_{10}	ore processed	tons	0.187	lb/ton	DEQ Method 7	once
	CO	ore processed	tons	0.041	lb/ton	Method 10	once
	NO_x	ore processed	tons	0.553	lb/ton	Method 7E	twice

EU ID	Pollutant	Process Parameter	Units	Short/Annual Term EF	Units	Test Method	Frequency
	SO_2	ore processed	tons	0.014	lb/ton	Not required	
	VOC	ore processed	tons	0.001	lb/ton	Not required	
	Pb	ore processed	tons	1.6E-06	lb/ton	Not required	
3.0	PM/PM_{10}	ore processed	tons	0.103	lb/ton	DEQ Method 5	once
	PM/PM_{10}	ore rejected	tons	0.125	lb/ton	DEQ Method 5	once
4.0	PM/PM_{10}	ore processed	tons	0.005	lb/ton	DEQ Method 8	once
	PM/PM_{10}	ore unloaded (truck)	tons	0.002	lb/ton	Not required	
	PM/PM_{10}	coal unloaded	tons	0.0006	lb/ton	Not required	
5.0	PM/PM_{10}	ore processed	tons	1.82	lb/ton	DEQ Method 5	twice
	CO	ore processed	tons	5.99	lb/ton	Method 10	twice
	NO_x	ore processed	tons	6.05	lb/ton	Method 7E	twice
	SO_2	ore processed	tons	0.35	lb/ton	EPA Method 6 or 6C	twice
	VOC	ore processed	tons	0.30	lb/ton	EPA Method 25A, 25B	twice
	Pb	ore processed	tons	2.4E-05	lb/ton	Not required	
7.0	PM/PM_{10}	ore processed	tons	0.13	lb/ton	DEQ Method 7	once
8.0	PM/PM_{10}	ferronickel refined	tons	0.30	lb/ton	Not required	
	CO	ferronickel refined	tons	4.9E-03	lb/ton	Not required	
	NO_x	ferronickel refined	tons	2.0E-02	lb/ton	Not required	
	SO_2	ferronickel refined	tons	3.6E-04	lb/ton	Not required	

EU ID	Pollutant	Process Parameter	Units	Short/Annual Term EF	Units	Test Method	Frequency
	VOC	ferronickel refined	tons	2.0E-04	lb/ton	Not required	
9.0	PM/PM_{10}	ferrosilicon produced	tons	0.55	lb/ton	Not required	
	CO	ferrosilicon produced	tons	8.33	lb/ton	Method 10	once
	NO_x	ferrosilicon produced	tons	10.63	lb/ton	Method 7E	twice
	SO_2	ferrosilicon produced	tons	27.96	lb/ton	Method 6 or 6C	twice
	VOC	ferrosilicon produced	tons	0.11	lb/ton	Not required	
	Pb	ferrosilicon produced	tons	1.9E-03	lb/ton	Not required	
10.0	PM/PM_{10}	skull processed	tons	9.2E-05	lb/ton	Not required	
	CO	skull processed	tons	7.7E-04	lb/ton	Not required	
	NO_x	skull processed	tons	3.7E-03	lb/ton	Not required	
	SO_2	skull processed	tons	9.5E-05	lb/ton	Not required	
	VOC	skull processed	tons	1.9E-04	lb/ton	Not required	
11.0	CO	distillate oil usage	gallons	5	lb/M gal	Not required	
	NO_x	distillate oil usage	gallons	20	lb/M gal	Not required	
	PM/PM_{10}	distillate oil usage	gallons	2	lb/M gal	Not required	
	SO_2	distillate oil usage	gallons	8.09	lb/M gal	Not required	
	VOC	distillate oil usage	gallons	0.556	lb/M gal	Not required	
	Pb	distillate oil usage heating value	Btu	194	lb/10^12 Btu	Not required	
12.0	PM/PM_{10}	ore processed	tons	0.002	lb/ton	Not required	

EU ID	Pollutant	Process Parameter	Units	Short/Annual Term EF	Units	Test Method	Frequency
13.0	PM/PM_{10}	ore processed	tons	0.05	lb/ton	Not required	
15.0	CO	skull fines treated	tons	3.9E-02	lb/ton	Not required	
	NO_x	skull fines treated	tons	1.5E-01	lb/ton	Not required	
	PM/PM_{10}	skull fines treated	tons	2.8E-02	lb/ton	Not required	
	SO_2	skull fines treated	tons	2.9E-03	lb/ton	Not required	
	VOC	skull fines treated	tons	1.5E-03	lb/ton	Not required	

45.b. For the emissions units listed in the table above, the permittee shall determine compliance with the short term and annual PSELs by multiplying the process parameter by the emission factor listed above for each pollutant.

$$E = \Sigma (P_{eu} \times EF_{eu}) / k$$

where:

E	=	Emissions, pounds/day or tons/year
P_{eu}	=	Process parameter for each emissions unit, units/day or units/year
EF_{eu}	=	Emission factor for each emissions unit, pounds/units
k	=	conversion factor, (1 lb/lb, 2000 lbs/ton)

46. The permittee shall conduct emission factor verification tests in accordance with the Department's Source Sampling Manual for the PM, CO, NO_x, SO_2, and VOC emission factors listed for emissions units using the test methods and minimum test frequencies listed above in condition 45.a except as provided by conditions 46.a and 46.c.

46.a. When more than one test is required during the permit term, the tests shall be separated by a minimum period of one (1) year. If the emission factor obtained from the emission factor verification testing for emissions units required to be tested twice during the life of the permit is less than 50% of the emission factor listed in condition 45.a, source testing shall be conducted once during the life of the permit, rather than twice for these emissions units.

46.b. The testing required in condition 29 may be used to satisfy this requirement in part.

46.c. To measure sulfur dioxide emissions, the permittee shall perform one of the following:

46.c.i. a source test using EPA Method 6 or 6C, or

46.c.ii. a material balance using the following equation to calculate the SO_2 emissions:

$$E=2SF/100$$

where

E = emissions of sulfur dioxide, lbs/day and tons/year;
S = sulfur content, %
F = fuel used, lbs/day and tons/yr; and
2 = $\frac{\text{64 lbs } SO_2\text{/mole}}{\text{32 lbs S/mole}}$

46.d. During each source test, the permittee shall record fuel type and usage, opacity, and production rate.

46.e. The permittee shall notify the Department at least 15 days prior to conducting any emission factor verification tests by submitting a source test plan in accordance with the Department's Source Sampling Manual. The permittee is not required to submit a source test plan if a plan has already been approved for the emissions unit and the pollutant to be tested.

46.f. The permittee shall submit a summary of all emission factor verification tests to the Department within 45 days of any test. The summary shall include the following information:

46.f.i. emissions unit and monitoring point identification;

46.f.ii. emission factors in the same units as in the table above;

46.f.iii. emission results in pounds per hour;

46.f.iv. process parameters during the test (e.g., material throughput, types and amounts of fuels, heat input, etc.); and

46.f.v. control device operating parameters.

47. The emissions factors listed in condition 45.a are not enforceable limits unless otherwise specified in this permit. Compliance with PSELs shall only be determined by the calculations contained in condition 45.b of this permit using the measured process parameters recorded during the reporting period and the emission factors contained in condition 45.a.

RECORDKEEPING REQUIREMENTS [OAR 340-028-2130(3)(b)]

48. The permittee shall maintain the following applicable general records of required monitoring information:

48.a. the date, place as defined in the permit, and time of sampling or measurements;
48.b. the date(s) analyses were performed;
48.c. the company or entity that performed the analyses;
48.d. the analytical techniques or methods used;
48.e. the results of such analyses; and
48.f. the operating conditions as existing at the time of sampling or measurement.

49. The permittee shall maintain the following specific records of required monitoring information:

49.a. deviations from action levels for the dryer scrubber pressure loss and liquid flow rate;
49.b. deviations from action levels for the baghouse pressure losses;
49.c. once-per-shift records of control system fan motor amperes;
49.d. daily records of baghouse inspections;
49.e. daily and annual records of ore mined (drilled, blasted, loaded, hauled, stockpiled, and conveyed);
49.f. daily and annual records of ore mined (wobbler, primary and secondary crushed, and screened);
49.g. daily and annual records of ore dried;
49.h. daily and annual records of ore crushed/screened;
49.i. daily and annual records of ore rejected;
49.j. daily and annual records of ore stored in day bins;
49.k. daily and annual records of ore unloaded from trucks;
49.l. daily and annual records of coal unloaded;
49.m. daily and annual records of ore calcined/melted/transferred;
49.n. daily records and annual records of the amount and heating value of distillate oil used in EU 11.0, boilers;

49.o. daily records and annual records of the amount of ferrosilicon produced;
49.p. daily records and annual records of the amount of ferronickel refined;
49.q. daily records and annual records of the amount of skull processed;
49.r. daily records and annual records of the amount of skull fines treated;
49.s. daily and annual calculations of PSELs;
49.t. complaint log and investigation reports;
49.u. fugitive dust inspection and maintenance activities;
49.v. occurrence and length of downtime for all pollution control devices; and
49.w. excess emissions.

50. The permittee shall retain records of all required monitoring data and support information for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. All existing records required by the previous Air Contaminant Discharge Permit shall also be retained for five (5) years.

REPORTING REQUIREMENTS [OAR 340-028-2130(3)(c)]

51. The permittee shall submit four (4) copies of the first semi-annual monitoring report, covering the period from January 1 to June 30, using Department approved forms, by July 30, unless otherwise approved in writing by the Department. One copy of the report shall be submitted to the Air Quality Division, two copies to the regional office, and one copy to the EPA Region X office. The semi-annual monitoring report shall include the semi-annual compliance certification.

52. The permittee shall submit four (4) copies of the annual monitoring report, using Department approved forms, by February 15, unless otherwise approved in writing by the Department. One copy of the report shall be submitted to the Air Quality Division, two copies to the regional office, and one copy to the EPA Region X office.

53. The annual monitoring report shall consist of:

53.a. specific annual reporting requirements:
53.a.i. annual records of ore mined (drilled, blasted, loaded, hauled, stockpiled, and conveyed);
53.a.ii. annual records of ore mined (wobbler, primary and secondary crushed, and screened);
53.a.iii. annual records of ore dried;
53.a.iv. annual records of ore crushed/screened;
53.a.v. annual records of ore rejected;
53.a.vi. annual records of ore stored in day bins;
53.a.vii. annual records of ore unloaded from trucks;
53.a.viii. annual records of coal unloaded;
53.a.ix. annual records of ore calcined/melted/transferred;
53.a.x. annual records of the amount and heating value of distillate oil used in EU 11.0, boilers;
53.a.xi. annual records of the amount of ferrosilicon produced;
53.a.xii. annual records of the amount of ferronickel refined;
53.a.xiii. annual records of the amount of skull processed;
53.a.xiv. annual records of the amount of skull fines treated;
53.a.xv. the excess emissions upset log; [OAR 340-028-1440] and

53.b. the second semi-annual compliance certification, covering the period from July 1 to December 31. [OAR 340-028-2160]

54. The permittee shall submit a report summarizing the work done to reduce fugitive emissions from the building containing emissions units 5.0, 8.0, and 9.0 and to reduce particulate matter emissions from the #1 and #2 melt furnace baghouses within sixty (60) days after completing the work for monitoring pertaining to condition 27. The detailed report shall describe the changes that were made and shall include the following:

54.a. results of the daily visible emissions observations for emissions unit 16.0 before and after any changes; and

54.b. changes in air flow and control efficiency for the #1 and #2 melt furnace baghouses.

55. Addresses of regulatory agencies are the following, unless otherwise instructed:

DEQ - Western Region 201 W. Main St, Suite 2-D Medford, OR 97501 (541) 776-6010	DEQ - Air Quality Division 811 SW Sixth Avenue Portland, OR 97204 (503) 229-5359	Air Operating Permits US Environmental Protection Agency Mail Stop OAQ 107 1200 Sixth Avenue Seattle, WA 98101

NON-APPLICABLE REQUIREMENTS

56. Air Quality Oregon Administrative Rules (OARs) currently determined not applicable to the permittee are listed below. [OAR 340-028-2190]

56.a. The following OARs are not applicable because the source is not in the source category cited in the rules:

340-022-0075, 340-022-0104 through 340-022-0403, 340-022-0405, 340-022-0415, 340-022-0460 through 340-022-0640,
340-024-0025, 340-024-0100 through 340-024-0350,
340-025-0015 through 340-025-0380, 340-025-0535 through 340-025-0735, 340-025-0850 through 340-025-0905
340-028-0500 through 340-028-0520, 340-028-0800 through 340-028-0820, 340-028-2170, 340-028-2180,
340- Division 31
340-032-0250, 340-032-0300 through 340-032-0380, 340-032-0530 through 340-032-0620, 340-032-2620 through 340-032-3010, 340-032-5000, 340-032-5400, 340-032-5530 through 340-032-5585.

56.b. The following OARs are not applicable because the source does not have specific emissions units cited in the rules:

340-021-0025, 340-021-0027, 340-021-0040,
340-022-0055.

56.c. The following OARs are not applicable because the source is outside the special control area, non-attainment area or county cited in the rules:

340-021-0210 through 340-021-0245,
340-027-0015,
340-028-1500 through 340-028-1520,
340-030-0012 through 340-030-0620.

56.d. The following OARs are not applicable because the source made no changes that would trigger the rule procedural requirements:

340-025-0800, 340-025-0805,
340-028-1030, 340-028-1040,
340-032-0230.

56.e. The following OARs are not applicable because the rules applied in the past and the fees have been paid:

340-028-2400 through 340-028-2550, 340-028-2570.

57. Federal applicable requirements currently determined not applicable to the permittee because the source is not in the source category cited in the rules are listed below:

40 CFR Part 55,
40 CFR Part 57,
40 CFR Part 60 (except subpart A and appendices),
40 CFR Part 61 (except subparts A and M and appendices),
40 CFR Part 63 (except subparts A and appendices),
40 CFR Parts 72, 73, 75, 76, 77, and 78,
40 CFR Part 82 (except subpart F),
40 CFR Parts 85 through 89,
Section 129 of the FCAA, Solid Waste,
Section 183(e) of the FCAA, Consumer and commercial products,
Section 183(f) of the FCAA, Tank Vessels.

GENERAL CONDITIONS

G1. General Provision

Terms not otherwise defined in the permit shall have the meaning assigned to such terms in the referenced regulation.

G2. Reference materials

Where referenced in this permit, the version of the following materials are effective as of the dates noted unless otherwise specified in the permit:

a. Source Sampling Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A4;
b. Continuous Monitoring Manual; January 23, 1992 - State Implementation Plan Volume 3,

Appendix A6; and

c. All state and federal regulations as in effect on the date of issuance of this permit.

G3. Compliance [OAR 340-028-2120(3)(n)(C), 340-028-2130(6), and 340-028-2160(4)]

a. The permittee shall comply with all conditions of the federal operating permit. Any permit condition noncompliance constitutes a violation of the Federal Clean Air Act and/or state rules and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. Any noncompliance with a permit condition specifically designated as enforceable only by the state constitutes a violation of state rules only and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

b. Any schedule of compliance for applicable requirements with which the source is not in compliance at the time of permit issuance shall be supplemental to, and shall not sanction noncompliance with the applicable requirements on which it is based.

c. For applicable requirements that will become effective during the permit term, the source shall meet such requirements on a timely basis unless a more detailed schedule is expressly required by the applicable requirement.

G4. Compliance Monitoring and Enforcement [OAR 340-028-0300, 340-028-1100, 340-028-1120, 340-028-1130, 340-028-1140, 340-028-2130(3), 340-028-2160, 340-032-0270]

a. For the purpose of submitting semi-annual compliance certification reports, the permittee shall use, at a minimum, the information obtained from the monitoring requirements of this permit. The permittee shall not knowingly falsify or render inaccurate any monitoring device or method required to be maintained or followed by the permit.

b. The information obtained from the monitoring required by this permit can be used directly for enforcement.

G5. Certification [OAR 340-028-0300, 340-028-2120(5) and 340-028-2160(2)]

Any document submitted to the Department pursuant to this permit shall contain certification by a responsible official of truth, accuracy and completeness. All certifications shall state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and, complete. The permittee shall promptly, upon discovery, report to the Department a material error or omission in these records, reports, plans, or other documents.

G6. Excess Emissions Reporting [OAR 340-028-1400 through 340-028-1460]

a. The permittee shall report all excess emissions in accordance with OAR 340-028-1400 through 340-028-1460. In summary, the permittee shall immediately (i.e., as soon as possible but in no case more than one hour after the beginning of the excess emission

period) notify the Department by telephone or in person of any excess emissions which are of a nature that could endanger public health. Follow-up reporting shall be made in accordance with Department direction and OAR 340-028-1430(2) and 340-028-1440.

b. Notification shall be made to the appropriate regional office. Current Departmental telephone numbers are:

Portland	229-5554	Medford	776-6010
Bend	388-6146	Pendleton	276-4063
Salem	378-8240		

c. In the event of any excess emissions which are of a nature that could endanger public health and occur during nonbusiness hours, weekends, or holidays, the permittee shall immediately notify the Department by calling the Oregon Emergency Response System (OERS). The current number is 1-800-452-0311.

d. If startups, shutdowns, or scheduled maintenance may result in excess emissions, the permittee shall submit startup, shutdown, or scheduled maintenance procedures used to minimize excess emissions to the Department for prior authorization, as required in OAR 340-028-1410 and 340-028-1420. New or modified procedures shall be received by the Department in writing at least 72 hours prior to the first occurrence of the excess emission event. The permittee shall abide by the approved procedures and have a copy available at all times.

e. The permittee shall notify the Department of planned startup/shutdown or scheduled maintenance events only if required by permit condition or if the source is located in a nonattainment area for a pollutant which may be emitted in excess of applicable standards.

f. The permittee shall maintain and submit to the Department a log of planned and unplanned excess emissions, on Department approved forms, in accordance with OAR 340-028-1440.

G7. Permit Deviation Reporting [OAR 340-028-2130(3)(c)(B)]

The permittee shall promptly report, by telephone or in person, any deviations from permit requirements that do not cause excess emissions, including those attributable to upset conditions, as defined in the permit, the probable cause of such deviations, and any corrective actions or preventative measures taken. Deviations are instances when any permit condition is violated. "Prompt" is defined as within seven (7) days of the deviation.

G8. Open Burning [OAR Chapter 340, Division 23]

The permittee is prohibited from conducting open burning, except as may be allowed by OAR 340-023-0025 through 340-023-0115.

G9. Asbestos [40 CFR Part 61, Subpart M (federally enforceable), OAR 340-032-5600 through 340-032-5650 and OAR Chapter 340, Division 33 (state-only enforceable)]

The permittee shall comply with OAR 340-032-5600 through 340-032-5650, OAR Chapter 340 Division 33, and 40 CFR Part 61, Subpart M when conducting any renovation or demolition activities at the facility.

G10. Stratospheric Ozone and Climate Protection [40 CFR 82 Subpart F, OAR 340-022-0420]

The permittee shall comply with the standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F, Recycling and Emissions Reduction.

G11. Permit Shield [OAR 340-028-2190]

a. Compliance with this permit shall be deemed compliance with all applicable requirements as of the date of permit issuance provided that:
   i. such applicable requirements are specifically identified in the permit, or
   ii. such applicable requirements are specifically identified in the "Non-Applicable Requirements" section of this permit.

b. Nothing in this rule or in any federal operating permit shall alter or affect the following:
   i. the provisions of ORS 468.115 (enforcement in cases of emergency) and ORS 468.035 (function of department);
   ii. the liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;
   iii. the applicable requirements of the national acid rain program, consistent with section 408(a) of the FCAA; or
   iv. the ability of the Department to obtain information from a source pursuant to ORS 468.095 (investigatory authority, entry on premises, status of records).

c. Sources are not shielded from applicable requirements that are enacted during the permit term, unless such applicable requirements are incorporated into the permit by administrative amendment, as provided in OAR 340-028-2230(1)(h), or significant permit modification.

G12. Inspection and Entry [OAR 340-028-2160(3)]

Upon presentation of credentials and other documents as may be required by law, the permittee shall allow the Department of Environmental Quality, or an authorized representative (including an authorized contractor acting as a representative of the EPA Administrator), to perform the following:

a. enter upon the permittee's premises where an Oregon Title V operating permit program source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;

b. have access to and copy, at reasonable times, any records that must be kept under conditions of the permit;

c. inspect, at reasonable times, any facilities, equipment (including monitoring and air

pollution control equipment), practices, or operations regulated or required under the permit; and

d. as authorized by the FCAA or state rules, sample or monitor, at reasonable times, substances or parameters, for the purposes of assuring compliance with the permit or applicable requirements.

G13. Fee Payment [OAR 340-028-2560, and 340-028-2580 through 340-028-2740]

The permittee shall pay an annual base fee and an annual emission fee for all regulated air pollutants except for carbon monoxide, any class I or class II substance subject to a standard promulgated under or established by Title VI of the Federal Clean Air Act, or any pollutant that is a regulated air pollutant solely because it is subject to a standard or regulation under section 112(r) of the Federal Clean Air Act. The permittee shall submit payment to the Department of Environmental Quality, Business Office, 811 SW 6th Avenue, Portland, OR 97204, within 30 days of the date the Department mails the fee invoice or August 1 of the year following the calendar year for which emission fees are paid, whichever is later. Disputes shall be submitted in writing to the Department of Environmental Quality. Payment shall be made regardless of the dispute. User-based fees shall be charged for specific activities (e.g., computer modeling review, ambient monitoring review, etc.) requested by the permittee.

G14. Off-Permit Changes to the Source [OAR 340-028-2220(2)]

a. The permittee shall monitor for, and record, any off-permit change to the source that:
   i. is not addressed or prohibited by the permit;
   ii. is not a Title I modification;
   iii. is not subject to any requirements under Title IV of the FCAA;
   iv. meets all applicable requirements;
   v. does not violate any existing permit term or condition; and
   vi. may result in emissions of regulated air pollutants subject to an applicable requirement but not otherwise regulated under this permit or may result in insignificant changes as defined in OAR 340-028-0110.

b. A contemporaneous notification, as required in OAR 340-028-2220(2)(b), shall be submitted to the Department and the EPA.

c. The permittee shall keep a record describing off-permit changes made at the facility that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those off-permit changes.

d. The permit shield of condition G11 shall not extend to off-permit changes.

G15. Section 502(b)(10) Changes to the Source [OAR 340-028-2220(3)]

a. The permittee shall monitor for, and record, any section 502(b)(10) change to the source, which is defined as a change that would contravene an express permit term but would not:

i. violate an applicable requirement;
ii. contravene a federally enforceable permit term or condition that is a monitoring, recordkeeping, reporting, or compliance certification requirement; or
iii. be a Title I modification.

b. A minimum 7-day advance notification shall be submitted to the Department and the EPA in accordance with OAR 340-028-2220(3)(b).

c. The permit shield of condition G11 shall not extend to section 502(b)(10) changes.

G16. Administrative Amendment [OAR 340-028-2230]

Administrative amendments to this permit shall be requested and granted in accordance with OAR 340-028-2230. The permittee shall promptly submit an application for the following types of administrative amendments upon becoming aware of the need for one, but no later than 60 days of such event:

a. legal change of the registered name of the company with the Corporations Division of the State of Oregon, or

b. sale or exchange of the activity or facility.

G17. Minor Permit Modification [OAR 340-028-2250]

The permittee shall submit an application for a minor permit modification in accordance with OAR 340-028-2250.

G18. Significant Permit Modification [OAR 340-028-2260]

The permittee shall submit an application for a significant permit modification in accordance with OAR 340-028-2260

G19. Construction/Operation Modification [OAR 340-028-2270]

No permittee shall construct or make modifications required to be reviewed under OAR 340-028-2270, the construction/operation modification rule, without receiving a Notice of Approval in accordance with OAR 340-028-2270. The permittee should allow 60 days for Department review of applications for a construction/operation modification if public notice is not required, or 180 days if public notice is required.

G20. New Source Review Modification [OAR 340-028-1900]

No permittee shall construct or make modifications required to be reviewed under New Source Review (OAR 340-028-1900(1)) without receiving an Air Contaminant Discharge Permit (ACDP)

(OAR 340-028-1700). The permittee should allow 180 days for Department review of an ACDP application for New Source Review.

G21. Hazardous Air Pollutant Modification for Major HAP Sources [OAR 340-032-0220, 340-032-0230, and 340-032-4500 (state-only enforceable)]

No permittee shall construct or make modifications required to be reviewed under OAR 340-028-2270, the construction/operation modification rule, as a hazardous air pollutant modification under OAR 340-032-4500 without receiving a Notice of Approval in accordance with OAR 340-028-2270. The permittee should allow 180 days for Department review of applications for a construction/operation modifications and issuance of a Notice of Approval.

G22. Need to Halt or Reduce Activity Not a Defense [OAR 340-028-2130(6)(b)]

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G23. Duty to Provide Information [OAR 340-028-2130(6)(e) and OAR 340-028-0300]

The permittee shall furnish to the Department, within a reasonable time, any information that the Department may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Department copies of records required to be retained by the permit.

G24. Reopening for Cause [OAR 340-028-2130(6)(c) and 340-028-2280]

a. The permit may be modified, revoked, reopened and reissued, or terminated for cause as determined by the Department.

b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

c. A permit shall be reopened and revised under any of the circumstances listed in OAR 340-028-2280(1)(a).

d. Proceedings to reopen and reissue a permit shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of the permit for which cause to reopen exists.

G25. Severability Clause [OAR 340-028-2130(5)]

Upon any administrative or judicial challenge, all the emission limits, specific and general

conditions, monitoring, recordkeeping, and reporting requirements of this permit, except those being challenged, remain valid and must be complied with.

G26. Permit Renewal and Expiration [OAR 340-028-2120(1)(a)(D) and 340-028-2210]

a. This permit shall expire at the end of its term. Permit expiration terminates the permittee's right to operate unless a timely and complete renewal application is submitted as described below.

b. Applications for renewal shall be submitted at least 12 months before the expiration of this permit, unless the Department requests an earlier submittal. If more than 12 months is required to process a permit renewal application, the Department shall provide no less than six (6) months for the owner or operator to prepare an application. Provided the permittee submits a timely and complete renewal application, this permit shall remain in effect until final action has been taken on the renewal application to issue or deny the permit.

G27. Permit Transference [OAR 340-028-2230(1)(d)]

The permit is not transferrable to any person except as provided in OAR 340-028-2230(1)(d).

G28. Property Rights [OAR 340-028-0110(9)(c) and 340-028-2130(6)(d)]

The permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations, except as provided in OAR 340-028-2190.

G29. Permit Availability [OAR 340-028-0110(9)(c) and 340-028-2200(2)]

The permittee shall have available at the facility at all times a copy of the Oregon Title V Operating Permit and shall provide a copy of the permit to the Department or an authorized representative upon request.

ALL INQUIRIES SHOULD BE DIRECTED TO:

Western Region
201 W. Main Street, Suite 2-D
Medford, OR 97501
Telephone: (503) 776-6010

PERMITS\T100007.FIN

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT REVIEW REPORT

Western Region
750 Front Street N.E., Suite 120
Salem, OR 97310
Telephone: (503) 378-8240

Glenbrook Nickel Company
P.O. Box 85
Riddle, OR 97469

PSEL CRED	SOURCE TEST	COMS	CEMS	AMB MON	COMPL SCHED	SPEC COND	REPORT A	REPORT S	REPORT Q	REPORT M	EXCESS R	EXCESS N	NSPS	NSR	PSD	NESHAPS	SIZE TV	SIZE A2
	X						x	x			x						x	

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PERMITTEE IDENTIFICATION

1. Glenbrook Nickel Company (GNC) operates a primary nickel smelter located at 5093 Riddle Bypass Road, in Riddle. The Glenbrook Nickel Mine Smelter Complex is located in Douglas County, Oregon. The site covers approximately 5,000 acres all located in Township 30S, Range 6W. The process includes mining of nickel oxide ore, calcination of the ore, recovery of 50-50 ferronickel metal from four electric arc furnaces (EAF), and refining and casting of ferronickel ingots.

The plant was originally built in 1953 as a joint venture between the U.S. Government and Hanna Mining Company (Cleveland, Ohio). The United States did not have a domestic supply of nickel which is a critical element in the production of high strength steels. The Glenbrook facility continues to be the only active nickel mine/smelter in the United States.

The nickel market for the past few years has not been healthy and it is reflected in our reduced production of nickel. The operation intends to resume to normal operating tonnages when the market improves.

Glenbrook Nickel has identified an alternate responsible official in case the primary responsible official is unable to certify any application form, report, or compliance certification. The alternate responsible official may certify a document in the absence of the primary responsible official and must accept the same responsibilities as the primary responsible official.

FACILITY/OPERATING SCENARIO DESCRIPTION

2. **1.0 Mining:**

Mining includes exploration drilling, production drill and blast, loading, hauling, road construction, stockpiling of ore, waste, and "lean ore", dumping, crushing, screening, and transporting to the smelter. Mining is carried out by conventional open pit methods. Exploration is carried out by trenching and drilling. Mining utilizes drill and blasting for most of the material. All ore and waste is loaded into haul trucks by mass excavators. The material, depending upon whether it's ore or waste is hauled to various dump sites located throughout Nickel Mountain.

Until 1983 the ore was hauled to a preparation area adjacent to the mine. The initial step in the ferronickel process is to screen the raw ore into two fractions. Material less than 14 cm (5.5 in.) is fed to a crusher (pt. 3) and is then screened for a second time. The undersized material from the second screening is carried to the surge pile and from there to the ore storage pile. A belt conveyor delivers the ore from the surge pile to tram cars which empty their contents into an ore storage hopper. Another belt conveyor is used to deliver ore material from the hopper to the ore storage pile. Oversized reject from the second screening (which contains relatively small amounts of nickel) is stockpiled.

Due to the falling grade of the ore deposit (from 1.6% Nickel in the 1950's, to 0.96% Nickel in the 1980's) the previous owner's of Glenbrook Nickel (M.A. Hanna Mining Company) installed a wet screening process. The wet screening process takes advantage of the fact that the finer the particles, the higher the grade of nickel (this is an uncommon characteristic of this ore body). The 200 minus mesh contained a nickel grade of 2.1%. However, to obtain the required smelter feed, the mine would

be required to move some 23,000,000 tons of material each year (8,000,000 tons of ore and 15,000,000 tons of waste). The price of nickel continued to fall to a level that forced Hanna to shut down the operation.

Cominco reopened the mine on a somewhat reduced scale. High grade areas remained from the previous owner's operation which would allow time to develop overseas sources of ore. Mining continues today, but the bulk of the ore is located such that hauling the material directly to the smelter proved more economic than hauling it uphill to the tramway.

The mine has approximately 49 million tons of mineralized material "ore" grading 0.7% nickel. The average nickel grade in the ore has steadily declined over the 40 year life of the mine at Nickel Mountain. In order to maintain or increase the production of ferronickel product, Glenbrook Nickel will increasingly turn to the use of imported higher nickel grade ore and the use of nickel bearing recyclable products from other industries.

2.0 Drying:

The mined ore is delivered to the smelter with 25% to 35% free moisture. In this wet condition the ore cannot be handled in the calcining and smelting processes so the ore is dried to 4% to 10% moisture content. Drying is accomplished with a 100 foot by 11 foot rotary kiln which is fired with natural gas or oil (stand-by fuel). The kiln is lined with lifters to drop the ore through the hot gas stream. The kiln is concurrent fired with three burners on the feed end. Dust collection on the drying system consists of (1) a large drop out box (2) standard steel design wet scrubber and (3) a large dewatering cyclone. The dust is picked up in a slurry which is put into a thickener with the under flow returned to the dryer.

3.0 Crushing, Screening, Rejecting:

The nickel ore is contained both in the fine particulate of the material and along joints and fractures of the larger rocks. Crushing and screening allows the more valuable ore to be separated from the less valuable peridotite. The less valuable peridotite is rejected while the valuable nickel ore can be crushed further to supplement later stages of heat treatment, namely calcining and melting. The peridotite rock is valuable as construction aggregate based on state and federal test work. The content of the nickel in the peridotite is approximately 0.25% (typical for rocks along the West Coast of the U.S.), but most of the fines have been removed during the initial processing for nickel ore.

The mined ore is delivered to the smelter at 12 inches by down. The larger sized ore has a lower nickel content than finer ore. Prior to drying, the +8 inch ore is screened and rejected. After drying more coarse material can be screened off and rejected to upgrade the nickel content in the remaining ore. The amount of reject is determined by the amount of rock in the ore and the smelter requirements for ore. The amount of rock and the ability to upgrade by rejecting varies with the geology of the deposit. Some areas of the deposit do not upgrade at all. After the reject is removed the ore is crushed to minus 1/2 inch and stored in six large day bins. The reject rock is stored for later use as aggregate.

Dust is controlled by hood and enclosures over the conveyor belts and crushers. The dust is collected by a 35,000 cfm baghouse. The dust is transported to the storage bins.

Glenbrook has the potential to market reject rock aside from producing ore for the smelter. Once the smelter is operating on 100% imported ore, the crushing/screening operation, and possibly the dryer, may be used to produce aggregate.

4.0 Ore Storage, Day Bins:

The dry, crushed ore from the Riddle dryer and the Coos Bay dryer are stored in six 1,200 ton bins called day bins. The day bins act as a storage of ore prior to being calcined. The dry storage also retains some of the heat from drying reducing the cost of calcining since the ore must be brought up to calcining temperature. Glenbrook also adds uncalcined edible oil catalyst at the day bins. The ore is delivered to the bins by conveyor belts. The ore is metered out of each bin with variable speed drag chain feeders to two conveyor belts which feed two calciners. The ore is normally metered out of two or more bins to feed one calciner. The dust is controlled by three baghouses, which collect dust from the feed conveyors, the day bins and the discharge belt conveyors. The dust from the baghouses is fed into the day bins or onto the calciner feed belts.

Edible oil catalyst is a product of the food industry. Nickel is used during the hydrogenation process which makes the oils used daily in cooking (vegetable, olive, etc.). The nickel eventually gets coated with enough tallow (oil) and must be filtered out using diatomaceous earth. The nickel, tallow, and diatomaceous earth make up the catalyst. The material is classified as hazardous because it contains nickel. When the nickel is recovered, heat is gained from the oil, and the resultant carbon from the burning of the catalyst reduces the iron in the ore from trivalent to divalent thereby reducing the need for coal addition. Glenbrook is limited to the addition of 2,000 tons of uncalcined edible oil catalyst because of the reducing capabilities (over reduced metal will separate or "fall out" in the furnaces which is highly undesirable). However, there are sources of calcined catalyst which are a direct substitute for nickel ore and can be added in "unlimited" quantities. The calcined catalyst is 30-40% nickel with the remaining material being silica and magnesium oxide (similar to the mined ore).

5.0 Calcining and Melting of Ore:

After the ore has been dried and sized the ore is calcined. The dried ore will contain about 6% free moisture and about 12% chemically combined moisture (LOI). Prior to melting the ore the moisture must be down to less than 4% total moisture. During calcining all the free moisture and most of the LOI (loss on ignition) will be removed by heating the ore to about 1200°F. The calcining is accomplished in two refractory lined rotary kilns which are 250 feet long by 8 feet inside diameter. The kilns are fired counter current (burners at the discharge end) by natural gas or oil (stand-by fuel). The gas temperature will very from 1600°F at the discharge to 500°F at the feed end. Coal and nickel bearing catalyst are added with the ore. The carbon from the coal and nickel catalyst is used for reduction of trivalent iron (Fe^{+3}) to divalent iron (Fe^{+2}). The nickel in the nickel catalyst is recovered in the smelting process.

Dust from the calcining process is controlled with two sets of quad cyclones in series on each kiln. The exhaust from the cyclones is ducted to the smelter baghouses. The coarse dust from the cyclones and the dust from the smelter furnace baghouse is returned to the hot ore bin.

Nickel recovery is initiated by gravity feeding the roasted and calciner ores into electric arc melting furnaces. The electric arc melt furnaces operate at approximately 1650°C (3000°F). As molten ore is

poured from the furnace into ladles, iron and nickel metals are extracted by adding a ferrosilicon reductant to the ladle and mixing vigorously. Mixing is accomplished by pouring molten materials back and forth from one ladle to another. As the iron and nickel compounds under go reduction, metallic nickel and iron settle to the bottom of the ladle. Slag is poured off the ladle and granulated by high pressure water jets. Part of the metal that accumulates in the mixing ladle is poured into another ladle and is transferred to a refining furnace. The metal remaining in the mixing ladle is known as "seed metal", serving as a metal collect for subsequent reactions of molten ore with ferrosilicon.

6.0 Fine Ore Roasting:

The baseline data includes a section on roasting. This was merely the baghouse dust being calcined prior to being smelted. The roasters have been deactivated with the dust being sent through the existing process.

7.0 Hot Ore Transfer:

The hot, calcined ore is transferred to the melt furnaces by a series of skip hoists. The skip cars (metal containers that travel on rail which are raised and lowered by a pulley system) can hold approximately 1.5 tons of hot calcined ore. The skip cars empty into small hoppers above the melt furnaces.

8.0 Ferronickel Refining:

Unrefined ferronickel as it comes from the smelting contains excessive amounts of carbon, phosphorus, and sometimes sulfur. Phosphorus and carbon are the main elements to refine for.

Phosphorus is removed from the ferronickel by oxidizing the phosphorus to P_2O_5 which will combine with the calcium in molten lime - iron ore ($CaO\text{-}Fe_2O_3$) slag on top of the molten ferronickel. The slag is removed taking the phosphorus with the slag. Carbon is removed in much the same way except the carbon is oxidized to carbon dioxide which goes off as a gas.

Sulfur is removed by deoxidizing the molten ferronickel with ferrosilicon and/or aluminum. The sulfur will then combine with the calcium in a lime (CaO) - Flourspar (CaF) slag. The sulfur is then removed with the slag.

The final step will be to deoxidize with ferrosilicon as required to remove excess oxygen prior to casting or granulating the metal.

Casting/shotting/drying - Refined ferronickel is cast into the form requested by the customer, either ingots or shot. "Shot" material is a granulated form of product that is being predominantly used by industry for the manufacture of stainless steel.

Shipping - Railcar or truck loading of product. There is a temporary storage at shipping dock where product is packed pallet form or in "conex" style boxes holding shot. Shot material can be bagged or loaded directly into rail cars.

9.0 Ferrosilicon Production:

Ferrosilicon is produced by reducing quartz (SiO_2) with carbon and adding iron in the form of iron turnings or iron ore. The iron ore would be reduced using carbon. Carbon is introduced into the process in the form of coal and/or coke. Waste wood is also introduced as a source of carbon. The following basic chemical reactions take place in the furnace. Heat from the electric arc in the furnace is required to make the chemical reaction proceed.

$Fe + SiO_2 + C \rightarrow$ (heat) Fe Si (liquid) + 2CO (gas)

$Fe_2O_3 + 2SiO_2 + C \rightarrow$ (heat) 2FeSi (liquid) + 7CO (gas)

$2CO + O_2$ (from air) $\rightarrow$ (heat) $2CO_2$ (gas)

The carbon monoxide will be oxidized to carbon dioxide as it leaves the furnace. The molten ore will be tapped from the bottom of the furnace and cast.

10.0 Skull Plant Operations:

The skull plant operation is very important to the overall nickel recovery of the smelter. Skull material is molten material that cools along the sides of ladles and refining slags and contains significant amounts of nickel/ferronickel. Skull material is sent to the skull plant for separation of metallic nickel from this material.

The skulls are processed through 24 inch grizzly screens to a hammer mill which reduces the material to less than three inches and free the large pieces of ferronickel. The freed ferronickel is removed with a large belt magnet and remaining material is ground to -1.2mm to free the small pieces of ferronickel in a wet ball mill. The slurry from the ball mill is processed through a wet magnetic drum separator. All recovered ferronickel is returned to the smelter for processing into product. The tailings from the skull plant is pumped in slurry form to a tailing stock pile area. The water is recycled back to the smelter water system.

11.0 Industrial Boiler:

The industrial boilers at Glenbrook Nickel are used to heat No. 6 fuel oil when the oil is used on the calciners. The boilers are used only when natural gas is curtailed, which is normally less than 30 days per year.

12.0 Process By-Product Stockpiles:

There are three main process by-product stockpiles located at the smelter. The skull fines, slag pile and reject pile.

13.0 Fugitive Dust from Roads:

The plant site has fugitive dust from the operation, most of it occurring from the processing of the mined ore.

15.0 Skull Fines Treatment:

The proposed skull fines treatment system will process the fine material produced in a grinding circuit which grinds skulls produced in ladles in the smelter. The ladle skulls are ground to free magnetic metal particles which are returned to the smelter. The skull fines will be processed to turn a waste product into a salable product. The fine sized product will be marketed as fillers.

The skull fines will start as a wet slurry and will be processed as follows:

- dewatering
- drying
- sizing and
- packaging.

16.0 Building Fugitives:

The building that houses the ferrosilicon furnace, EU 9.0, the melting furnaces of EU 5.0, and the refining furnaces of EU 8.0 has been identified as an emissions unit. Fugitive emissions escape from this building at both the east and west ends.

17.0 Oxygen Refining (Planned):

In the future to reduce the time required to refine ferronickel, a oxygen blowing system would be installed. Refining for phosphorus and carbon are carried out using the flow of the molten metal during heating in the electric arc furnace to gain contact between the metal and the refining slag ($CaO + Fe_2O_3$) so the phosphorus and carbon can be transferred to the slag from the metal. The oxygen blowing system would supply larger quantities of oxygen for faster oxidation and removal of the carbon and phosphorus from the metal.

18.0 Catalyst Processing System (Planned):

A system for processing spent nickel catalyst is planned. The system would include receiving system for handling catalyst in bulk and in containers such as barrel and gaylords. The catalyst would be processed so that it can be added into the smelting process.

The process in general would be (1) removal from container with a shredder or other equipment (2) separation of packaging material (steel barrels can be added to the smelting process) (3) sizing by crushing and (4) metering into the smelter.

Summary

The ore smelted at Glenbrook Nickel Company to produce ferronickel is a complex mineral containing nickel silicates, iron silicates, magnesium silica and other minor materials.

The process steps at Glenbrook are as follows:

1. The ore is dried to remove most of the free moisture.
2. The dried ore is calcined by heating to approximately 1100°F to remove the remaining free moisture and a portion of the chemically combined moisture plus a portion of the iron is reduced using carbon as a reducing agent.
3. The ore is then melted and the final reduction of the nickel oxide is made using ferrosilicon as a reducing agent.

Nickel Reduction Processes

The two primary reduction processes used to reduce the nickel "oxide" to metallic nickel are carbon reduction and silicon reduction. The following basic reactions take place in the processes:

Carbon Reduction

Reducing agents - coal, coke and spent nickel catalyst (containing edible oils and waste wood products).

Reaction #1: $Fe_2O_3 + C \rightarrow FeO$ (liquid) $+ CO$ (gas)
Reaction #2: $NiO + C \rightarrow Ni + CO$ (gas)
Reaction #3: $FeO + C \rightarrow Fe + CO$ (gas)

Silicon Reduction

Reducing Agent - Ferrosilicon (FeSi)

Reaction #1: $Fe_2O_3 + FeSi \rightarrow FeO + SiO_2$ (liquid)
Reaction #2: $NiO + FeSi \rightarrow Fe\ Ni + SiO_2$ (liquid)
Reaction #3: $FeO + FeSi \rightarrow Fe + SiO_2$ (liquid)

In the carbon reduction and the silicon reduction, the trivalent iron (Fe_2O_3) is reduced to divalent iron (FeO) prior to the nickel oxide (NiO) being reduced to metallic nickel. The nickel reduction and the divalent iron reductions overlap so that some divalent iron is reduced in order to complete the nickel reduction process.

The process at Glenbrook Nickel is a combination of the carbon and silicon reduction processes. About 80% of the trivalent iron (Fe_2O_3) is reduced to divalent iron (FeO) using carbon reduction in the rotary kiln calciners and the ore melting furnaces. The reaction in the calciner gives off carbon monoxide

(CO) as a gas, which is combined with the products of combustion from the natural gas fired burners and the moisture from the ore. This mixture forms the off gasses from the calciners. This pre-reduction of iron in the calciner has been used for the last 30 years in the processing of ore at the Riddle operation. The final reduction is made using ferrosilicon in the molten state.

After the ore passes through the calciners it is fed to electric arc melting furnaces. In the melting furnaces minor reactions take place and the ore is melted. The ore is then poured into large ladles where ferrosilicon (FeSi) is added to reduce the final trivalent iron (Fe_2O_3), the nickel oxide and some amount of divalent iron (FeO) to metallic iron (Fe).

The use of carbon to reduce a portion of the trivalent iron in the calciners has been used for the past 30 years in conjunction with the silicon reduction process. The reducing agents used has been coal, coke, waste wood and oil bearing waste in spent nickel catalyst.

Reaction Ladles

During the reaction process molten ore and molten metal (ferronickel and ferrosilicon) are poured from one ladle to the other; approximately 30 tons of molten material is poured. The violent mixing action facilitates the contact between the metal and ore so the following basic reactions can take place:

$$Fe_2O_3 + FeSi \rightarrow 3FeO\ (liquid) + SiO_2\ (liquid)$$
$$2NiO + FeSi \rightarrow 2FeNi\ (liquid) + SiO_2\ (liquid)$$
$$2FeO + FeSi \rightarrow 3Fe\ (liquid) + SiO_2\ (liquid)$$

The basic chemical reactions are in liquid phase so there should be no gaseous emissions form these reactions. Along with these basic reactions, the following can occur in minor quantities:

$$Fe_2O_3 + 3C \rightarrow 2Fe + 3CO\ (gas)$$

As you can see, minor quantities of CO gas can be evolved. Most of the CO gas will be oxidized to CO_2 as it is dissipated from the molten material.

As the molten material is poured from ladle to ladle, some air will be entrapped in the molten bath. When the molten material settles down after the pour is complete, some of this entrapped air will be released from the molten ore as the air is heated.

Ferronickel Refining Process

Ferronickel that has been reduced from oxide using ferrosilicon as a reducing agent contains quantities of phosphorus, carbon and sulfur, higher than raw material specification for ferronickel. The content of these elements must be lowered to meet these specifications. The refining process used by Glenbrook Nickel employees a molten slag which reacts with the elements phosphorus, carbon or sulfur from the metal and ties them up in the slag. The slag is then removed from the molten metal taking the phosphorus, carbon or sulfur with it.

Phosphorus and carbon are removed with the metal in oxidized state (prior to addition of deoxiders i.e., ferrosilicon or aluminum). Metal in the oxidized state will give up phosphorus and carbon to the slag. The slag is a mixture of iron ore and lime (Fe_2O_3).

When the ferronickel is deoxidized it will give up the sulfur to the slag. The slag is burnt lime with a small amount of flourospar for fluidizing. When the level of phosphorus carbon and sulfur meet the specification it is cast into pigs or into granulated shot.

Concentrate, which is the nickel/slag material that contains enough ferronickel to be picked up by the magnet at the skull recovery plant, is remelted either in any of the furnaces (including the ferrosilicon furnace).

EMISSIONS UNIT AND POLLUTION CONTROL DEVICE IDENTIFICATION[1]

3. The emissions units regulated by this permit are the following [OAR 340-28-2120(3)] :

Emissions Unit	EU Capacity	EU ID	Pollution Control Device	Design Parameters	PCD ID
Mining Drilling Production Drill and Blast Loading Hauling Road Construction Stockpiling of Ore, Waste, and Lean Ore Crushing Screening Transporting	2,400 tons/day to smelter; 21,600 tons/day to waste/lean ore; 45,000 tons/day stripping	1.0	None	NA	NA
Drying #3 Dryer	120 MMBtu/hr, 4.7 MM ft^3/day natural gas, 500 gallons/day used oil, No. 2 fuel oil, 1,800°F	2.0	Wet Scrubber	99% efficiency, 640 gpm, 100,000 acfm, 15" water	2-DC-001

[1]The devices identified in the emissions unit identification table in shaded areas are devices that will be added in the future.

Emissions Unit	EU Capacity	EU ID	Pollution Control Device	Design Parameters	PCD ID
			Baghouse	99+% efficiency, 120,000 acfm, 4:1 air:cloth ratio, 4"-7" water	17-DC-018
Crush/Screen/Reject Scalping screens (4) Crusher Jaw Vertical Impact	400,000lbs/hr nickel ore	3.0	Rees Baghouse	99% efficiency, 30,500 acfm, 1.07:1 air:cloth ratio, 1,344 bags, 5"-7" water	No. 20E, 2-DC-002
Ore Storage/Day Bins (6 silos)	1,200 tons/bin, 240,000 lbs/hr calciner feed-nickel ore, 10,000 lbs/hr nickel bearing catalyst	4.0	Koppers Baghouse (day bins)	99% efficiency, 10,401 acfm, 4.56:1 air:cloth ratio, 2278 ft^2 cloth, 32 bags - 12"x22'8", blow ring cleaning, 6"-8" water	No. 20B, 2-DC-003
			Micro-pulseair Baghouse (transfer points and belts)	99% efficiency, 6,000 acfm, 4.90:1 air:cloth ratio, 1225 ft^2 cloth, 130 bags - 4.5"x8', pulse jet cleaning, 4"-7" water	No. 20, 2-DC-004
			Micro-pulseair Baghouse (transfer points, belts and #1 and #2 day bins)	99% efficiency, 4,000 acfm, 5.30:1 air:cloth ratio, 754 ft^2 cloth, 64 bags - 4.5"x10', pulse jet cleaning, 4"-7" water	No. 20A, 2-DC-007
Coal Addition	4 tons/hour		Coal Addition Baghouse	99% efficiency, 2,500 acfm, 3.9:1 air:cloth ratio, 640 ft^2 cloth, 49 bags - 6"x8'4", pulse jet cleaning, 4"-6" water	2-DC-008

Emissions Unit	EU Capacity	EU ID	Pollution Control Device	Design Parameters	PCD ID
Dumping	250 tons/hour		Truck unloading baghouse	99% efficiency, 22,000 acfm, 6.34:1 air:cloth ratio, 3470 ft^2 cloth, 221 bags - 6"x10', pulse jet cleaning, 4"-7" water	10-DC-001
Calcining/Melting	240,000 lbs/hr molten nickel ore	5.0			
Calciner #1 2-CA-001	70 tons/hr nickel ore, nickel catalyst, 80 MMBtu/hr, 0.1 MM ft^3/hr natural gas, 43 gal/hr No. 2 diesel		Buell #54 series quad cyclones (2)	~85%	2-DC-005
			#1 Melt Furnace Baghouse (controls 2-CA-001, 3-FR-001 and 3-FR-002)	99.9% efficiency, 275,000 acfm, 1.8:1 air:cloth ratio, 1,536 bags, 10" water	17-DC-001
Nickel Ore Melting Furnace 3-FR-001	220 tons/furnace, 24 mega volt-amps each				
Nickel Ore Melting Furnace 3-FR-002	220 tons/furnace, 24 mega volt-amps each				
Calciner #2 2-CA-002	70 tons/hr nickel ore, nickel catalyst, 80 MMBtu/hr, 0.1 MM ft^3/hr natural gas, 43 gal/hr No. 2 diesel		Buell #54 series quad cyclones (2)	~85%	2-DC-006
			#2 Melt Furnace Baghouse (controls 2-CA-002, 3-FR-003 and 3-FR-004)	99.9% efficiency, 275,000 acfm, 1.8:1 air:cloth ratio, 1,536 bags, 10" water	17-DC-002
Nickel Ore Melting Furnace 3-FR-003	220 tons/furnace, 24 mega volt-amps each				
Nickel Ore Melting Furnace 3-FR-004	220 tons/furnace, 24 mega volt-amps each				

Emissions Unit	EU Capacity	EU ID	Pollution Control Device	Design Parameters	PCD ID
Hot Ore Transfer	1,5 tons/skip car, 200 batches/hr, 240,000 lbs/hr, 4,000 lbs/batch,	7.0	Micro-pulseair Baghouse	99% efficiency, 15,000 acfm, 5.51:1 air:cloth ratio, 2722 ft^2 cloth, 289 bags - 4.5"x8', pulse jet cleaning, 5"-7" water	No. 1A, 17-DC-011
			Serbaco	99% efficiency, 20,000 acfm, 4.19:1 air:cloth ratio, 4785 ft^2 cloth, 319 bags - 6"x10', pulse jet cleaning	No. 1B, 17-DC-012
			Micro-pulseair Baghouse	99% efficiency, 5,000 acfm, 5.30:1 air:cloth ratio, 942 ft^2 cloth, 100 bags - 4.5"x8', pulse jet cleaning, 5"-7" water	17-DC-009
Skip Hoists			Koppers Baghouse	99% efficiency, 44,000 acfm, 4.83:1 air:cloth ratio, 128 bags, 8"-10" water	No. 3A, 17-DC-004
			Koppers Baghouse	99% efficiency, 44,000 acfm, 4.83:1 air:cloth ratio, 128 bags, 8"-10" water	No. 3B, 17-DC-005
Refining		8.0			
FeNi Refining Furnace 3-FR-005	10 tons/furnace, 2.5 mega volt-amps each		Koppers Baghouse[2]	99% efficiency, 22,000 acfm, 4.83:1 air:cloth ratio, 4556 ft^2 cloth, 64 bags - 12"x22'8", blow ring cleaning, 8"-10" water	No. 4A, 17-DC-006

[2]The two baghouses are connected in parallel to both refining furnaces.

Emissions Unit	EU Capacity	EU ID	Pollution Control Device	Design Parameters	PCD ID
FeNi Refining Furnace 3-FR-006	10 tons/furnace, 2.5 mega volt-amps each		Koppers Baghouse	99% efficiency, 22,000 acfm, 4.83:1 air:cloth ratio, 4556 ft^2 cloth, 64 bags - 12"x22'8", blow ring cleaning, 8"-10" water	No. 4B, 17-DC-007
Pig Machine	10,000 lbs/hr		None	NA	NA
Casting/shotting/drying Shotting System Dryer	10,000 lbs/hr refined ferronickel	8.0A	None	NA	NA
Ferrosilicon Production Ferrosilicon Furnace 4-FR-001	70 MMBtu/hr, 70 tons/day, 13.5 mega volt-amps, 31,000 tpy quartz, 15,000 tpy iron, 10,000 tpy coke, 10,000 tpy coal, 10,000 tpy wood	9.0	FeSi Baghouse	99.9% efficiency, 165,000 acfm, 1.54:1 air:cloth ratio, 107,100 ft^2 cloth, 1080 bags - 12"x31'7", reverse air cleaning, 6"-10" water	17-DC-008
Skull Plant Operations Hopper Grizzly Hammermill Belt Magnet Dryer	400 tons/day skull material, 47,000 lbs/day ferronickel concentrate 350,000 Btu/hr	10.0	Water Sprays	NA	NA
Boilers (2) 2-BO-001, 2-BO-002	40 horsepower each	11.0	None	NA	NA
By-Product Stockpiles Skull Fines Stockpile Slag Stockpile Reject Stockpile		12.0	Watering	NA	NA
Road Fugitives	12 miles	13.0	Watering	NA	NA
Skull Fines Treatment Cyclone (1) Dryer	400 tons/day sized, dried, screened	15.0	Baghouse	99+% efficiency, 15,000 acfm, 4:1 air:cloth ratio	17-DC-019

Emissions Unit	EU Capacity	EU ID	Pollution Control Device	Design Parameters	PCD ID
Building Fugitives	NA	16.0	None	NA	NA

EMISSION LIMITS AND STANDARDS

RESCINDED ACDP CONDITIONS

4. The following conditions do not appear in the federal operating permit as they existed in the ACDP for the reasons given below:

4.a. 11/09/90 ACDP 10-0007 condition 1 for Highest and Best Practicable Treatment and Control (Highest and Best) has been rescinded because of the difficulty in demonstrating compliance. Examination of all emissions units at the facility indicates that operation and maintenance requirements are necessary for the pollution control devices. It does not appear that any other emissions units require operation and maintenance requirements for Highest and Best at this time.

4.a.i. Glenbrook Nickel is required to take corrective action whenever there is a deviation from a control device parameter action level. The Department has chosen not to include the action levels in the permit because of the possible need to correct the action levels once further data is obtained. If a correction is needed, Glenbrook Nickel shall make the request in writing along with the verification for the change and receive written approval from the Department. The following action levels will be established once monitoring and source testing have been completed as part of this Title V permit:

Emissions Unit/Pollution Control Device	Emission Action Level
Dryer scrubber, PCD 2-DC-001	scrubber pressure loss, inches of H_2O
Dryer scrubber, PCD 2-DC-001	scrubbing liquid supply pressure, psig
Dryer scrubber, PCD 2-DC-001	scrubbing liquid flow rate, gpm
Rees Baghouse No. 20E	baghouse pressure loss, inches of H_2O
#1 Melt Furnace Baghouse	baghouse pressure loss, inches of H_2O
#2 Melt Furnace Baghouse	baghouse pressure loss, inches of H_2O
Micro-pulseair Baghouse No. 1A	baghouse pressure loss, inches of H_2O
Serbaco Baghouse No. 1B	baghouse pressure loss, inches of H_2O
Micro-pulseair Baghouse, 17-DC-009	baghouse pressure loss, inches of H_2O

Emissions Unit/Pollution Control Device	Emission Action Level
Koppers Baghouse 3A/3B	baghouse pressure loss, inches of H_2O
Koppers Baghouse No. 4A/4B	baghouse pressure loss, inches of H_2O
Ferrosilicon Baghouse, 17-DC-008	baghouse pressure loss, inches of H_2O

4.a.ii. Operation and maintenance or emission action levels for fugitive emission sources were not established at this time, except for the vehicular areas, storage of collected materials, hoods and conveyors, tailings pile, ore bins, and ore piles, because no complaints have been received by the Department regarding fugitive emission sources.

4.b. 11/09/90 ACDP 10-0007 condition 12 has been rescinded because Glenbrook Nickel has demonstrated compliance for the calciners when the ESP was removed. The baghouses for the ore dryer, the calciners, and the ore melters were tested and found to be in compliance.

4.c. 11/09/90 ACDP 10-0007 condition 13 has been omitted because it sets forth monitoring and reporting requirements. Because the Title V program includes specific monitoring and reporting requirements, and because the Title V application specifically and comprehensively addresses monitoring and reporting requirements, the requirements of condition 10 have been replaced with the Title V monitoring and reporting requirements in order to ensure consistency.

4.d. 11/09/90 ACDP 10-0007 condition 15 has been omitted because it concerns compliance determination fees under the ACDP program. These fees do not apply to Title V permittees, which are subject to separate, comprehensive fee provisions.

4.e. 11/09/90 ACDP 10-0007 general conditions G1 through G10 have been omitted because these conditions will be superseded by Title V general conditions. In addition, many of the conditions do not clearly state the applicable requirements or do not apply to Title V sources.

REVISED ACDP CONDITIONS

5. The following ACDP conditions have been revised in the federal operating permit because of reasons given below:

5.a. 11/09/90 ACDP 10-0007 condition 2c, 3.5 pounds per ton of dry laterite ore produced, based upon the average dry laterite ore production rate, has been revised. OAR 340-025-0410(5) states that "Average dry laterite ore production rate means the average amount of dry laterite ore produced per hour based upon annual production records." The production rate is the amount of ore coming out of the day bins before it is fed to the calciner. Based on the definition of "average dry laterite ore production," the Department believes that the limit based on 3.5 pounds/ton is a floating limit, meaning it changes depending upon the average dry laterite ore production for the year. Since the average dry laterite ore production is based

upon annual production records, Glenbrook Nickel will be required to calculate its limit in units of pounds/hour at the beginning of each year for the previous year based on the annual production of dry laterite ore and the greater total hours of operation of the two calciners.

5.b. 11/09/90 ACDP 10-0007 condition 9 has been modified requiring Glenbrook Nickel to investigate complaints received within 2 to 5 working days.

NEW FEDERAL OPERATING PERMIT CONDITIONS

6. All applicable requirements, not previously contained in the ACDP, have been added to the permit. In addition, a special condition has been added to the Title V permit requiring Glenbrook Nickel to complete work to reduce fugitive emissions from the building (emissions unit 16.0) containing emissions units 5.0, 8.0, and 9.0 and reduce particulate matter emissions from the #1 and #2 melt furnace baghouses within two years of permit issuance. Previous visits to the facility (not formal inspections) showed large amounts of fugitive emissions escaping from the building, emissions unit 16.0. The fugitive emissions observed at inspections since then have been greatly reduced. Glenbrook Nickel is continuing to work on methods to reduce fugitive emissions.

PLANT SITE EMISSION LIMITS

HISTORY OF CHANGES TO THE FACILITY

7. The following is a list of changes made to the baseline since the last permit was issued:

7.a. equipment previously not included in the baseline even though it existed
7.b. corrected dryer throughput to 1,377,213 tons/year through all four dryers rather than through each dryer
7.c. used source test data instead of DEQ or AP-42 emission factors
7.d. calculated emissions based on the air flow rate from the exhaust of the baghouse rather than the inlet
7.e. separated the roaster emissions from the ore melting baghouse emissions
7.f. used the Department's emissions factors for SO_2 emissions from natural gas combustion
7.g. used AP-42 emissions factors rather than DEQ emission factors
7.h. used updated AP-42 emission factors
7.i. corrected emission factor based on source test data and 1/4 of production going through each baghouse
7.j. corrected emission factor based on source test data and production during the source test

BASELINE CHANGES				
POLLUTANT	SOURCE	REASON CODE	LBS/DAY	TONS/YEAR
CO	2.0	7.g	+ 2,104.9	+ 309.9
CO	5.0	7.b	+ 19,840.0	+ 3,180.3
CO	9.0	7.g	+ 33.1	+ 4.9

BASELINE CHANGES				
POLLUTANT	SOURCE	REASON CODE	LBS/DAY	TONS/YEAR
		CO TOTAL	+ 21,978.0	+ 3,495.1
NO_x	5.0	7.b	+ 21,064.4	+ 3,376.7
NO_x	9.0	7.g	- 12.3	- 2.1
		NO_x TOTAL	+ 21,052.1	+ 3,374.6
PM/PM_{10}	1.0	7.a	+ 538.3	+ 90.4
PM/PM_{10}	2.0	7.b	- 4,046.3	- 86.7
PM/PM_{10}	5.0	7.a, 7.d	+ 6,402.3	+ 1,026.3
PM/PM_{10}	6.0	7.e	+ 16.0	+ 3
PM/PM_{10}	7.0	7.i	+ 34.3	+ 5.5
PM/PM_{10}	8.0	7.j	- 10.7	- 1.8
PM/PM_{10}	12.0	7.a	+ 1.6	+ 0.3
PM/PM_{10}	13.0	7.a	+ 142.9	+ 26.0
		PM/PM_{10} TOTAL	+ 3,042.5	+ 1,057.7
SO_2	2.0	7.g	- 17.6	- 2.6
SO_2	5.0	7.g	- 8.8	+ 1.6
SO_2	6.0	7.f, 7.g	- 9.7	+ 1.0
SO_2	9.0	7.g	+ 1,359.6	+ 220.4
		SO_2 TOTAL	+ 1,395.7	+ 220.4
VOC	2.0	7.g	- 657.5	- 96.7
	5.0	7.b, 7.g	+ 767.3	+ 122.9
VOC	9.0	7.g, 7.h	- 12.0	- 1.9
		VOC TOTAL	+ 97.8	+ 24.3

The increases of emissions for the baseline due to the above corrections do not represent an actual increase in emissions. The increases are due to corrections, allowed by OAR 340-28-1020(7)(a), for emissions that were previously calculated incorrectly or were inadvertently omitted from the last permit revision.

8. The Plant Site Emission Limits have changed from the previously permitted PSELs due to the following:

8.a. updated emission factor based on latest version of AP-42
8.b. equipment previously not included in the PSEL even though it existed
8.c. updated source test data with more recent source test data
8.d. used AP-42 emission factors rather than DEQ emission factors
8.e. switched to natural gas and used oil for ore drying instead of wood chips
8.f. used source test data instead of DEQ emission factors
8.g. reduced crushed ore from 1.6 MM tons/year to 1.102 MM tons/year
8.h. added equipment since the last ACDP was issued
8.i. fines surge bin shut down
8.j. removed ESP and routed calciner emissions to ore melter baghouses
8.k. increased natural gas usage in calciner from 7.62 MM therms/year to 1430 MMft^3/year
8.l. reduced diesel usage in calciner from 1.016 MM gallons/year to 0.654 MM gallons/year
8.m. replaced sawdust with coal and catalyst in the calciners
8.n. based skip hoists emissions on worst case source test data
8.o. shut down roasters
8.p. increased coke usage in ferrosilicon furnace from 5,000 tons/year to 7,440 tons/year
8.q. increased coal usage in ferrosilicon furnace from 8,000 tons/year to 10,200 tons/year
8.r. increased wood usage in ferrosilicon furnace from 2,300 tons/year to 8,200 tons/year
8.s. increase production through day bins

PSEL CHANGES				
POLLUTANT	EU ID	REASON CODE	LBS/DAY	TONS/YEAR
CO	2.0	8.a, 8.d, 8.e	- 1,350.7	- 229.4
CO	5.0	8.c, 8.j, 8.k, 8.l, 8.m	+ 18,737.6	+ 3,005.2
CO	6.0	8.o	- 21.6	- 3.5
CO	8.0	8.b	+ 0.7	+ 0.1
CO	9.0	8.d, 8.p, 8.q, 8.r	+ 425.1	+ 67.3
CO	15.0	8.h	+ 15.5	+ 1.9
		CO TOTAL	+ 17,806.6	+ 2,841.6
NO_x	2.0	8.a, 8.d, 8.e	+ 1,285.9	+ 184.2
NO_x	5.0	8.c, 8.j, 8.k, 8.l, 8.m	+ 19,596.6	+ 3,198.3
NO_x	6.0	8.o	- 50.4	- 8.7
NO_x	8.0	8.b	+ 2.9	+ 0.5

PSEL CHANGES				
POLLUTANT	EU ID	REASON CODE	LBS/DAY	TONS/YEAR
NO_x	9.0	8.d, 8.p, 8.q, 8.r	+ 239.9	+ 34.8
NO_x	15.0	8.h	+ 61.8	+ 7.4
		NO_x TOTAL	+ 21,136.7	+ 3,416.5
PM/PM_{10}	1.0	8.b	+ 1,330.2	+ 223.5
PM/PM_{10}	2.0	8.a, 8.c	- 318.1	- 64.1
PM/PM_{10}	3.0	8.f, 8.g	- 745.3	- 44.1
PM/PM_{10}	4.0 (day bins)	8.s	+ 2.4	+ 0.3
PM/PM_{10}	4.0 (truck unloading baghouse)	8.h	+ 7.2	+ 1.2
PM/PM_{10}	4.0 (coal unloading baghouse)	8.h	+ 0.1	+ 0.1
PM/PM_{10}	4.0 (fines surge bin)	8.i	- 7.2	- 1.2
PM/PM_{10}	4.0 (fines surge bin conveyors)	8.i	- 31.2	- 2.7
PM/PM_{10}	5.0	8.c, 8.j, 8.k, 8.l, 8.m	+ 740.8	+ 76.4
PM/PM_{10}	7.0	8.n	+ 116.2	+ 118.6
PM/PM_{10}	8.0	8.c	- 61.5	- 4.3
PM/PM_{10}	12.0	8.b	+ 1.7	+ 0.3
PM/PM_{10}	13.0	8.b	+ 152.4	+ 27.7
PM/PM_{10}	15.0	8.h	+ 11.1	+ 1.3
		PM/PM_{10} TOTAL	+ 1198.8	+ 331.7
SO_2	2.0	8.d, 8.e	+ 15.2	+ 1.7
SO_2	5.0	8.c, 8.j, 8.k, 8.l, 8.m	+ 911.2	+ 180.0
SO_2	6.0	8.o	- 21.6	- 3.5
SO_2	8.0	8.b	+ 0.1	+ 0.1
SO_2	9.0	8.d, 8.p, 8.q, 8.r	+ 1,578.2	+ 252.0
SO_2	15.0	8.h	+ 1.1	+ 0.1

PSEL CHANGES				
POLLUTANT	EU ID	REASON CODE	LBS/DAY	TONS/YEAR
		SO_2 TOTAL	+ 2,484.2	+ 430.4
VOC	2.0	8.d, 8.e	- 200.1	- 33.8
VOC	5.0	8.c, 8.j, 8.k, 8.l, 8.m	+ 773.4	+ 122.8
VOC	6.0	8.o	---	- 0.1
VOC	9.0	8.d, 8.p, 8.q, 8.r	- 3.6	- 0.7
VOC	15.0	8.h	+ 0.6	+ 0.1
		VOC TOTAL	+ 570.3	+ 88.3

The increases of emissions for the PSEL due to the above corrections represent both actual increases in emissions and corrections with no actual increase in emissions. The actual emission increases are due to increases in production within existing baseline capacity and are not required to be reviewed under New Source Review. Actual increases are also from the addition of new equipment are in the shaded areas of the table above. See the discussion below for emissions increases above the baseline emissions.

9. In 1988, all the dryers, (No. 1 through No. 4) were sold at an auction. Dryers No. 1, No. 2, and No. 4 were cut up and sold for scrap. Dryer No. 3 was upgraded in 1989 by the addition of a bigger oven to increase the capacity. The capacity of Dryer No. 3 is not as large as the capacity of the combined four previously permitted dryers.

10. The roasters have not been operated since 1985. When in operation, the roasters exhaust to the melt furnace baghouses along with the calciners. The Title V permit has included continued operation of the roasters in case Glenbrook Nickel should choose to operate them in the future.

11. On 02/07/92, the Department approved an ACDP modification to remove the electrostatic precipitator on the calciner from service. The ESP had chronic compliance problems and was not effective. Emissions were rerouted through the existing ore melter baghouses.

12. In 10/92, Glenbrook Nickel installed a small natural gas fired dryer as part of the ferronickel shotting system.

13. In 10/93, Glenbrook Nickel began receiving imported ore from New Caledonia from the Glenbrook Nickel Coos Bay facility. Imported ore is dried at Coos Bay and trucked to Riddle. The approval to receive imported ore at Riddle included construction and operation of an ore truck unloading facility and an ore conveying system.

14. In 05/93, Glenbrook Nickel expanded the dust collecting capabilities of the skip hoist system as a result of a Notice of Noncompliance issued for underpayment of interim emission fees. The project enlarged

and added hooding and duct work and installed gates to draw the fugitive emissions to the baghouses. The project also included installation of a dust collection system on the hot ore storage bins.

15. In 02/94, Glenbrook Nickel requested approval to change from a single deck screen operation to a 3 deck wet screen crushing operation. Emissions were controlled with spray bars and switching to electric power instead of diesel fuel.

16. On 09/06/95, the Department approved modifications to the ferrosilicon furnace system. The modifications include an automated mechanical furnace feed system and replacement of the furnace baghouse drive (gear box type) with a fluid drive.

17. The permittee is planning on adding more equipment during the permit term. These devices are listed in the emissions unit identification table with shaded background. This Title V permit pre-approves the construction of these devices. The permittee shall notify the Department within 30 days of completion of construction of each device.

18. The Plant Site Emission Limits have changed from the baseline emission limits because of the following reasons:

18.a. quit using wood chips in the dryer and removed the wood chip storage pile
18.b. increased production through the calcine/melt EU 5.0 and hot ore transfer EU7.0 from 1,031,064 tons/year to 1,100,000 tons/year
18.c. increased natural gas usage in the calcine/melt EU 5.0 from 861 $MMft_3$/year to 1,430 $MMft_3$/year
18.d. changed to #2 diesel (654,000 gallons/year) from #6 residual oil (1,477,000 gallons/year) in calcine/melt EU 5.0
18.e. replaced the carbon source (sawdust) in the calcine/melt EU 5.0 with coal
18.f. started using catalyst in the calcine/melt EU 5.0
18.g. roasters EU 6.0 shut down
18.h. added skull fines treatment
18.i. increased mined ore from 6,335,562 tons/year to 23,000,000 tons/year
18.j. shut down 2 koppers baghouses on crush/screen/reject EU 3.0
18.k. added truck unloading and coal unloading (both controlled by baghouses) and removed the fine bins
18.l. shut down dryers 1, 2, 3, and 4 from EU 2.0 and added new larger dryer 3
18.m. removed the ESP from EU 5.0 and routed the calciner emissions to the ore melter baghouses
18.n. increased the production in the refiners EU 8.0 from 27,344 tons/year to 50,000 tons/year
18.o. increased coke usage from 6,783 tons/year to 7,440 tons/year and wood chip usage from 3,040 tons/year to 8,200 tons/year in EU 9.0

PSEL INCREASES/DECREASES SINCE BASELINE				
POLLUTANT	EU ID	REASON CODE	LBS/DAY	TONS/YEAR
CO	2.0	18.a	- 7,847.6	- 1,153.6

PSEL INCREASES/DECREASES SINCE BASELINE				
POLLUTANT	EU ID	REASON CODE	LBS/DAY	TONS/YEAR
CO	5.0	18.b, 18.c, 18.d, 18.e, 18.f	- 1,088.0	- 174.4
CO	6.0	18.g	- 12.9	- 2.1
CO	9.0	18.o	+ 219.2	+ 35.5
CO	15.0	18.h	+ 15.5	+ 1.9
		CO TOTAL	- 8,713.8	- 1,292.7
NO_x	2.0	18.a	+ 619.1	+ 91.0
NO_x	5.0	18.b, 18.c, 18.d, 18.e, 18.f	- 623.0	- 99.9
NO_x	6.0	18.g	- 51.5	- 8.3
NO_x	9.0	18.o	+ 31.4	+ 5.0
NO_x	15.0	18.h	+ 61.8	+ 7.4
		NO_x TOTAL	+ 37.7	- 4.8
PM/PM_{10}	1.0	18.i	+ 791.9	+ 133.1
PM/PM_{10}	2.0	18.a, 18.l	- 356.6	- 52.4
PM/PM_{10}	3.0	18.j	- 3.8	- 0.6
PM/PM_{10}	4.0	18.k	+ 0.1	---
PM/PM_{10}	5.0	18.b, 18.c, 18.d, 18.e, 18.f, 18.m	- 5,661.5	- 907.6
PM/PM_{10}	6.0	18.g	- 16.0	- 3.0
PM/PM_{10}	7.0	18.b	+ 17.1	+ 105.0
PM/PM_{10}	8.0	18.n	- 50.8	- 8.7
PM/PM_{10}	13.0	18.b	+ 9.5	+ 1.7
PM/PM_{10}	15.0	18.h	+ 11.1	+ 1.3
		PM/PM_{10} TOTAL	- 5,259.0	- 731.2
SO_2	2.0	18.a	- 36.8	- 5.4
SO_2	5.0	18.b, 18.c, 18.d, 18.e, 18.f	+ 276.8	+ 44.4

PSEL INCREASES/DECREASES SINCE BASELINE				
POLLUTANT	EU ID	REASON CODE	LBS/DAY	TONS/YEAR
SO_2	6.0	18.g	- 20.9	- 3.3
SO_2	9.0	18.o	+ 21.8	+ 3.6
SO_2	15.0	18.h	+ 1.1	+ 0.1
		SO_2 TOTAL	+ 242.0	+ 39.4
VOC	2.0	18.a	- 157.0	- 23.1
VOC	5.0	18.b, 18.c, 18.d, 18.e, 18.f	- 5.9	- 0.9
VOC	6.0	18.g	- 0.5	- 0.1
VOC	9.0	18.o	+ 3.6	+ 0.6
VOC	15.0	18.h	+ 0.6	+ 0.1
		VOC TOTAL	- 159.2	- 23.4

The shaded areas in the table above show the emissions units that were installed since the baseline period. The decreases in PSEL from the baseline emissions have been designated as unassigned PSELs which are available for internal use by Glenbrook Nickel for a previously permitted activity upon receipt of written approval from the Department. The increases in PSELs from the baseline emissions are actual emissions increases due to increases in production from the use of existing capacity and from the installation of the Skull Fines Treatment, emissions unit 15.0. The increases in Plant Site Emission Limits over the baseline emissions for all pollutants are less than significant emission rates as summarized below. Therefore, no further additional air quality analysis was necessary.

Pollutant	Baseline Emissions (tons/year)	PSEL (tons/year)	Increase Above Baseline (tons/year)	Significant Emission Rate (tons/year)
CO	4708	3416	- 1293	100
NO_x	3689	3684	- 5	40
PM/PM_{10}	2305	1574	- 731	25/15
SO_2	494	534	39.3	40
VOC	189	165	- 23	40
Pb	0.03	0.03	0	0.6

AGGREGATE INSIGNIFICANT EMISSIONS

19. The emissions from the activities included in the aggregate insignificant emissions are the following:

Pollutant	Description of activity	Emissions (tons/yr)	Total emissions
PM/PM_{10}	raw material piles for ferrosilicon production	0.1	
PM/PM_{10}	raw material piles for refining operations	0.05	
PM/PM_{10}	skull plant operation	0.03	
		TOTAL	0.2

CATEGORICALLY INSIGNIFICANT ACTIVITIES

20. Glenbrook Nickel has the following categorically insignificant activities onsite:

- Constituents of a chemical mixture present at less than 1% by weight of any chemical or compound regulated under Divisions 20 through 32 of this chapter, or less than 0.1% by weight of any carcinogen listed in the U.S. Department of Health and Human Service's Annual Report on Carcinogens when usage of the chemical mixture is less than 100,000 pounds/year
- Evaporative and tail pipe emissions from on-site motor vehicle operation
- Distillate oil, kerosene, and gasoline fuel burning equipment rated at less than or equal to 0.4 million Btu/hr
- Natural gas and propane burning equipment rated at less than or equal to 2.0 million Btu/hr
- Office activities
- Food service activities
- Janitorial activities
- Personal care activities
- Groundskeeping activities including, but not limited to building painting and road and parking lot maintenance
- On-site laundry activities
- Instrument calibration
- Maintenance and repair shop
- Automotive repair shops or storage garages
- Air cooling or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment
- Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems
- Bench scale laboratory equipment and laboratory equipment used exclusively for chemical and physical

analysis, including associated vacuum producing devices but excluding research and development facilities

- Temporary construction activities
- Warehouse activities
- Accidental fires
- Air vents from air compressors
- Air purification systems
- Demineralized water tanks
- Electrical charging stations
- Fire brigade training
- Instrument air dryers and distribution
- Process raw water filtration systems
- Blueprint making
- Routine maintenance, repair, and replacement such as anticipated activities most often associated with and performed during regularly scheduled equipment outages to maintain a plant and its equipment in good operating condition, including but not limited to steam cleaning, abrasive use, and woodworking
- Electric motors
- Storage tanks, reservoirs, transfer and lubricating equipment used for ASTM grade distillate or residual fuels, lubricants, and hydraulic fluids
- On-site storage tanks not subject to any New Source Performance Standards (NSPS), including underground storage tanks (UST), storing gasoline or diesel used exclusively for fueling of the facility's fleet of vehicles
- Natural gas, propane, and liquefied petroleum gas (LPG) storage tanks and transfer equipment
- Pressurized tanks containing gaseous compounds
- Storm water settling basins
- Fire suppression and training
- Paved roads and paved parking lots within an urban growth boundary
- Hazardous air pollutant emissions of fugitive dust from paved and unpaved roads except for those sources that have processes or activities that contribute to the deposition and entrainment of hazardous air pollutants from surface soils
- Health, safety, and emergency response activities
- Emergency generators and pumps used only during loss of primary equipment or utility service
- Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems
- Non-contact steam condensate flash tanks
- Non-contact steam vents on condensate receivers, deaerators and similar equipment
- Boiler blowdown tanks
- Industrial cooling towers that do not use chromium-based water treatment chemicals
- Ash piles maintained in a wetted condition and associated handling systems and activities
- Oil/water separators in effluent treatment systems
- Combustion source flame safety purging on startup

HAZARDOUS AIR POLLUTANTS

21. The following hazardous air pollutants are estimated by Glenbrook Nickel to be emitted:

Pollutant	Potential to Emit (tons/yr)
Nickel	30
Chromium	9
Manganese	3
Cobalt	1
TOTAL	43

MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (MACT)

22. Glenbrook Nickel is a major source for nickel. Glenbrook Nickel is the only primary nickel smelter in the country, making them the only source in their MACT category. The EPA is currently developing the MACT standards for Glenbrook Nickel. The Title V permit will be reopened to include the MACT standards upon adoption.

One issue that the ACDP did not address and that will be addressed in the MACT standard is fugitive emissions. In order to determine what requirements should be included in the Title V permit for fugitive emissions, the New Source Performance Standards (NSPS) for similar sources were reviewed for potential requirements, with respect to both the standards and monitoring requirements.

OAR 340-025-0415(1) contains a 20 percent opacity limit for all emissions units at Glenbrook Nickel, including fugitive emissions units. The opacity standards in the NSPS range from 6 percent to 40 percent during tapping for shop roof monitors. Since Glenbrook Nickel is considered to be MACT, the Department believes that the current 20 percent opacity limit will not be changed for fugitive sources. The MACT standard may require better capture of fugitive emissions.

22.a. Subpart Na - Standards of Performance for Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is commenced after January 20, 1983

This NSPS requires continuous monitoring of exhaust ventilation through each duct of the secondary emission capture system. Glenbrook Nickel currently does not monitor exhaust ventilation but monitors baghouse fan motor amperes which can be used to calculate the volumetric flow rate.

22.b. Subpart Z - Standards of Performance for Ferroalloy Production Facilities

This NSPS includes a particulate matter emission limit based on the furnace power input. The Department considered requiring Glenbrook Nickel to also monitor furnace power input as a parameter for emissions monitoring. Furnace input power is related to the production through the furnaces but it is also affected by the moisture of the ore. If the moisture content of the

ore is high, more power would be required to drive off the excess moisture. Therefore, the Department feels that production would be a better parameter than furnace input power for monitoring emissions, especially since the state's process weight rule is based on production. Therefore, the Department is not requiring Glenbrook Nickel to monitor furnace power input.

This NSPS requires monitoring furnace power input; and continuous monitoring of volumetric flow rate through each separately ducted hood of the capture system or alternatively, calculation of the volumetric flow rate from the fan power consumption, pressure drop across the fan and the fan performance curve. As stated above, Glenbrook Nickel does monitor fan motor amperes but does not monitor volumetric flow rate.

22.c. Subpart AA - Standards of Performance for Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983; Subpart AAa - Standards of Performance for Steel Plants: Electric Arc Furnaces Constructed After August 17, 1893

This NSPS requires daily Method 9 observations, monthly operational status inspection of the equipment that is important to the performance of the total capture system, and checking and recording of the control system fan motor amperes and damper position once per shift or continuously recording volumetric flow rate through each separately ducted hood. As stated above, Glenbrook Nickel does monitor fan motor amperes but does not monitor damper position or volumetric flow rate. The positions of the dampers do not change except for being closed during maintenance, therefore, monitoring the position does not provide valuable information.

Based on this information, the Department has determined that monitoring fan motor amperes continuously and requiring corrective action for deviations from an action level established with the source test data is adequate for parametric monitoring. The Department is also requiring daily Method 9 tests on the building fugitive emissions, with the frequency decreasing if compliance is demonstrated.

Glenbrook Nickel is also required to complete work to reduce fugitive emissions from the building, emissions unit 16.0 and reduce particulate matter emissions from the #1 and #2 melt furnace baghouses within three (3) years of permit issuance. Glenbrook Nickel is required to submit a detailed report to the Department describing the changes that were made and the emission reductions achieved.

TOXIC AND FLAMMABLE SUBSTANCE USAGE

23. The following toxic and flammable substances are used at Glenbrook Nickel in the approximate quantities listed below:

Toxic Substance Usage						
CAS Number	Chemical name	Insignificant	1,001-10,000 lbs/yr	10,001-20,000 lbs/yr	20,001-50,000 lbs/yr	>50,000 lbs/yr
0000074-86-2	acetylene		X			
115-07-1	apachi	X				
0007440-37-1	argon	X				
007664-93-9	sulfuric acid		X			
	calcium oxide					X
68476-34-6	diesel					X
000074-98-6	propane		X			

STRATOSPHERIC OZONE-DEPLETING SUBSTANCES

24. Glenbrook Nickel uses Halon 1211 in the fire suppression system. The fire suppression system is serviced once per year by an outside contractor. The production of halon was discontinued on 01/01/94. Use of halon is not regulated and can continue until supplies are depleted.

MONITORING REQUIREMENTS

25. The monitoring requirements for the following emissions units are not conventional because of certain problems/difficulties associated with the emissions unit:

25.a. Section 70.6(a)(3)(i) of 40 CFR requires that all monitoring and analysis procedures or test methods required under applicable requirements be contained in Title V permits. In addition, where the applicable requirement does not require periodic testing or monitoring, periodic monitoring must be prescribed that is sufficient to yield reliable data from the relevant time period that is representative of the source's compliance with the permit.

The requirement to include in a permit testing, monitoring, recordkeeping, reporting, and compliance certification sufficient to assure compliance does not require the permit to impose the same level of rigor with respect to all emissions units and applicable requirement situations. It does not require extensive testing or monitoring to assure compliance with the applicable requirements for emissions units that do not have significant potential to violate

emission limitations or other requirements under normal operating conditions. Where compliance with the underlying applicable requirement for an insignificant emission unit is not threatened by a lack of a regular program of monitoring and where periodic testing or monitoring is not otherwise required by the applicable requirement, then in this instance, the status quo (i.e., **no monitoring**) will meet section 70.6(a)(3)(i).

25.b. In most cases, the monitoring conditions in the permit include test methods for measuring pollutant emissions. If the monitoring condition does not include a test method, the emission limits and standards conditions have been modified to reference a new section added to the permits for the purpose of identifying test methods and averaging times that serve to define the emissions limits and standards. This section, titled "Test Methods and Procedures", is provided so that the permittee and Department will know what test methods should be used to measure pollutant emissions in the event that testing is conducted for any reason. The addition of this section does not by itself require the permittee to conduct any more testing than was previously included in the permit. Although the permit may not require testing because other routine monitoring is used to determine compliance, the Department and EPA always have the authority to require testing if deemed necessary to determine compliance with an emission limit or standard. In addition, the permittee may elect to voluntarily conduct testing to confirm the compliance status. In either case, the methods to be used for testing in the event that testing is conducted are included in the permit. This is true for State Implementation Plan (SIP) as well as New Source Performance Standards (NSPS) emission limits and standards.

It is not anticipated that testing will ever be required in some situations; especially for the insignificant activities and natural gas fired devices. In most cases, the cost of testing would be unreasonable relative to the environmental benefit derived from more precise measurement of pollutant emissions. In fact, the Department is considering re-writing many of the rules to exempt insignificant activities. Once this is approved by the Commission, it will no longer be necessary to include test methods and averaging times for these activities.

For the most part, the Department did attempt to include averaging times for all emission limits and standards. However, this did not extend to insignificant activities. The "Test Methods and Procedures" section added to the permit, as described above, will include averaging times for those emissions limits and standards that do not have monitoring conditions that include test methods and averaging times.

25.c. The definition of "all sources" does not address fugitive emissions except for open storage areas and mining activities. The Department believes that fugitive emissions are not included in the process weight limit established for "all sources" because of the following reasons:

25.c.i. OAR 340-025-0410(4) defines all sources as "all equipment, structures, processes and procedures directly related to or involved in the production of ferronickel from laterite ore excluding open storage areas and mining activities."

25.c.ii. OAR 340-21-050 defines "fugitive emissions" as dust, fumes, gases, mist, odorous matter, vapors or any combination thereof not easily given to measurement, collection and treatment by conventional pollution control methods.

In order to monitor compliance with the rule limits, fugitive emissions must be measured. As

stated in the definition of fugitive emissions, measurement is not easily done. Therefore, the Department has exempted the fugitive sources from the particulate pound/ton of dry laterite ore produced.

25.d. Monitoring compliance with the process weight limit based on 3.5 pounds per ton of dry laterite ore produced will be based on source test data and calculations using emission factors for emissions units not required to be source tested.

The dry laterite ore production upon which the 3.5 pounds/ton process weight limit is based and also used to calculate the PSEL is 1,100,000 tons/year. The annual dry laterite ore production rate should be used when determining compliance with the limit based on 3.5 pounds/ton, not the production going through the individual emissions unit. For example, emissions unit 8.0 refines only 50,000 tons of ferronickel so the emission factor used to calculate the PSEL from this emissions unit is based on ferronickel, not dry laterite ore. Therefore, when Glenbrook Nickel determines compliance with the limit based on 3.5 pounds/ton, emissions in units of pounds/ton from the source test should be converted to a dry laterite ore basis, not a ferronickel basis. The table below shows the emission factors and the production rates used to calculate the PSELs. The table also contains example calculations of how Glenbrook Nickel would demonstrate compliance using the dry laterite ore production of 1,100,000 tons/year.

Emissions Unit	PSEL Emission Factor (lbs/ton)	PSEL Production (tons)	Process Weight Emission Factor (lbs/ton)	Process Weight Production (tons)
2.0	0.187	800,000	0.136	1,100,000
3.0 (crush/screen)	0.103	640,000	0.060	
3.0 (reject)	0.125	366,000	0.042	1,100,000
4.0	0.010	1,030,083	0.009	1,100,000
5.0	1.82	1,100,000	1.82	1,100,000
7.0	0.13	1,100,000	0.13	1,100,000
8.0	0.30	50,000	0.014	1,100,000
9.0	0.55	24,000	0.012	1,100,000
10.0	9.2E-05	150,000	1.26E-05	1,100,000
11.0	0.1 tpy	1,100,000	1.82E-04	1,100,000
15.0	0.028	96,000	0.002	1,100,000
		TOTAL	2.225	

After this permit is issued, Glenbrook Nickel will use the source test data for emissions units

2.0, 3.0, 5.0, 7.0, 8.0, and 9.0, not the PSEL emission factor, to determine compliance with the 3.5 pounds/ton limit. The PSEL emission factors will be used for emissions units 4.0, 10.0, 11.0, and 15.0. Actual production rates for the year will be used along with the source test data and the PSEL emission factors for monitoring compliance as required in the permit.

25.e. Glenbrook Nickel is required to survey the facility for excess visible emissions. Most facilities are required to survey the property boundaries. In the case of Glenbrook Nickel, some of the property boundaries are not accessible. Therefore, Glenbrook Nickel has agreed to monitor a smaller area, the boundaries of the active portion of the mine and the smelter area. This area is much smaller than the property boundaries but should indicate whether a fugitive dust problem exists.

REPORTING

26. The permittee is required to submit reports to the Department semi-annually and annually. The semi-annual reports are for certifying compliance with the applicable requirements contained in the permit. The report will include a list of all emission limits and monitoring deviations, the reason, and the corrective action as a result of the deviation. In addition, the annual report will include the amount of raw materials used during the year.

27. The permittee must immediately report any excess emissions that could endanger public health. The permittee shall maintain a log of all excess emissions periods and submit the log with the annual report.

GENERAL BACKGROUND INFORMATION

28. The proposed permit is an Oregon Title V Operating Permit that will replace the existing Air Contaminant Discharge Permit (ACDP 10-0007) which was issued on 11/09/90 and was originally scheduled to expire on 11/01/95. A permit addendum (Addendum C) was issued on 09/08/95 which extended the ACDP expiration date to 11/01/00 or when the Title V permit is issued, whichever date occurs first.

29. Other permits issued or required by the Department of Environmental Quality for this source include an NPDES permit (NPDES 100697), a hazardous waste generator permit (ORD 000756932), and an open burn permit (10-8-90-016).

30. This source is located in an area that is in attainment for all pollutants.

31. The source is located within 100 kilometers of two Class I air quality protection areas: the Crater Lake Wilderness Area and the Kalmiopsis Wilderness Area.

32. The annual production capacity is approximately 50,000,000 pounds of nickel.

33. The plant is operated 24 hours per day, 7 days per week, and 48 weeks per year.

COMPLIANCE HISTORY

34. Notices of Noncompliance (NON-AQ-SWR/R-91-024 and NON-AQ-SWR/R-91-032) were issued on 03/04/91 and 03/12/91 respectively for excess particulate emissions from the calciners. The excess emissions were due to a lack of ore to the smelters and were determined to be avoidable. The violation was corrected.

35. A Notice of Noncompliance (#91-142) was issued on 10/16/91 for failure to have certified opacity readers. The violation was corrected.

36. A Notice of Noncompliance (#91-178) was issued on 12/09/91 for failure of the ore dryer to meet the 0.1 gr/dscf limit. A cyclonic demister was added to the wet scrubber to prevent re-entrainment of particulate matter. On 02/19/92, the scrubber was tested and found to be in compliance with the grain loading standard.

37. A Notice of Noncompliance was issued on 06/30/93 for underpayment of interim emission fees of $36,309. Glenbrook Nickel voluntarily performed source testing of gaseous pollutants on the melt furnace/calciner baghouses. The source test results indicated that actual emissions were much higher than permitted emissions, which were based on emission factors. The Department gave Glenbrook Nickel an option to either pay the fees or submit a plan to invest like funds into air pollution controls. Glenbrook Nickel chose to invest the money to expand the skip hoist dust collection system, which met the Department requirements.

38. A Notice of Noncompliance was issued on 09/10/96 for failure to submit a complete Title V permit application. A civil penalty of $1,796 was assessed and a Department Order was issued to submit the necessary information to complete the Title V permit. The violation was corrected on 11/26/96.

39. The facility was inspected on 09/24/91. The ore dryer was found to be out of compliance with the grain loading limit based on source test results and for using uncertified smoke readers for monitoring opacity. Notices of Noncompliance were issued for both violations.

40. The facility was inspected on 06/17/92, 05/11/93, 08/30/95, 03/13/96 and 07/16/96 and was found to be in compliance with Department regulations and permit conditions. The facility was shut down from 08/17/93 to 04/01/95.

41. During the prior permit period, no nuisance complaints were received.

PUBLIC NOTICE

42. The draft permit was placed on public notice from March 19, 1997 to April 21, 1997. Comments were received from the EPA and from Glenbrook Nickel. The comments are summarize below:

42.a. The following include the EPA's comments along with Department responses:

42.a.i. Condition 2.a. - This condition needs to be revised to delete reference to Conditions 5 and 21. Since the requirements in Condition 5 and Condition 21 are based on requirements in a federally-enforceable Air Contaminant Discharge Permit and affect the emissions of criteria pollutants (PM10 emissions for Condition 5 and all criteria

pollutants except lead for Condition 21), then they cannot be listed as "State-only" enforceable in the Title V permit. The parenthetical "state-only enforceable" needs to be deleted from Conditions 5 and 21 as well. This is a potential veto issue.

Response: Condition 5 will be changed. See below for change to condition 21.

42.a.ii. Condition 10. - This condition is poorly worded as it appears to require the source to burn only used oil. If the intent is to require any used oil to meet the definitions in the cited State and federal rules, it needs to be revised to clearly state such.

Response: The changes will be made.

42.a.iii. Condition 11. - The cited rules do not provide an adequate basis for this condition. The cited rules are for establishment of Plant Site Emission Limits, and not for specific requirements regarding types of materials that can be burned. Either an adequate legal basis for this condition must be cited or the condition needs to identified as a State-only enforceable condition.

Response: Based on recent conversations with EPA staff, the authority to add restrictions to fuel usage would be the same as the authority to limit potential to emit, OAR 340-028-1020. The Department believes that the restriction on the amount of onsite generated waste material is similar to a fuel restriction because burning more onsite generated waste material than is allowed would violate the PSEL. No change is proposed.

42.a.iv. Table of applicable requirements for emission units - The applicable requirements listed in the Table for Conditions 22 through 25 need to include a citation to OAR 340-028-2130(1) in order to establish the basis for federal enforceability. The only rules currently cited are not yet federally enforceable.

Response: The changes will be made.

42.a.v. Condition 28. - The permit fails to include a citation to the basis for this requirement. Also, without any basis, EPA cannot determine if this is a federally enforceable provision as currently indicated in Condition 2 or if it needs to identified as a state-only enforceable provision.

Response: OAR 340-028-2130(1) has been added as the citation to condition 28. This condition was added both voluntarily by Glenbrook Nickel and as a requirement by the Department. During the start up of the ferrosilicon furnace after a few years of being shut down, the Department observed excess emissions from the building that houses the ferrosilicon furnace, the calciners and melting furnaces, and refining. Since that time, the ferrosilicon furnace was observed in compliance with the opacity limit. Information recently obtained indicate that there may still be problems with the ferrosilicon furnace operating in compliance. Therefore, the Department has determined that condition 28 was necessary to ensure compliance with the opacity standard and its authority is OAR 340-028-2130(1).

42.a.vi. Condition 58. - This condition needs to be revised to indicate the reasons why these

federal regulations are not applicable to the source. It is unacceptable to simply state that they are not applicable without any basis or rationale.

Response: The changes will be made.

42.b. The following include Glenbrook Nickel's comments along with Department responses:

42.b.i. We request that Mr. Eric Norton, Operations Manager, be added as a second Responsible Official.

Response: The Department has determined that two responsible officials can be identified as long as both officials understand the responsibilities involved in certifying a document for truth, accuracy, and completeness.

42.b.ii. GNC requests the elimination of condition 15, page 9. GNC has reviewed the list of substances found in 40 CFR Part 68.130 and find we do not, nor do we anticipate exceeding any threshold value found in those tables (1-4).

Response: The Department denies Glenbrook Nickel's request to remove condition 15. The Accident Prevention and Risk Management rules have a general duty requirement that requires all facilities to identify hazards, design and maintain a safe facility, prevent releases, and minimize consequences. The general duty requirements are not limited to the listed chemicals. Even though Glenbrook Nickel does not store any substances exceeding the thresholds in 40 CFR Part 68.130, the general duty requirements must still be met.

42.b.iii. GNC feels that condition 21, page 10, is not needed due to the fact that the plan process cannot accept more than three percent (3%) uncalcined catalyst and function properly. GNC requests deletion of this condition as we would not exceed 3% as a matter of plant process.

Response: The Department originally included this condition in the Title V permit since it was an existing ACDP condition. The Department has agreed to remove condition 21 and its associated monitoring condition 41 because of physical restrictions on the amount of uncalcined catalyst that can be added to the process. If too much of the uncalcined catalyst is added as a reducing agent, the reduced metal will separate or fall out in the furnace, which is highly undesirable.

42.b.iv. GNC requests clarification of the special condition 28. GNC intends to undertake projects to reduce fugitives and increase efficiencies of the #1 and #2 baghouses. GNC will submit a report describing changes made but it would be very difficult to describe emissions reduction since the fugitives are not quantified. GNC requests that the last sentence be changed by deleting "and the emissions reductions achieved" and substituting "and will include changes in air flow and capture efficiencies."

Response: The Department has clarified condition 28 and its monitoring condition 55 to specify what must be included in the report describing the changes made to reduce fugitive emissions from the building that houses emissions units 5.0, 8.0, and

9.0. Glenbrook Nickel is required to report changes in air flow and control efficiencies of the #1 and #2 melt furnace baghouses. Glenbrook Nickel is also required to report daily visible emission observations before and after any changes made to the ferrosilicon furnace or hooding to reduce fugitive emissions.

42.b.v. GNC requests that condition 30.c be rewritten to reflect the following: GNC will source test emissions units 2.0, 3.0, 7.0., 8.0, and 9.0 within 90 days of permit issuance. EU 5.0 will be source tested within 60 days of the proposed bag replacement program and if no such program is initiated, EU 5.0 will be source tested within 90 days of that decision.

Response: The changes will be made.

42.b.vi. GNC requests deletion of condition 37 as it is the proposed monitoring for condition 15 which does not apply to GNC.

Response: See response above. No change is proposed.

42.b.vii. GNC request clarification of condition 40.b as this condition requires calculation of particulate emissions in lbs/hour based on calciner production for EU's 2.0, 3.0, 5.0, 7.0, 8.0, and 9.0. EU's 2.0, 3.0, 7.0, 8.0, and 9.0 operate independently of EU5.0 (calciner) and using the equation given, if we had no calciner production in tons per hour, we would have no emissions when in fact, other EU's and plant processes could be operating.

GNC seeks the expertise of your department in our joint effort to find a solution to the problem posed by this condition.

Response: The Department agrees with GNC's comment on this condition and has changed conditions 20 and 40 as described above.

42.b.viii. GNC request deletion of condition 41 as it is the monitoring request for condition 21 previously addressed.

Response: The changes will be made.

42.b.ix. GNC requests two baghouses identified as Koppers Baghouse No. 4A and Koppers baghouse No. 4B be deleted from condition 43.b and added to condition 43.a. The reason for this request is that results from source tests conducted on baghouses 4A and 4B indicate that the particulate emissions from these units were 0.41 and 0.20 pounds/hour respectively. These levels show that the baghouses more fit the emission level of the other small units identified in condition 43.a as they would fit the levels from the three large baghouses in condition 43.b.

Response: The changes will be made.

42.b.x. After review of condition 44.c, GNC proposes the following change which will make the activity reflect actual maintenance procedures now in practice.

No. 5 - change "Check carriage drive motors and chains" to "check carriage drive motors and chains for condition and operation"

No. 6 - check for operation: delete

No. 9 should read "check ID fan bearings and belts"

No. 10 delete

Response: The changes will be made.

42.b.xi. GNC requests clarification of condition 55 pertaining to the last sentence. GNC believes this sentence should read that GNC will provide a report describing the changes made to improve the air flow and capture efficiency (if any) of the modified system. Changes of this nature and definition are more readily reportable and can be calculated based upon engineering methods.

Response: The changes will be made.

42.c. The following changes were initiated by the Department:

42.c.i. Errors and inconsistencies found in the draft permit were corrected.

42.c.ii. The Department corrected conditions 20 (525 pounds/hour) and the associated monitoring condition 40 based on further internal discussion of the interpretation of the rule. See the discussion above for further explanation.

42.c.iii. The Department corrected some particulate matter emission factors that were based on source test data. The hourly rates were divided by the baseline production rate rather than the production rate during the source test.

42.c.iv. The Department removed conditions 2.b and 2.c from the permit and the references to "state-only enforceable pending EPA SIP approval" from the conditions listed in condition 2.b. Recent conversations with EPA Region 10 staff indicate that the SIP submittal containing the renumbering of many Division 20 rules to Division 28 and the highest and best practicable treatment and control rules has been approved and will become effective on 05/06/97.

JSI:j
PERMITS\T100007.FIN (06/16/97)

GLENBROOK NICKEL COMPANY

Emission Factors & annual Quantities

Process	PM_{10}	SOx	NOx	VOC	CO	Pb	Ni .0127	Cr .0095	Mn .002	Co .0003	Units	Notes	Quantities Baseline	Current	Title V	Units
1.0 Mining													**6,335,562**	**2,200,000**	**23,000,000**	**tons**
Drill	1.0E-4						Varies	PM*0.95%	PM*0.23%	PM*0.03%	lbs/ton mined	GNC estimate	6,335,562	220,000	23,000,000	tons
Blast	1.0E-4										lbs/ton mined	GNC estimate	6,335,562	220,000	23,000,000	tons
Load	1.0E-5										lbs/ton mined	GNC estimate	6,335,562	2,200,000	23,000,000	tons
Haul	1.0E-5										lbs/ton mined	GNC estimate	6,335,562	2,200,000	23,000,000	tons
Stockpile	2.0E-5										lbs/ton mined	GNC estimate	6,335,562	2,200,000	23,000,000	tons
Wobbler	1.0E-5										lbs/ton mined	GNC estimate	3,335,229	0	8,000,000	tons
Conveying	2.0E-4										lbs/ton mined	GNC estimate	6,335,562	220,000	23,000,000	tons
Primary Crush	1.7E-2										lbs/ton mined	GNC estimate	3,335,229	0	8,000,000	tons
Secondary Crush	1.7E-2										lbs/ton mined	GNC estimate	3,335,229	0	8,000,000	tons
Screen	1.7E-2										lbs/ton mined	GNC estimate	3,335,229	220,000	8,000,000	ton:
Load Tram	1.0E-5										lbs/ton mined	GNC estimate	1,676,500			tons
Stockpile Fugitives	1.3E-3										lbs/ton mined	GNC estimate	6,335,562	2,200,000	23,000,000	to:
Emission Unit Summary																

2.0 Drying **(120 MMBtu/hr each)**

											tons		**1,377,213**	**1,217,630**	**800,000**	**tons**
Dryer 1	0.2609						3.3E-3	2.5E-3	6.0E-4	7.8E-5	lbs/ton	Source Test-Dec. 1975 *				tons
Dryer 2	0.2022						2.6E-3	1.9E-3	4.7E-4	6.1E-5	lbs/ton	Source Test-Dec. 1975				tons
Dryer 3	0.1874						2.4E-3	1.8E-3	4.3E-4	5.6E-5	lbs/ton	Source Test-Mar1992		1,217,630	800,000	tons
Dryer 4	0.0891						1.1E-3	8.5E-4	2.0E-4	2.7E-5	lbs/ton	Source Test-Dec. 1981				tons
Natural Gas		2.6	550	1.4	40						lbs/mmcf	AP-42 1.4-2 & 3	0	1,218	800	mmcf
Used Oil (0.5% sulfur)		73.5	19	0.1	5	1.1E-2	1.1E-2	2.0E-2	6.8E-2	2.1E-4	lbs/1000 gal	AP-42 1.11-2 & 3	119,000	0	119,000	gallons
Wood Chips (stoker boiler)		0.075	1.5	0.22	13.6		5.6E-4	1.3E-4	8.9E-3	1.3E-4	lbs/ton	AP-42 1.6-2 & 3	172,000	0	0	tons
Raw Material Stockpiles	0.0001			0.11							lbs/dry unit	AP-42	86,000	0	0	units
Emission Unit Summary																

* All PM source test data used the average value rather than the maximum value

3.0 Crush/Screen/Reject

												tons	**1,101,770**	**998,457**	**640,000**	**ton**
Rees Baghouse	0.103						Varies				lbs/ton	Source test-Oct 1972				tons
Koppers Baghouse	0.017										lbs/ton	Source test-Oct 1972				tons
Koppers Baghouse	0.078										lbs/ton	Source test-Oct 1972				tons
Rejecting	0.125										lbs/ton	DEQ Estimate	345,744	305,681	366,000	tons
Emission Unit Summary																

4.0 Ore Storage: Day Bin

											tons	**tons**	**1,030,083**	**998,457**	**1,030,083**	**tons**
Koppers Baghouse	0.003										lbs/ton	GNC estimate				
Mikro-pulsaire Baghouse	0.001										lbs/ton	GNC estimate				
Mikro-pulsaire Baghouse	0.001										lbs/ton	GNC estimate				
Fines Bins (2) (Baseline Only)	0.002										lbs/ton	GNC estimate	240,000	0	0	tons
Truck Unloading Baghouse	0.002										lbs/ton	GNC estimate	0	750,000	1,100,000	tons
Coal Unloading Bagouse	0.0006										lbs/ton	GNC estimate	0	30,778	30,778	tons

GLENBROOK NICKEL COMPANY

Emission Factors & annual Quantities

Process	PM_{10}	SOx	NOx	VOC	CO	Pb	Ni .0127	Cr .0095	Mn .002	Co .0003	Units	Notes	Quantities Baseline	Current	Title V	Units
Emission Unit Summary																
5.0 Calcine/Melt	**80 MMBtu/hr/calciner**															
													1,031,064	**998,457**	**1,100,000**	tons
Electrostatic Precipitator	1.882						Varies				lbs/ton	Source test-July 1972				
#1 Baghouse (Furnace 1,2)	1.779		3.11	0.209	5.119						lbs/ton	Source test-July 1996				
#2 Baghouse (Furnace 3,4)	1.792		2.85	0.082	0.843						lbs/ton	Source test-July 1996				
Natural Gas		2.6	550	1.4	40						lbs/mmcf	AP-42 1.4-2 & 3	861	1,298	1,430	mmcf
No. 2 Fuel Oil		71.00	20.0	0.20	5	1.1E-2					lbs/1000 gal	AP-42 1.3-2 & 4	0	595	654	x10[illegible]
Bunker C Oil*		194.7	100.5	9	5	3.0E-4					lbs/1000 gal	AP-42 1.3-2 & 4	1,477	0	0	x1[illegible]
Carbon: a) Sawdust		0.075	1.5	0.22	13.6						lb/ton	AP-42 1.6-2 & 3	55,000	5,000	0	tons
b) Coke ** (spreader/stoker)		38	13.7	0.05	5	1.3E-3		3.3E-3			lb/ton	AP-42 1.1-1 & 11		0		tons
c) Coal ** (spreader/stoker)		38	13.7	0.05	5	1.3E-3		3.3E-3			lb/ton	AP-42 1.1-1 & 11		9,000	8,750	tons
d) Catalyst ***		0	4	0.2	1.25	3.0E-4					lb/ton	AP-42 1.3-2 & 4		24,000	24,000	tons
e) Wood Chips		0.075	1.5	0.22	13.6						lb/ton	AP-42 1.6-2 & 3				tons
Raw Material Stockpiles				0.11							lb/unit	AP-42				units
Ladle Reaction/Theiving/ slagging	0.034										lb/ton	GNC Est. 4.5 lbs/hour	1,031,064		1,100,000	tons
Gas Heating/Plant Services	2.5	2.6	20	1.4	35						lbs/mmcf	AP-42 1.4-2 & 3	110	110	110	mmcf
Scrap Nickel																tons
Emission Unit Summary																

* sulfur content of bunker C oil = 1.24%; ** sulfur content of coal and coke = 1%

*** catalyst = distillate oil EF, 1 ton catalyst = 1000 lb oil; 5 lb/gal; sulfur content ~0%

6.0 Roasters	**40 MMBtu/hr**															
													240,650		**310,000**	tons
Future baghouse	0.021										lbs/ton	GNC estimate				
Natural Gas *	0	2.6	550	1.4	40						lbs/mmcf	AP-42 1.4-2 & 3		0	370	mm[illegible]
Diesel Oil *, **	0	8.09	20	0.2	5	1.1E-2					lbs/1000 gal	AP-42 1.3-2 & 4	826	0	0	x1[illegible]
Emission Unit Summary																

* Particulate matter emissions included with #1 and #2 baghouse emissions

** Sulfur content of diesel oil = 0.057%

7.0 Hot Ore Transfer																
													1,031,064	**998,457**	**1,100,000**	tons
Skip 1A Baghouse	0.322						7.7E-3	3.1E-3	7.4E-4	9.7E-5	lbs/ton	Source Test-Dec1974				
Skip 1B Baghouse	0.088						2.1E-3	8.3E-4	2.0E-4	2.6E-5	lbs/ton	Source Test-date unknown				
Skip 3A Baghouse	0.039						9.4E-4	3.7E-4	9.0E-5	1.2E-5	lbs/ton	Source Test-date unknown				
Skip 3B Baghouse	0.065						1.6E-3	6.2E-4	1.5E-4	2.0E-5	lbs/ton	Source Test-date unknown				
Micro-pulsaire	0.052						1.3E-3	5.0E-4	1.2E-4	1.6E-5	lbs/ton	Estimate				
Emission Unit Summary																

GLENBROOK NICKEL COMPANY

Emission Factors & annual Quantities

Process	PM_{10}	SOx	NOx	VOC	CO	Pb	Ni .0127	Cr .0095	Mn .002	Co .0003	Units	Notes	Quantities Baseline	Current	Title V	Units
8.0 Refining																
													27,344	**36,000**	**50,000**	**tons**
Baghouse 4A & 4B	1.189/0.302 (baseline/Title V)						Negligible	Negligible	Negligible	Negligible	lbs/ton ferronicke	Source Test- July 1996				
Natural Gas *	2.5	2.6	140	1.4	35						lbs/mmcf	AP-42 1.4-2 & 3	0	5	7	mmcf
Fluorspar													65		100	tons
Dolomite													100		320	tons
Ferrosilicon													90		270	tons
Calcium Silicon													18		50	tons
Aluminum													8		25	tons
Casting/Shotting													13,186	18,000	25,000	tons
Raw Material Stockpiles																tons
Scrap Nickel																tor
Emission Unit Summary																

* Particulate matter emissions not included in emissions from baghouse, separate natural gas for dryer for shot and used to heat thieving ladle

9.0 Ferrosilicon **70 MMBtu/hr**

													24,103	**18,500**	**24,000**	**tons**
FeSi Baghouse	0.549					9.3E-4					lbs/ton	GNC estimate				
Coke (spreader/stoker) *		38	13.7	0.05	5	1.3E-3		3.3E-3			lbs/ton	AP-42 1.1-1 & 11	6,783		7,440	tons
Coal (spreader/stoker) *		38	13.7	0.05	5	1.3E-3		3.3E-3			lbs/ton	AP-42 1.1-1 & 11	10,681		10,200	tons
Wood Chips (stoker boiler)		0.075	1.5	0.22	13.6						lbs/ton	AP-42 1.6-2 & 3	3,040		8,200	tons
Natural Gas	2.5	2.6	140	2.8	35						lbs/mmcf	AP-42 1.4-2 & 3	8		8	mmcf
Iron Turnings						1.0E-1					lbs/ton		18,500		18,500	tons
Quartz (Silica)											lbs/ton		25,750		25,750	tons
Casting											lbs/ton metal		24,103		24,103	tons FeSi
Drying (PM)											lbs/hour		24,103		24,103	tons FeSi
Purchase/Stockpile FeSi											lbs/ton		4,000	27,000	36,000	tons
Raw Material Stockpiles				0.11							lbs/ton metal					tons
Emission Unit Summary																

* Sulfur content of coke and coal = 1%

10.0 Skull Plant Operatio 350,000 Btu/hr

													139,318	**134,912**	**150,000**	**tons**
Natural Gas	2.5	2.6	100	5.28	21						lbs/mmcf	AP-42 1.4-2 & 3	5.1	5	5.5	mmcf
Concentrate Dryer	negligible	negligible	negligible	negligible	negligible						lbs/hour	DEQ (elect)				tons
Mill Operation	negligible	negligible	negligible	negligible	negligible						lbs/hour	DEQ (wet)				tons
Skull Stockpile	negligible										lbs/ton nickel		10,000	10,000	10,000	tons
Emission Unit Summary																

11.0 Boilers **40 horsepower each**

#2 Diesel Oil **	2	8.09	20	0.556	5	5.0E-3					lbs/1000 gal	AP-42 1.3-2 & 4	57	0	57	x1000 gal

Process	PM_{10}	SOx	NOx	VOC	CO	Pb	Ni .0127	Cr .0095	Mn .002	Co .0003	Units	Notes	Quantities Baseline	Current	Title V	Units
Emission Unit Summary																

** Sulfur content of diesel oil = 0.057%

12.0 By-Product Stockpil s

Skull Fines *	0.00206										lbs/ton	AP-42 13.2-4	139,318	134,912	150,000	tons
Slag	negligible										lbs/ton	AP-42 13.2-4				tons
Reject **	0.0008										lbs/ton	AP-42 13.2-4	366,000	366,000	366,000	tons
Emission Unit Summary																

* particle size multiplier=0.74; mean wind speed=4.8 mph; moisture content=10%
* particle size multiplier=0.48; mean wind speed=4.8 mph; moisture content=1%

13.0 Road Fugitives

Plant Activity *	0.0504										lbs/ton smelted	AP-42 13.2-2	1,031,064	998,457	1,100,000	tons
Emission Unit Summary																

* Unpaved Roads: particle size multiplier=0.5; silt content=5%; speed=15mph; mean weight=16 tons; mean no. of wheels=4, days with >0.1" precip=150; 40,000 VMT/year

Fine Dust Agglomeration													0	0	137,000	tons
Natural Gas (40 MMBtu/hr)	2.5	2.6	140	1.4	35						lbs/mmcf	AP-42 1.4-2 & 3			151	mmcf
Catalyst Processing System																tons
Natural Gas (<10 MMBtu/hr)	2.5	2.6	140	1.4	35						lbs/mmcf	AP-42 1.4-2 & 3				mmcf
Skull Fines Treatment System													0	0	96,000	tons
Baghouse	0.028						5.6E-5	2.6E-4	6.4E-5	8.3E-6	lbs/ton	GNC Estimate				
Natural Gas (<10 MMBtu/hr)		2.6	140	1.4	35						lbs/mmcf	AP-42 1.4-2 & 3			106	mmcf
Aggregate Insignificant Summary: TOTAL																

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Baseline 1976

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM_{10}		SOx		NOx		VOC		CO		Pb		Ni	0.0183	Cr	0.0095	Mn	0.0023	Co	3E-04
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
1.0 Mining	**6,335,562**	**tons**	**8064**	**24**	**7**	**48**																				
Drill	6,335,562	tons					1.9	0.3											1.0E-4	1.7E-5	1.8E-2	3.0E-3	1.3E-5	2.2E-6	1.7E-6	2.8E-7
Blast	6,335,562	tons					1.9	0.3											1.0E-4	1.7E-5	1.8E-2	3.0E-3	1.3E-5	2.2E-6	1.7E-6	2.8E-7
Load	6,335,562	tons					0.2	0.03											1.0E-5	1.7E-6	1.8E-3	3.0E-4	1.3E-6	2.2E-7	1.7E-7	2.8E-8
Haul	6,335,562	tons					0.2	0.03											1.0E-5	1.7E-6	1.8E-3	3.0E-4	1.3E-6	2.2E-7	1.7E-7	2.8E-8
Stockpile	6,335,562	tons					0.4	0.1											2.1E-5	3.5E-6	3.6E-3	6.0E-4	2.6E-6	4.3E-7	3.4E-7	5.7E-8
Wobbler	3,335,229	tons					0.1	0.02											5.4E-6	9.1E-7	9.4E-4	1.6E-4	6.8E-7	1.1E-7	8.9E-8	1.5E-8
Conveying	6,335,562	tons					3.8	0.6											2.1E-4	3.5E-5	3.6E-2	6.0E-3	2.6E-5	4.3E-6	3.4E-6	5.7E-7
Primary Crush	3,335,229	tons					168.7	28.3											9.2E-3	1.5E-3	1.6E+0	2.7E-1	1.2E-3	1.9E-4	1.5E-4	2.5E-5
Secondary Crush	3,335,229	tons					168.7	28.3											9.2E-3	1.5E-3	1.6E+0	2.7E-1	1.2E-3	1.9E-4	1.5E-4	2
Screen	3,335,229	tons					168.7	28.3											9.2E-3	1.5E-3	1.6E+0	2.7E-1	1.2E-3	1.9E-4	1.5E-4	2
Load Tram	1,676,500	tons					0.05	0.01											2.7E-6	4.6E-7	4.7E-4	8.0E-5	3.4E-7	5.7E-8	4.5E-8	7
Stockpile Fugitives	6,335,562	tons					23.6	4.0											1.3E-3	2.2E-4	2.2E-1	3.8E-2	1.6E-4	2.7E-5	2.1E-5	
Emission Unit Summary							538.3	90.4	0	0	0	0	0	0	0	0	0	0	2.9E-2	4.9E-3	5.1E+0	8.6E-1	3.7E-3	6.2E-4	4.8E-4	8.1E-5

2.0 Drying

	1,377,213	**tons**	**7056**	**24**	**7**	**42**																				
Dryer 1							305.5	44.9																		
Dryer 2							236.8	34.8																		
Dryer 3							219.5	32.3																		
Dryer 4							104.3	15.3																		
Natural Gas	0	mmcf							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Used Oil (0.5% sulfur)	119	x1000 gal							29.8	4.4	7.7	1.1	0.04	0.01	2.0	0.3	4.5E-3	6.5E-4	4.5E-3	6.5E-4	8.1E-3	1.2E-3	2.8E-2	4.0E-3	8.5E-5	1.2E-5
Wood Chips (stoker boiler)	172,000	tons							43.9	6.5	877.6	129.0	128.7	18.9	7956.5	1169.6	0.0E+0	0.0E+0	3.3E-1	4.8E-2	7.6E-2	1.1E-2	5.2E+0	7.7E-1	7.6E-2	1.1E-2
Raw Material Stockpiles	86,000	units					0.5	0.07					32.2	4.7												
Emission Unit Summary							866.5	127.4	73.6	10.8	885.2	130.1	160.9	23.7	7958.5	1169.9	4.5E-3	6.5E-4	3.3E-1	4.9E-2	8.4E-2	1.2E-2	5.2E+0	7.7E-1	7.6E-2	1.1E-2

3.0 Crush/Screen/Reject

	1,101,770	**tons**	**7056**	**24**	**7**	**42**																				
Rees Baghouse							193.4	28.4											3.5E+0	5.2E-1	1.8E+0	2.7E-1	4.4E-1	6.5E-2	5.8E-2	8.5E-3
Koppers Baghouse							29.1	4.3											5.3E-1	7.8E-2	2.8E-1	4.1E-2	6.7E-2	9.8E-3	8.7E-3	1.3E-3
Koppers Baghouse							14.6	2.1											2.7E-1	3.9E-2	1.4E-1	2.0E-2	3.3E-2	4.9E-3	4.4E-3	6.4E-4
Rejecting	345,744	tons					147.0	21.6											2.7E+0	4.0E-1	1.4E+0	2.1E-1	3.4E-1	5.0E-2	4.4E-2	6.5E-3
Emission Unit Summary							384.1	56.5	0	0	0	0	0	0	0	0	0	0	7.0E+0	1.0E+0	3.6E+0	5.4E-1	8.8E-1	1.3E-1	1.2E-1	1.7E-2

4.0 Ore Storage: Day Bin

	1,030,083	**tons**	**7694**	**24**	**7**	**45.8**																				
Koppers Baghouse							9.6	1.5											1.8E-1	2.8E-2	9.1E-2	1.5E-2	2.2E-2	3.5E-3	2.9E-3	4.6E-4
Mikro-pulsaire Baghouse							2.4	0.4											4.4E-2	7.0E-3	2.3E-2	3.7E-3	5.5E-3	8.8E-4	7.2E-4	1.2E-4
Mikro-pulsaire Baghouse							2.4	0.4											4.4E-2	7.0E-3	2.3E-2	3.7E-3	5.5E-3	8.8E-4	7.2E-4	1.2E-4
Fines Bins (2) (Baseline Only)							7.2	1.2											1.3E-1	2.1E-2	6.8E-2	1.1E-2	1.7E-2	2.7E-3	2.2E-3	3.5E-4
Truck Unloading Baghouse																										
Coal Unloading Bagouse																										

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Baseline 1976

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM10		SOx		NOx		VOC		CO		Pb		Ni	0.0183	Cr	0.0095	Mn	0.0023	Co	3E-04
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Emission Unit Summary							21.6	3.5	0	0	0	0	0	0	0	0	0	0	4.0E-1	6.3E-2	2.1E-1	3.3E-2	5.0E-2	8.0E-3	6.5E-3	1.0E-3
5.0 Calcine/Melt																										
	1,031,064	tons	7694	24	7	45.8																				
Electrostatic Precipitator		tons					6052.6	970.2											1.1E+2	1.8E+1	5.8E+1	9.2E+0	1.4E+1	2.2E+0	1.8E+0	2.9E-1
#1 Baghouse (Furnace 1,2)		tons					2933.0	470.2			10001.9	1603.3	672.2	107.7	16462.9	2639.0			5.4E+1	8.6E+0	2.8E+1	4.5E+0	6.7E+0	1.1E+0	8.8E-1	1.4E-1
#2 Baghouse (Furnace 3,4)		tons					2808.6	450.2			9165.7	1469.3	263.7	42.3	2711.1	434.6			5.1E+1	8.2E+0	2.7E+1	4.3E+0	6.5E+0	1.0E+0	8.4E-1	1.4E-1
Natural Gas	861	mmcf							7.0	1.1	1476.7	236.7	3.8	0.6	107.4	17.2										
No. 2 Fuel Oil	0	x1000 gal							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0								
Bunker C Oil*	1,477	x1000 gal							896.9	143.8	463.0	74.2	41.5	6.6	23.0	3.7	1.4E-3	2.2E-4								
Carbon: a) Sawdust	55,000	tons							12.9	2.1	257.3	41.3	37.7	6.1	2333.1	374.0	0.0E+0	0.0E+0								
b) Coke ** (spreader/stoke	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0								
c) Coal ** (spreader/stoker	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0								
d) Catalyst ***	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0								
e) Wood Chips	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0								
Raw Material Stockpiles	0	units																								
Ladle Reaction/Theiving/	1,031,064	tons					108	17.31											2.0E+0	3.2E-1	1.0E+0	1.6E-1	2.5E-1	0.0E+0	3.2E-2	0.0E+0
slagging																										
Gas Heating/Plant Services	110	mmcf					0.9	0.14	0.9	0.14	6.9	1.10	0.5	0.08	12.0	1.93										
Scrap Nickel	0	tons																								
Emission Unit Summary							11903.1	1908.1	917.6	147.1	21371.6	3425.9	1019.3	163.4	21649.6	3470.4	1.4E-3	2.2E-4	2.2E+2	3.5E+1	1.1E+2	1.8E+1	2.7E+1	4.3E+0	3.6E+0	5.7E-1
6.0 Roasters																										
	240,650	tons	7694	24	7	45.8																				
Future baghouse							16.0	2.6											2.9E-1	4.7E-2	1.5E-1	2.4E-2	3.7E-2	5.9E-3	4.8E-3	7.7E-4
Natural Gas *	0	mmcf					0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Diesel Oil *, **	826	x1000 gal					0	0	20.9	3.3	51.5	8.3	0.5	0.1	12.9	2.1	2.8E-2	4.5E-3	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0
Emission Unit Summary							16	3	20.9	3.3	51.5	8.3	0.5	0.1	12.9	2.1	2.8E-2	4.5E-3	2.9E-1	4.7E-2	1.5E-1	2.4E-2	3.7E-2	5.9E-3	4.8E-3	
7.0 Hot Ore Transfer																										
	1,031,064	tons	7694	24	7	45.8																				
Skip 1A Baghouse							259.1	41.5											4.7E+0	7.6E-1	2.5E+0	3.9E-1	6.0E-1	9.6E-2	7.8E-2	1.2E-2
Skip 1B Baghouse							70.7	11.3											1.3E+0	2.1E-1	6.7E-1	1.1E-1	1.6E-1	2.6E-2	2.1E-2	3.4E-3
Skip 3A Baghouse							31.4	5.0											5.7E-1	9.2E-2	3.0E-1	4.8E-2	7.2E-2	1.2E-2	9.4E-3	1.5E-3
Skip 3B Baghouse							52.3	8.4											9.6E-1	1.5E-1	5.0E-1	8.0E-2	1.2E-1	1.9E-2	1.6E-2	2.5E-3
Micro-pulsaire																										
Emission Unit Summary							413.5	66.3	0	0	0	0	0	0	0	0	0	0	7.6E+0	1.2E+0	3.9E+0	6.3E-1	9.5E-1	1.5E-1	1.2E-1	2.0E-2

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Baseline 1976

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM10		SOx		NOx		VOC		CO		Pb		Ni	0.0183	Cr	0.0095	Mn	0.0023	Co	3E-04
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
8.0 Refining																										
	27,344	tons	8232	24	7	49																				
Baghouse 4A & 4B							94.8	16.3											1.7E+0	3.0E-1	9.0E-1	1.5E-1	2.2E-1	3.7E-2	2.8E-2	4.9E-3
Natural Gas *	7	mmcf					0.051	0.01	0.053	0.009	2.9	0.5	0.03	0.005	0.7	0.1										
Fluorspar	65	tons																								
Dolomite	100	tons																								
Ferrosilicon	90	tons																								
Calcium Silicon	18	tons																								
Aluminum	8	tons																								
Casting/Shotting	13,186	tons Ni																								
Raw Material Stockpiles	0	tons																								
Scrap Nickel	0	tons																								
Emission Unit Summary							94.9	16.3	0.1	0.01	2.9	0.5	0.03	0.005	0.7	0.1	0.0E+0	0.0E+0	1.7E+0	3.0E-1	9.0E-1	1.5E-1	2.2E-1	3.7E-2	2.8E-2	4.9E-3
9.0 Ferrosilicon																										
	24,103	tons	7778	24	7	46.3																				
FeSi Baghouse	0						40.8	6.6									6.9E-2	1.1E-2								
Coke (spreader/stoker) *	6,783	tons							795.3	128.9	286.7	46.5	1.0	0.2	104.6	17.0	1.1E-3	4.5E-3			2.8E-3	1.1E-2				
Coal (spreader/stoker) *	10,681	tons							1252.3	202.9	451.5	73.2	1.6	0.3	164.8	26.7	1.8E-3	7.0E-3			4.5E-3	1.7E-2				
Wood Chips (stoker boiler)	3,040	tons							0.7	0.1	14.1	2.3	2.1	0.3	127.6	20.7										
Natural Gas	8	mmcf					0.1	0.01	0.1	0.01	3.5	0.6	0.1	0.01	0.9	0.1										
Iron Turnings	18,500	tons																								
Quartz (Silica)	25,750	tons																								
Casting	24,103	tons FeSi																								
Drying (PM)	24,103	tons FeSi																								
Purchase/Stockpile FeSi	4,000	tons																								
Raw Material Stockpiles	0	tons																								
Emission Unit Summary							40.9	6.6	2048.4	331.9	755.7	122.5	4.8	0.8	397.9	64.5	7.2E-2	2.3E-2	0.0E+0	0.0E+0	7.3E-3	2.9E-2	0.0E+0	0.0E+0	0.0E+0	0.0E+0
10.0 Skull Plant Operatio																										
	139,318	tons	6300	7	18	50																				
Natural Gas	5	mmcf					0.01	0.01	0.01	0.01	0.6	0.3	0.03	0.01	0.1	0.1										
Concentrate Dryer	0	tons																								
Mill Operation	0	tons																								
Skull Stockpile	10,000	tons																								
Emission Unit Summary							0.01	0.01	0.01	0.01	0.6	0.3	0.03	0.01	0.1	0.1	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0
11.0 Boilers																										
	0	0	2184	24	7	13																				
#2 Diesel Oil **	57	x1000 gal					1.3	0.1	5.1	0.2	12.5	0.6	0.3	0.02	3.1	0.1	3.1E-3	1.4E-4								

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Baseline 1976

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM_{10}		SOx		NOx		VOC		CO		Pb		Ni	0.0183	Cr	0.0095	Mn	0.0023	Co	3E-04
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Emission Unit Summary							1.3	0.1	5.1	0.2	12.5	0.6	0.3	0.02	3.1	0.1	3.1E-3	1.4E-4	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

12.0 By-Product Stockpil

	0	0	8736	24	7	52																				
Skull Fines *	139,318	tons	0				0.8	0.1											1.6E-1	2.9E-2	7.5E-3	1.4E-3	7.5E-3	1.4E-3	2.4E-4	
Slag	0	tons	0																							
Reject **	366,000	tons	0				0.8	0.1											1.6E-1	0.0E+0	7.6E-3	1.4E-3	7.6E-3	1.4E-3	2.4E-4	
Emission Unit Summary							1.6	0.3	0	0	0	0	0	0	0	0	0	0	3.2E-1	2.9E-2	1.5E-2	2.8E-3	1.5E-2	2.8E-3	4.8E-4	0.0E+0

13.0 Road Fugitives

	0	0	8736	24	7	52																				
Plant Activity *	1,031,064	tons	0				142.9	26																		
Emission Unit Summary							142.9	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

Fine Dust Agglomeration	0	tons	7056	24	7	42																				
Natural Gas (40 MMBtu/hr)	0	mmcf	0																							
	0	0	0																							
Catalyst Processing System	0	tons	0																							
Natural Gas (<10 MMBtu/hr)	0	mmcf	0																							
Skull Fines Treatment System	0	tons	0	0	0	0																				
Baghouse																										
Natural Gas (<10 MMBtu/hr)	0	mmcf	0	0	0	0																				
Aggregate Insignificant								1		1		1		1		1		6.0E-2								
Summary: TOTAL							14424	2305	3066	494	23080	3689	1186	189	30023	4708	0.1	0.09	236	38	127	20	35	5	4	

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Title V Permit

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM_{10}		SOx		NOx		VOC		CO		Pb		Ni .024		Cr .007		Mn .0023		Co .0006	
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
1.0 Mining	**23,000,000**	**tons**	**8064**	**24**	**7**	**48**																				
Drill	23,000,000	tons					6.8	1.2											1.6E-1	2.8E-2	4.8E-2	8.1E-3	1.6E-2	2.6E-3	4.1E-3	6.9E-4
Blast	23,000,000	tons					6.8	1.2											1.6E-1	2.8E-2	4.8E-2	8.1E-3	1.6E-2	2.6E-3	4.1E-3	6.9E-4
Load	23,000,000	tons					0.7	0.1											1.6E-2	2.8E-3	4.8E-3	8.1E-4	1.6E-3	2.6E-4	4.1E-4	6.9E-5
Haul	23,000,000	tons					0.7	0.1											1.6E-2	2.8E-3	4.8E-3	8.1E-4	1.6E-3	2.6E-4	4.1E-4	6.9E-5
Stockpile	23,000,000	tons					1.4	0.2											3.3E-2	5.5E-3	9.6E-3	1.6E-3	3.1E-3	5.3E-4	8.2E-4	1.4E-4
Wobbler	8,000,000	tons					0.2	0.0											5.7E-3	9.6E-4	1.7E-3	2.8E-4	5.5E-4	9.2E-5	1.4E-4	2.4E-5
Conveying	23,000,000	tons					13.7	2.3											3.3E-1	5.5E-2	9.6E-2	1.6E-2	3.1E-2	5.3E-3	8.2E-3	1.4E-3
Primary Crush	8,000,000	tons					404.8	68.0											9.7E+0	1.6E+0	2.8E+0	4.8E-1	9.3E-1	1.6E-1	2.4E-1	4.1E-2
Secondary Crush	8,000,000	tons					404.8	68.0											9.7E+0	1.6E+0	2.8E+0	4.8E-1	9.3E-1	1.6E-1	2.4E-1	4.1E
Screen	8,000,000	tons					404.8	68.0											9.7E+0	1.6E+0	2.8E+0	4.8E-1	9.3E-1	1.6E-1	2.4E-1	4.
Load Tram	0	tons					0.0	0.0											0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	####
Stockpile Fugitives	23,000,000	tons					85.6	14.4											2.1E+0	3.5E-1	6.0E-1	1.0E-1	2.0E-1	3.3E-2	5.1E-2	
Emission Unit Summary							1330.2	223.5	0	0	0	0	0	0	0	0	0	0	3.2E+1	5.4E+0	9.3E+0	1.6E+0	3.1E+0	5.1E-1	8.0E-1	1.3E-1

2.0 Drying

	800,000	**tons**	**7056**	**24**	**7**	**42**																				
Dryer 1	0	tons																								
Dryer 2	0	tons																								
Dryer 3	800,000	tons					509.9	75.0											1.2E+1	1.8E+0	3.6E+0	5.2E-1	1.2E+0	1.7E-1	3.1E-1	4.5E-2
Dryer 4	0	tons																								
Natural Gas	800	mmcf							7.1	1.0	1496.6	220.0	3.8	0.6	108.8	16.0										
Used Oil (0.5% sulfur)	119	x1000 gal							29.8	4.4	7.7	1.1	0.04	0.01	2.0	0.3	4.5E-3	6.5E-4	4.5E-3	6.5E-4	8.1E-3	1.2E-3	2.8E-2	4.0E-3	8.5E-5	1.2E-5
Wood Chips (stoker boiler)	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Raw Material Stockpiles	0	units							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Emission Unit Summary							509.9	75.0	36.8	5.4	1504.3	221.1	3.9	0.6	110.9	16.3	4.5E-3	6.5E-4	1.2E+1	1.8E+0	3.6E+0	5.3E-1	1.2E+0	1.8E-1	3.1E-1	4.5E-2
			COMPOSITE EF (lb/ton)				0.187		0.014		0.553		0.001		0.041		1.6E-06									

3.0 Crush/Screen/Reject

	640,000	**tons**	**7056**	**24**	**7**	**42**																				
Rees Baghouse							224.7	33.0											5.4E+0	7.9E-1	1.6E+0	2.3E-1	5.2E-1	7.6E-2	1.3E-1	2.0E-2
Koppers Baghouse																										
Koppers Baghouse																										
Rejecting	366,000	tons					155.6	22.9											3.7E+0	5.5E-1	1.1E+0	1.6E-1	3.6E-1	5.3E-2	9.3E-2	1.4E-2
Emission Unit Summary							380.3	55.9	0	0	0	0	0	0	0	0	0	0	9.1E+0	1.3E+0	2.7E+0	3.9E-1	8.7E-1	1.3E-1	2.3E-1	3.4E-2

4.0 Ore Storage: Day Bin

	1,030,083	**tons**	**7694**	**24**	**7**	**45.8**																				
Koppers Baghouse							9.6	1.5											2.3E-1	3.7E-2	6.7E-2	1.1E-2	2.2E-2	3.5E-3	5.8E-3	9.2E-4
Mikro-pulsaire Baghouse							2.4	0.4											5.8E-2	9.2E-3	1.7E-2	2.7E-3	5.5E-3	8.8E-4	1.4E-3	2.3E-4
Mikro-pulsaire Baghouse							2.4	0.4											5.8E-2	9.2E-3	1.7E-2	2.7E-3	5.5E-3	8.8E-4	1.4E-3	2.3E-4
Fines Bins (2) (Baseline Only)																										
Truck Unloading Baghouse	1,100,000	tons					7.2	1.2											1.7E-1	2.8E-2	5.0E-2	8.1E-3	1.7E-2	2.7E-3	4.3E-3	6.9E-4
Coal Unloading Bagouse	30,778						0.1	0.01																		

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Title V Permit

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM_{10}		SOx		NOx		VOC		CO		Pb		Ni .024		Cr .007		Mn .0023		Co .0006	
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Emission Unit Summary							21.7	3.5	0	0	0	0	0	0	0	0	0	0	5.2E-1	8.3E-2	1.5E-1	2.4E-2	5.0E-2	8.0E-3	1.3E-2	2.1E-3
5.0 Calcine/Melt																										
	1,100,000	tons	7694	24	7	45.8																				
Electrostatic Precipitator																										
#1 Baghouse (Furnace 1,2)							3129.1	501.6			10670.6	1710.5	717.1	115.0	17563.6	2815.5			7.5E+1	1.2E+1	2.0E+1	3.2E+0	7.2E+0	1.2E+0	1.9E+0	3.0E-1
#2 Baghouse (Furnace 3,4)							2996.4	480.3			9778.5	1567.5	281.3	45.1	2892.4	463.7			7.2E+1	1.2E+1	2.1E+1	3.4E+0	6.9E+0	1.1E+0	1.8E+0	2.9E-1
Natural Gas	1,430	mmcf							11.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0									
No. 2 Fuel Oil	654	x1000 gal							144.8	23.2	0.0	0.0	0.0	0.0	0.0	0.0	2.2E-2	3.6E-3								
Bunker C Oil*	0	x1000 gal							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Carbon: a) Sawdust	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
b) Coke ** (spreader/stoke	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0			0.0E+0	0.0E+0				
c) Coal ** (spreader/stoker	8,750	tons							1037.1	166.3	0.0	0.0	0.0	0.0	0.0	0.0	3.6E-2	5.8E-3			8.9E-2	1.4E-2				
d) Catalyst ***	24,000	tons							0.0	0.0	299.4	48.0	15.0	2.4	93.6	15.0	2.2E-2	3.6E-3			0.0E+0	0.0E+0				
e) Wood Chips	0	tons							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Raw Material Stockpiles	0	units																								
Ladle Reaction/Theiving/	1,100,000	tons					115.2	18.5							-				2.9E-1	4.6E-2	8.1E-1	1.3E-1	2.7E-1	4.2E-2	6.9E-2	1.1E-2
slagging																										
Gas Heating/Plant Services	110	mmcf					0.9	0.1	0.9	0.1	0.0	0.0	0.0	0.0	12.0	1.9										
Scrap Nickel	0	tons							0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0	0.0E+0	0.0E+0						
Emission Unit Summary							6241.6	1000.5	1194.4	191.5	20748.6	3326.0	1013.4	162.5	20561.6	3296.0	8.1E-2	1.3E-2	1.5E+2	2.4E+1	4.2E+1	6.7E+0	1.4E+1	2.3E+0	3.7E+0	6.0E-1
			COMPOSITE EF (lb/ton)				1.82		0.35		6.05		0.30		5.99		2.4E-05									
6.0 Roasters							**WILL BE ADDED IN THE FUTURE**																			
	0	tons	0	0	1	1																				
Future baghouse							0	0.0											0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0
Natural Gas *	0	mmcf							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Diesel Oil *, **	0	x1000 gal																								
Emission Unit Summary							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0
7.0 Hot Ore Transfer																										
	1,100,000	tons	7694	24	7	45.8																				
Skip 1A Baghouse							265.3	42.5											6.4E+0	1.0E+0	1.9E+0	3.0E-1	6.1E-1	9.8E-2	6.1E-1	9.8E-2
Skip 1B Baghouse							72.4	42.5											1.7E+0	2.8E-1	5.1E-1	8.1E-2	1.7E-1	2.7E-2	1.7E-1	2.7E-2
Skip 3A Baghouse							32.2	42.5											7.7E-1	1.2E-1	2.3E-1	3.6E-2	7.4E-2	1.2E-2	7.4E-2	1.2E-2
Skip 3B Baghouse							53.6	42.5											1.3E+0	2.1E-1	3.8E-1	6.0E-2	1.2E-1	2.0E-2	1.2E-1	2.0E-2
Micro-pulsaire							7.2	1.1											1.7E-1	2.8E-2	5.0E-2	8.0E-3	1.6E-2	2.6E-3	1.6E-2	2.6E-3
Emission Unit Summary							430.6	171.3	0	0	0	0	0	0	0	0	0	0	1.0E+1	1.7E+0	3.0E+0	4.8E-1	9.9E-1	1.6E-1	9.9E-1	1.6E-1
			COMPOSITE EF (lb/ton)				0.13																			

Note: used 1974 ST data for all skip hoist baghouses for PSEL

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Title V Permit

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM10		SOx		NOx		VOC		CO		Pb		Ni .024		Cr .007		Mn .0023		Co .0006	
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
8.0 Refining																										
	50,000	tons	8232	24	7	49																				
Baghouse 4A & 4B							44.0	7.5											1.2E-3	2.1E-4	3.7E-5	6.4E-6	6.6E-3	1.1E-3	1.7E-5	2.9E-6
Natural Gas *	7	mmcf					0.1	0.01	0.1	0.01	2.9	0.5	0.03	0.005	0.7	0.1										
Fluorspar	100	tons																								
Dolomite	320	tons																								
Ferrosilicon	270	tons																								
Calcium Silicon	50	tons																								
Aluminum	25	tons																								
Casting/Shotting	25,000	tons Ni																								
Raw Material Stockpiles	0	tons																								
Scrap Nickel	0	tons																								
Emission Unit Summary							44.1	7.6	0.1	0.01	2.9	0.5	0.03	0.005	0.7	0.1	0.0E+0	0.0E+0	1.2E-3	2.1E-4	3.7E-5	6.4E-6	6.6E-3	1.1E-3	1.7E-5	2.9E-6
			COMPOSITE EF (lb/ton)				0.30		3.6E-04		2.0E-02		2.0E-04		4.9E-03											
9.0 Ferrosilicon																										
	24,000	tons	7778	24	7	46.3																				
FeSi Baghouse							40.6	6.6									6.9E-2	1.1E-2								
Coke (spreader/stoker) *	7,440	tons							872.3	141.4	314.5	51.0	1.1	0.2	114.8	18.6	3.0E-2	4.9E-3								
Coal (spreader/stoker) *	10,200	tons							1195.9	193.8	431.2	69.9	1.6	0.3	157.4	25.5	4.1E-2	6.7E-3								
Wood Chips (stoker boiler)	8,200	tons							1.9	0.3	38.0	6.2	5.6	0.9	344.1	55.8	0.0E+0	0.0E+0								
Natural Gas	8	mmcf					0.1	0.01	0.1	0.01	3.5	0.6	0.1	0.01	0.9	0.1										
Iron Turnings	18,500	tons																								
Quartz (Silica)	25,750	tons																								
Casting	24,103	tons FeSi																								
Drying (PM)	24,103	tons FeSi																								
Purchase/Stockpile FeSi	36,000	tons																								
Raw Material Stockpiles	0	tons																								
Emission Unit Summary							40.7	6.6	2070.2	335.5	787.1	127.5	8.4	1.4	617.1	100.0	1.4E-1	2.3E-2	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0
			COMPOSITE EF (lb/ton)				0.55		27.96		10.63		0.11		8.33		1.9E-03									
10.0 Skull Plant Operatio																										
	150,000	tons	6300	7	18	50																				
Natural Gas	5	mmcf					0.02	0.01	0.02	0.01	0.6	0.3	0.03	0.01	0.1	0.1										
Concentrate Dryer	0	tons																								
Mill Operation	0	tons																								
Skull Stockpile	10,000	tons																								
Emission Unit Summary							0.02	0.01	0.02	0.01	0.6	0.3	0.03	0.01	0.1	0.1	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0
			COMPOSITE EF (lb/ton)				9.2E-05		9.5E-05		3.7E-03		1.9E-04		7.7E-04											
11.0 Boilers																										
			2184	24	7	13																				
#2 Diesel Oil **	57	x1000 gal					1.3	0.1	5.1	0.2	12.5	0.6	0.3	0.02	3.1	0.1	3.1E-3	1.4E-4								

GLENBROOK NICKEL COMPANY

Pound/Day and Ton/Year Emissions By Emission Unit

Title V Permit

Process	Quantity	Units	Hours	hr/day	day/wk	wk/yr	PM10		SOx		NOx		VOC		CO		Pb		Ni .024		Cr .007		Mn .0023		Co .0006	
							lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr	lb/day	ton/yr
Emission Unit Summary							1.3	0.1	5.1	0.2	12.5	0.6	0.3	0.0	3.1	0.1	3.1E-3	1.4E-4	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0
12.0 By-Product Stockpil																										
			8736	24	7	52																				
Skull Fines *	150,000	tons					0.8	0.2											2.1E-3	3.9E-4	5.9E-3	1.1E-3	2.0E-3	3.6E-4	2.5E-4	4.6E-5
Slag	0	tons					negligible																			
Reject **	366,000	tons					0.8	0.1											2.0E-3	3.7E-4	5.6E-3	1.0E-3	1.9E-3	3.4E-4	2.4E-4	4.4E-5
Emission Unit Summary							1.7	0.3	0	0	0	0	0	0	0	0	0	0	4.1E-3	7.5E-4	1.2E-2	2.1E-3	3.8E-3	6.9E-4	5.0E-4	9.0E-5
13.0 Road Fugitives																										
			8736	24	7	52																				
Plant Activity *	1,100,000	tons					152.4	27.7											3.7E+0	6.7E-1	1.1E+0	1.9E-1	3.5E-1	6.4E-2	9.1E-2	1.7E-2
Emission Unit Summary							152.4	27.7	0	0	0	0	0	0	0	0	0	0	3.7E+0	6.7E-1	1.1E+0	1.9E-1	3.5E-1	6.4E-2	9.1E-2	1.7E-2
WILL BE ADDED IN FUTURE																										
Fine Dust Agglomeration	0	tons	0	0	0	0													0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0
Natural Gas (40 MMBtu/hr)	0	mmcf					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Catalyst Processing System	0	tons																								
Natural Gas (<10 MMBtu/hr)	0	mmcf																								
Skull Fines Treatment System	96,000	tons	5184	24	5	48	0.0																			
Baghouse							11.1	1.3											2.7E-1	3.2E-2	7.8E-2	9.3E-3	2.6E-2	3.1E-3	3.3E-3	4.0E-4
Natural Gas (<10 MMBtu/hr)	106	mmcf							1.1	0.1	61.8	7.4	0.6	0.1	15.5	1.9										
			COMPOSITE EF (lb/ton)				2.8E-02		2.9E-03		1.5E-01		1.5E-03		3.9E-02											
Aggregate Insignificant								1		1		1		1		1		6.0E-2								
Summary: TOTAL							9165	1574	3308	534	23118	3684	1027	165	21309	3416	0	0.1	215	35	61	10	21	3	6	
		Baseline emissions					14424	2305	3066	494	23080	3689	1186	189	30023	4708	0.1	0.1								
		Increase over baseline emissions						-731		39.3		-5		-23		-1293		0.0								