4-20-95
12.3.8v.6

ATTACHMENT #1

ASH GROVE CEMENT COMPANY

"WESTERN REGION"

To: Ken Rone

From: Ed Pierce

Date: April 20, 1995

Subject: STANDARD PROCEDURE FOR EVALUATION AND ACCEPTANCE OF COMINCO SLAG AS A PLANT RAW MATERIAL

STEP#1 Determine the waste Classification

A. Hazardous or dangerous waste
B. Use considered "beneficial recycling" or exempt
C. Non-hazardous with prejudice
D. Non-hazardous

Cominco slag is a non-hazardous industrial by-product.

STEP #2 Determine Quantity Available

A. Is material a one-time site cleanup?
B. Is material an ongoing industrial by-product?
C. What is the schedule of delivery?

Cominco slag is an ongoing industrial by-product that can be delivered to the plant at the necessary amounts to satisfy the raw material requirements.

Step #3 Sample, Test and Evaluate Impacts of Material Use

A. Visit site or waste source
B. Secure representative samples and classify physical properties
C. Determine basic cement chemical oxide analysis
D. Make mix design calculations with the new material

See attachments.

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ATTACHMENT #1

Step#4 Evaluation of Waste for Effect on Plant Operating Permits

A. Are there restrictions on raw materials in existing permits?
B. Does waste cause plant to exceed any pollutant emission limits?

There are no existing permits that will restrict Cominco slag as a raw material. The use of Cominco slag as a raw material should not cause the plant to exceed pollutant emission limits although no emission tests were conducted during the trail grind and burn.

Step #5 Determine Method of Addition in the Plant Process

A. How do we blend and store?
B. Can we use as received in existing feeder?
C. Do we need to construct a material-specific feed system?
D. What are the estimated capital and operating costs?

Cominco slag will be unloaded directly to the 500 ton capacity steel scale storage silo. Capital approval has been received to construct a rail unloading system for approximately $100,000.

Step #6 Determine Acceptance Fee or Charge to Supplier

A. Evaluate cost for Ash Grove to use material
B. Review effect on cement quality
C. Review freight and handling costs
D. Review public relations and employee concerns
E. Determine market cost for optional disposition methods

See attachments.

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Inter-Office Memorandum

Date April 13, 1995

To Ed Pierce

From Patrick Noon

Copies to Ken Rone
Hans Steuch

Subject Cominco Slag

ATTACHMENT #2

Corporate policy requires approval previous to use of waste materials as a plant raw material. I have reviewed the corporate policy, and have included relevant information (mix designs, chemical analysis etc.) to provide background information for this proposed raw material change.

Step #1 Waste Classification

Cominco Slag is considered a Non-hazardous waste material.

A relevant review of Dangerous Waste Regulations WAC 173-303 indicates Cominco Slag is Non-hazardous material.

Cominco has submitted a SWEP Test (Solid Waste Extraction Procedure), which is the Canadian equivalent of the Toxic Characteristic Leach Procedure. A sample for TCLP has been submitted to AGC Research Kansas City. The SWEP test data indicates all critical parameters (Cr, As, Ba, Cd, Ag, Hg, Pb, Se) were well under maximum allowable limits.

Step #2 Quantity Available

Cominco Slag is a continuously produced by-product of Zinc and Lead extraction at the Cominco Smelter in Trail B. C.. The elemental Zinc levels are approximately 3.5%. One of the previous modes of disposal was dumping into the Columbia River. This "Barren Slag" represents a disposal problem for Cominco. Our approximate requirements are 35 thousand tons per year. Cominco can fully satisfy our requirements for this material.

The material can be delivered in 100 ton rail cars by Burlington Northern Rail Road. A rail car unloading system has been approved in the 1995 capital budget. The approximate daily usage rate is 120-130 tons. This is slightly more than a rail car per day.

Step #3 Sample, Test and Evaluate Impacts of Material Use

Site Visit
A site trip to Cominco by Seattle Plant personnel has not been undertaken at this point.

Sample and Classify Properties
This has been determined and is attached.

Mix Design
These have been previously designed and are attached with updated received material costs.

Test Burn
A six day test burn was performed in May 1994. There were no noticeable effects in chemistry nor physical performance of the cement manufactured during this period. The 100 mesh residue for the raw mill was very low during this period of time. Cominco slag is easier to grind than both Salmon Bay iron source and the Heckett Slag. In addition the lack of metallics is a definite advantage.

ATTACHMENT 3

COMINCO *"FERROUS GRANULES"*
Typical Analysis

	TYPICAL %	RANGE %
Cu	0.5	.4 - .7
Pb	0.05	.03 - .10
Zn	2.6	1.9 - 3.0
S	1.0	.5 - 1.5
SiO_2	28	27 - 29
Fe	31.5	31 - 32
CaO	16	14 - 16
As	.007	.005 - .009
Cd	0.0006	0.0001 - 0.003
Ge	0.007	0.003 - 0.012
Sn	0.02	0.01 - 0.04
MgO	0.8	0.7 - 1.0
Al_2O_3	3.5	2.5 - 4.5
Mn	0.8	0.7 - 1.0
Ni	0.005	0.002 - 0.01
Sb	0.02	0.007 - 0.05
Co	0.02	
Tl	<0.001	
Cl	0.002	
F	.01	
Na	.5	
Tl	.15	
P	.15	
Cr	.059	
Sr	.1	
Ba	.3	
	TR OZ/TON	TR OZ/TON
Au	0.004	0.0012 - 0.01
Ag	0.6	0.26 - 0.9
In	0.8	0.3 - 1.3

DLT/Ferrous Granules
November 1995

ATTACHMENT 3

COMINCO
"FERROUS GRANULES"

NOMINAL QUANTITY: 150,000 st/year

BULK DENSITY: 80-90 lbs/ft^3

COLOUR: Black

SCREEN ANALYSIS:

Selve	
+ #8	2
+ #10	6
+ #14	15
+ #20	45
+ #28	27
+ #35	3
Pan	2