

Merton C. Flemings  
Room 8-309  
Massachusetts Institute of Technology  
Cambridge, Massachusetts, 02139

February 23, 1987

Mr. William G. Wood, President  
FSM Technologies Inc.  
880 - 789 West Pender Street  
Vancouver, B.C. V6C 182  
CANADA

Dear Mr. Wood:

In response to your recent request, following is my analysis of the viability of the low-carbon ferrochromium project known as "SHERWOOD Pacific".

Summarizing, this project to produce 30,000 tons of low-carbon ferrochromium from the chromite ore in the Klamath Mountains appears to me to be both technically and economically sound.

On a personal note, I should point out to you that the designers of this process are all well known to me. Two of them have died in the last four years. Charles W. Sherman, who did his post-graduate work under one of my predecessors, Professor John Chipman; and Professor Thomas B. King, who was another of my predecessors as head of this department. Charlie was arguably the best practical alloy steel metallurgist in the United States. He did excellent innovative, production-oriented work for Armco, J&L, Vasco and Latrobe Steel before joining WOODING in 1976. I worked with Tom King for some 20 years and had a very great respect for his abilities as a process metallurgist. Tom was an outstanding researcher and educator, and a leader in the field of steelmaking fundamentals.

The third of the three process designers, P.J. Wooding, has been responsible for many of the advanced melting projects in the U.S. and overseas during the last twenty-five years. He was director of engineering of Lectromelt, founder and president of Consarc, and for the last ten years has been owner-operator of the New Jersey corporation which designed and built the full scale SHERWOOD primary melter prototype in Luxembourg in 1980-81. He has earned a reputation for designing and building newer and simpler melting systems which consistently operate at less cost than their predecessors.

Mr. William G. Wood, President  
PSM Technologies Inc.

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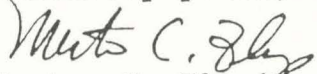
February 23, 1986

The documents available to me for this analysis are listed below:

1. Report by Professor T.B. King, June 1985.
2. Commentary on Professor King's report by Professor H.B. Bell of Strathclyde, July 1985.
3. Report by Professor Tor Grong of Trondheim, July 1986, with telex postscript November 1986.
4. Report by Professor R.J. Fruehan of Carnegie Mellon, November 1986.
5. Chromium resources in the United States by Nicholas Wetzel of the Bureau of Mines (unpublished).
6. SHERWOOD Pacific's business plan.
7. Chase Econometrics' study of the market for low-carbon ferrochrome prepared for the Pacific Power and Light.
8. A variety of additional sources, both industrial and from within this and other universities.

The key to the profitability of this project is the combination of WOODING's newly proven "SHERWOOD" primary melter with vacuum refining technology. None of these elements is new in itself. Their combination may involve mechanical and/or electrical equipment modifications during commissioning, but the overall principle is absolutely sound and should result in production costs 35% to 40% less than the current worldwide means of producing low-carbon ferrochromium. I also believe that this new technology will find application in the production of high value added ferrous alloys.

Sincerely yours,

  
Merton C. Flemings  
Toyota Professor and Head  
Department of Materials Science and  
Engineering  
Massachusetts Institute of Technology

MCF:hnp

(also sent via FACSIMILE)

Attorney FJI

Copy for  
Fred Hansen  
Don Hull

LEAGUE OF WOMEN VOTERS OF COOS COUNTY

P.O. BOX 3155  
COOS BAY, OREGON 97420

RECEIVED

JUN 3 1987

RECEIVED-PILL

JUN 30 1987

GOVERNOR'S OFFICE  
DEPARTMENT OF GEOLOGY  
MINERAL INDUSTRIES

May 25, 1987

Frank G. Martin, General Manager  
Oregon International Port of Coos Bay  
Front and Market  
Coos Bay, OR 97420

Dear Mr. Martin:

As you know, a number of residents of the area have expressed concern about the proposed ferrochromium smelting plant to be sited on the North Spit. Notwithstanding the community's great need and desire for new industry, a number of issues have been raised which need to be addressed.

We noted with interest a recent newspaper article in which you were quoted as saying that "the entire project will require community review and permitting by state and federal regulatory agencies." We were pleased that the community will have the opportunity to review the project and agree that such a review is essential to alleviate economic, environmental, and ethical questions which have been raised.

We are unable to tell from the comments in *The World* exactly how the community review will be effected. When will the review period begin, and how will members of the public be made aware of the opportunity for involvement? Also, since we do not know the exact location of the proposed site, we are not sure what agencies will be involved in the permitting process.

Much of the public concern about this project could be alleviated by answers to these and other questions which have been raised in recent weeks. We urge you to take the earliest possible opportunity to inform local residents of the facts about the proposed project.

Sincerely,

*Alice Carlson*

Alice Carlson  
Ellen Stinchfield  
Co-Presidents

cc: ✓ Governor Goldschmidt  
The World





## STATE OF OREGON

## INTEROFFICE MEMO

RECEIVED-PTLD

TO: Don Hull

DATE: April 24, 1987

APR 27 1987

FROM: Len Ramp

DEPT. OF GEOLOGY  
& MINERAL INDUSTRIES

SUBJECT: Low carbon ferro chromium smelter for Coos Bay

A newly formed company - Sherwood Pacific Limited was initiated to construct and operate a chromium smelter in Coos Bay, Oregon. Announced on the 11th of April, 1987 to the Vancouver, B.C. Stock Exchange by parent company, P.S.M. Technologies, Inc., a subsidiary of U.S. Chrome, Inc. and U.S. Nickel Corp. (See copy of announcement by Bill Wood, President & clippings enclosed).

Pacific Power and Light is reportedly funding the project in the amount of \$2,000,000 as well as offering an incentive power rate agreement and installation of a \$4,000,000 transmission and substation facility.

The Governor through EDD is also expected to contribute to the project. P.S.M. (Precious Strategic Metals) will provide \$10,000,000 to the project and have exclusive right to supply raw material to the smelter.

The Port of Coos Bay is providing a fully-serviced site including deep water dock on very attractive terms for the first six years. Frank G. Martin, Jr. Port General Manager is credited with arrangements.

Primary suppliers of Domestic Chromite are reported to be Del Norte Chrome and Asamera Metals from mines in N. California.

I have been told that minimum grade ore acceptable at the smelter will be 46% Cr<sub>2</sub>O<sub>3</sub> with a Cr:Fe ratio of 2.05 to 1.

The U.S. BuMines estimates California has 1.6 million metric tons of Cr<sub>2</sub>O<sub>3</sub> contained in 14.6 million mt with a Cr:Fe ratio of greater than 2.0. How much of this is greater than 2.5 Cr:Fe ratio isn't reported but it may be about 1 million mt. One million mt of Cr<sub>2</sub>O<sub>3</sub> contains 684,250 mt of Cr. If the plant is to produce only 30,000 mt of LCFC which contains about 50% Cr, the 1 million mt of Cr<sub>2</sub>O<sub>3</sub> would last more than 40 years. LCFC (March market quotes E & MJ effective 9-25-86) sells for about 83¢ a pound (.82 to .84) of contained Cr. Better check my figures. They sound too good.

Interoffice Memo  
To Don Hull  
April 24, 1987  
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Lloyd Frizzell indicated to me that the plant would probably be using imported foreign ore also.

I seem to recall that Jim Haight said the John Day ore could be upgraded to only about 43%  $\text{Cr}_2\text{O}_3$  with a less than 2 to 1 Cr:Fe ratio so it wouldn't be considered a source.

I'll have more details regarding this subject following my meeting with Tony Kuhn of CCD business development and Herb Wedge and Don Meyers of Hanna Nickel this Friday A.M.

See you in Portland.

A handwritten signature in cursive script, appearing to read "Len".

Len

LR:rep  
Encl: 4 pages photo copies



## STATE OF OREGON

## INTEROFFICE MEMO

TO: Gail Achterman

DATE: March 5, 1987

FROM: Steve Petersen *SP*  
Economic Development

SUBJECT: Sherwood Pacific Corporation Construction of a Ferrochromium Smelting Plant in Coos Bay

The Governor asked me to brief you on this project. Since we have not been able to connect on the phone, I would appreciate any information or comments you have on this project or on ferrochromium. We are assisting PPL and the Port of Coos Bay in attempts to attract Sherwood Pacific Corporation to Coos Bay. Sherwood Pacific Corporation is a new company which will be formed by:

1. Pacific Power and Light which is considering incentive electric power rates, constructing a \$4 million substation, and \$2 million in equity investment. PPL would have 6% of voting stock and ownership.
2. Wooding, a New Jersey corporation owned by P. J. Wooding, which will provide \$10 million in equity and at least 510,000 tons of high grade chromite concentrate. PSM will own 30% of the voting stock.
3. PSM Technologies, Inc., a Vancouver, British Columbia company, which will provide \$10 million in equity and at least 510,000 tons of high grade chromite concentrate. PSM will own 30% of the voting stock.

Project

Sherwood will build and operate a smelting facility for the production of low carbon ferrochromium using chromite ore deposits in southern Oregon and northern California. A full production scale unit has been successfully tested. Project development cost is estimated at \$20 million. The facility will employ 60 initially and up to 250 as production at the facility expands. There are also plans to develop production facilities on the site that will process other special metals on the site. PSM owns the chromite deposits as well as several other ore mines and deposits throughout the world. Sherwood is looking to purchase 40 acres for the project.

Competition

1. British Columbia offers electricity at 9 mills and \$3 million in subsidies. Problems include a B.C. sales tax, potential labor problems, and possible tariff issues.

2. Oregon is being considered because of its proximity to the ore deposits. They are considering Coos Bay because of its location on a deep water port. Grants Pass has also been discussed due to its proximity to the ore deposits. P.J. Wooding prefers Coos Bay.

#### STATUS

PPL, PSM and Wooding are negotiating a final agreement this week. Coos Bay and EDD have made an aggressive financial proposal to the partners for development of the project at the Port of Coos Bay.

ST:ljs

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