

KAWASAKI STEEL CORPORATION

ENVIRONMENTAL SYSTEMS DIVISION

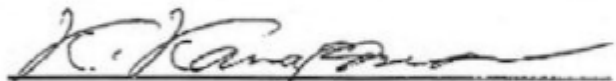
Chiyoda-ku, Tokyo 100, JAPAN

Date : May 10, 2000
To : Dr. Jurgen Reigel
of : Thermoselect S.A
Telefax : 41-91-7562598
From : Kazuteru Kanazawa
Number of pages : 1

Dear Dr. Reigel,

This is to inform you that we, Kawasaki Steel Corporation, received on April 13, 2000 a certificate for successful completion of the technical test run for municipal waste treatment regarding a Thermoselect plant at Chiba issued by the Japan Waste Management Association. This certificate is now equivalent to the approval by the Ministry of Health and Welfare which is referred to in Article 6 of License and Technical Assistance Agreement after abolishment of such approval by the Ministry of Health and Welfare. This event has a very important meaning to Kawasaki in that we are able to market and sell the plants in Japan.

Sincerely yours,



Kazuteru Kanazawa
Director

技術検証・確認概要書

川鉄サーモセレクト式ガス化熔融技術

(本技術の概要)

本技術は、ごみを前処理せずに圧縮し、閉鎖加熱して乾燥・脱ガスした後、融解の供給により高温でガス化と改質を伴って、清浄な融解ガスを回収するとともに、不燃物は溶融した後スラグおよびメタルとし、その他、金属水酸化物、灰質、混合塩等を回収することを目的とする技術である。

この技術は、平成9年11月にスイス国サーモセレクト社から川崎製鉄株式会社で技術導入したものである。

廃棄物処理施設検証・確認事業実施要綱の規定に基づき、平成11年8月25日に受理した上記技術については、下記のとおり検証・確認を終了した。

平成12年3月31日

社団法人 全国都市清掃会議

会長

高秀秀信



記

1 検証・確認申請技術の特徴

申請による本技術の主な特徴は、以下のとおりである。

- (1) 処理過程におけるダイオキシン類の発生を極力抑制し、施設全体からのダイオキシン発生量は非常に小さい。
- (2) ごみを変換処理して精製ガス・スラグ・メタル・金属水酸化物・灰質・混合塩等を回収し、これらの回収物をリサイクルすること、飛灰が発生しないことで、埋立処分量をゼロにする可能性がある。
- (3) 破砕等のごみの前処理が不要である。
- (4) ごみの熱分解・改質と溶融を一体化したシステムになっていること、発生するガス量が少ないため施設全体がコンパクトであるが、ガスの精製に湿式処理を採用しているため水処理設備が比較的に複雑である。

2 検証・確認の範囲と方法

- (1) 川崎製鉄株式会社の子会社製鉄所内に設置された150t/日×2系列の施設を検証・確認の対象範囲とした。(この施設には、精製ガス利用設備・塩酸造酸槽・酸水製造設備は含まれない。)
- (2) 検証・確認に当たっては、申請者から提出された技術資料および運転データを解析し、ヒアリング調査を行うとともに、総合的に検討を行った。
- (3) ドイツ国カールスルーエ市に建設・試運転中の実用施設(240t/日×3系列)を現地調査し、精製ガス利用設備・塩酸造酸槽・酸水製造設備等の検証・確認を補充的に実施した。

3 検証・確認の結果

- (1) 実用レベルにあると判断される。
- (2) 回収物の確実な引受先を、事前に確保することが必要である。
- (3) 合成ガス冷却水の低溫熱の有効利用が期待できない場合は、水使用量が多くなる。

4 検証・確認の詳細

別添の検証・確認報告書(文書番号 H12RT-001)による。

5 検証・確認申請者

- (1) 申請者 川崎製鉄株式会社
- (2) 代表者 取締役社長 江本 寛治
- (3) 所在地 東京都千代田区内幸町2-2-3

**General Description of Technical Verification and Confirmation
On
Kawasaki Steel Thermoselect Gasification Technology**

Outline of the technology

The purpose of this technology is that the waste, without pre-preparation before this process, is compacted, dried and degassed by indirect heating, gasified and reformed with high temperature obtained by supplying oxygen to recover clean synthesis gas, slugs and metals by melting of non farmable waste in the process, metal hydroxide, sulfur, mixed salt.

This technology was introduced in November, 1997 by Kawasaki Steel from Thermoselect S.A. located in Switzerland.

It is certified that the verification and confirmation on the technology described above which application was received on August 25, 1999 has been completed as follows in accordance with the procedure of waste processing technology verification and confirmation.

Date : March 31, 2000

By Japan Waste Management Association
Chairman

1. The main feature of the technology

As per application

- (1) To prevent as much as possible generation of dioxins in the process of waste treatment and the emission of dioxin from the entire process facility is very small.
- (2) From actual waste treatment, synthesis gas, slugs and metals, metal hydroxide, sulfur, mixed salt and other by products are recovered. From the point that these recovered materials are recycled and no fly ash is produced in this process, the quantity of waste to the final landfill can be zero.
- (3) The pre-treatment of waste such as crushing etc. is not required.

- (4) Because of the integrated process of the thermal decomposition and reformulation and melting of waste and the low quantity of gas produced, the facility is designed compact. The water treatment facility is rather complicated because of the use of wet processing for gas refining.

2. The scope of verification and manner of investigation

- (1) The facility with capacity of 150 tons/day/line x two lines build in the Chiba steel works compound of Kawasaki Steel Corporation is verified. (This facility does not have a synthesis gas consumption facility, mixed salt production facility and oxygen production facility in the process facilities.)
- (2) For verification, the technical data, operation data submitted by the applicant were used and analyzed and interview and inspection were conducted. Consolidate investigation was done.
- (3) The visit to the commercial facility being under construction and test running in Karlsruhe , Germany (240t/day x 3 lines) was made to investigate supplementary the facilities of synthesis gas use, mixed salt production, oxygen production etc.

3. Result of verification and confirmation

- (1) It is decided that this is in a practical level.
- (2) It is necessary to secure in advance the recipient of the recovered products.
- (3) Any effective method of low temperature recovered from the gas cooling is not expected, the quantity of water used will be large.

4. Details of the verification and confirmation

As per attached investigation and confirmation report (Document No. H12RT-001)

5. Applicant

- (1) Name of applicant : Kawasaki Steel Corporation
- (2) Representative : President, Kanji Emoto
- (3) Address : 2-3, Uchisaiwaicho 2-chome, Chiyoda-ku, Tokyo, Japan