

US EPA ARCHIVE DOCUMENT

**ATTACHMENT 7**

**F006 SLUDGE RECYCLING PROJECT  
POTENTIAL STAKEHOLDER'S MEETING**

# **F006 Sludge Recycling Project**

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## **Potential Stakeholder's Meeting**

# Agenda

- Introduction
- Project XL Background Information
- Overview of F006 Sludge Recycling Project
- Background Information
- F006 Sludge Recycling Project Description
- Project XL Criteria
- Requested Flexibility
- Summary

# Introduction

- Proposal is to reuse wastewater sludge in cement manufacturing
  - ▶ Similar composition
  - ▶ Proven feasibility
- Requested flexibility
  - ▶ Concurrence that sludge becomes an integral part of the cement

# USEPA Project XL Program

- What is the Project XL program?
- Public Participation is key
  - ▶ Sponsors and Co-Sponsors
  - ▶ Stakeholders
- How does it work?
  - ▶ Preproposal
  - ▶ Proposal Development
  - ▶ EPA / State Proposal Review
  - ▶ Development of Final Project Agreement
  - ▶ Project Implementation

# Stakeholders and Sponsors

- Who are Sponsors?
- Who are Co-Sponsors?
- Who are Stakeholders?
  - ▶ Direct Participants
  - ▶ Commentors
  - ▶ General Public

# Overview of F006 Sludge Recycling Project

- Reuse of wastewater treatment sludge in cement manufacturing
  - ▶ F006, wastewater treatment sludge from electroplating operations
  - ▶ IBM East Fishkill Facility West Complex
  - ▶ 300 tons / year
- Regulatory considerations
  - ▶ "use/reuse" exemption
  - ▶ "use constituting disposal" restriction



# Background Information

- Wastewater treatment sludge reused in cement kiln 1988 - 1991
  - ▶ NYSDEC and USEPA concurrence
  - ▶ 2300 tons
- Regulatory changes / interpretations
  - ▶ BIF Rules
  - ▶ Land Disposal Restriction Treatment Standards
- Reuse program discontinued in 1991

# F006 Sludge Recycling Project Description

- Generation
- Characterization
  - ▶ Composition
  - ▶ Appendix VIII Constituents
  - ▶ Comparison to raw materials
- Effect on cement products
- Transportation to cement kiln
- Processing at cement kiln

# F006 Sludge Composition - General

<b>Major Constituent</b>	<b>Approximate Concentration</b>
Water	50%
Calcium Hydroxide	15%
Calcium Carbonate	15%
Calcium Fluoride	8%
Various Sulfates	2% - 3%

# F006 Sludge Analysis - Appendix VIII Constituents

<b>Constituents Analyzed For</b>	<b>Rationale</b>
Hexavalent Chromium, Nickel, Cadmium, Cyanide (complexed)	F006 sludge listed constituent; Utilized in manufacturing process
Chromium, Lead, Mercury	Utilized in manufacturing process; Analysis requested by USEPA
Volatile Organic Compounds, Semivolatile Organic Compounds, Silver, Formaldehyde, Saccharin	Utilized in manufacturing process
Arsenic, Beryllium, Dioxins and Furans	Analysis requested by USEPA

# F006 Sludge Composition - Minor Constituents (Total)

Constituent of Concern	Analytical Result (mg/kg) (1) Min - Max; Mean
Arsenic	2.2
Beryllium	0.21
Cadmium	0.26 - 0.77; 0.52
Chromium (total)	9.8 - 20.0; 14.9
Lead	1.91 - 16.8; 9.36
Nickel	8.0 - 8.33; 8.16
Silver	0.123 - 1.4; 0.76
Cyanide (total)	<0.393 (MDL)
Cyanide (amenable)	<0.393 (MDL)

(1) Based on samples taken 2/8/99 and 11/1/99

# F006 Sludge Composition - Minor Constituents (TCLP)

Constituent of Concern	Analytical Result (mg/l) (1)	LDR Treatment Standard (mg/l)
Cadmium	<0.0004 (MDL)	0.11
Chromium (total)	0.0258	0.60
Lead	<0.002 (MDL)	0.75
Nickel	<0.002 (MDL)	11
Silver	0.0056	0.14
Cyanide (total)	<0.06 (MDL)	590 mg/kg
Cyanide (amenable)	<0.06 (MDL)	30 mg/kg

(1) Based on samples taken 11/1/99

# Comparison to Raw Materials - Major Constituents

Constituents	Limestone (%)	Typical Raw Mix (%)	IBM F006 Sludge (%)
SiO <sub>2</sub>	2.16	14.30	13.09
Al <sub>2</sub> O <sub>3</sub>	1.09	3.03	5.94
Fe <sub>2</sub> O <sub>3</sub>	0.54	1.11	0.36
CaO	52.72	44.38	41.33
MgO	0.68	0.59	0.89
S	0.03	nil	nil
SO <sub>3</sub>	0.02	0.07	8.45 (a)
Loss on Ignition	42.39	35.86	28.65
K <sub>2</sub> O	0.26	0.52	0.04
Na <sub>2</sub> O	0.11	0.13	0.08
Total	100.00	99.99	98.83

(a) Present as Sulfates

# Comparison to Raw Materials- Minor Constituents

Constituents	Typical Raw Mix (mg/kg) (Min - Max; Mean)	IBM F006 Sludge (mg/kg) (1) (Min - Max; Mean)	Effective Contribution in Feedstock (mg/kg)
Arsenic	1.5 - 11; 4.1	2.2	0.033
Beryllium	ND - 0.55; 0.23	0.21	0.0032
Cadmium	ND - 0.65; 0.46	0.26 - 0.77; 0.52	0.0078
Chromium (total)	9.8 - 29; 18	9.8 - 20.0; 14.9	0.22
Lead	ND - 6.3; 3.0	1.91 - 16.8; 9.36	0.14
Nickel	7.8 - 42; 19	8.0 - 8.33; 8.16	0.12
Silver	ND - 1.6; 0.51	0.123 - 1.4; 0.76	0.011
Cyanide (total)	ND - 2.2; 1.1	ND	ND
Cyanide (amenable)	NA	ND	ND

(1) Based on samples taken 2/8/99 and 11/1/99



# Effect on Cement Products

Chemical Constituent	Cement w/IBM Sludge (a)	Cement w/o IBM Sludge (b)
Ca	46.14%	44.31%
Si	9.29%	8.61%
Fe	2.73%	2.46%
Al	1.81%	1.76%
Mg	0.53%	0.61%
Cr (total)	98 ppm	81 ppm
Ni	24 ppm	29 ppm
Cd	49 ppm	55 ppm
Pb	25 ppm	29 ppm
Ag	46 ppm	55 ppm

(a) ICC Cement Product; 6/2/88 & 6/22/88 samples; Average

(b) ICC Cement Product; 4/18/88 & 7/4/88 samples; Average

# Project XL Criteria

- Superior Environmental Performance
- Benefits
- Transferability
- Feasibility
- Evaluation, Monitoring and Accountability
- Shifting of Risk Burden

# Project XL Criteria (Continued)

- Benefits
  - ▶ Higher position in waste management hierarchy
  - ▶ Conservation of natural resources and minimization of mining operations
  - ▶ Conservation / better utilization of landfill capacity
  - ▶ Cost savings
  - ▶ Avoided costs

# Project XL Criteria (Continued)

- Transferability
  - ▶ Landfill capacity
  - ▶ Disposal and transportation costs
  - ▶ Avoided costs
- Feasibility
- Evaluation, Monitoring and Accountability
  - ▶ Accountability
  - ▶ Enforceable and voluntary commitments
  - ▶ Tracking, reporting and evaluation
- Shifting of Risk Burden

# Requested Flexibility

- Use / reuse of hazardous waste in the manufacture of a commercial product
  - ▶ Exemption has been determined to be applicable
- "Use constituting disposal"
  - ▶ Agency decision required

# Summary

- Public participation is an essential element of the XL Project process
- Proposal is to reuse wastewater sludge in cement manufacturing
  - ▶ Similar composition
  - ▶ Proven feasibility
- Requested flexibility
  - ▶ Concurrence that sludge becomes an integral part of the cement

# Request

- Consider participation in this Project XL as a Direct Participant or Commentor

Salvatore Tranchina                      (845) 892-1629  
tranchin@us.ibm.com

Narayan Ayengar                        (845) 892-1624  
ayengar@us.ibm.com

IBM East Fishkill      B/325  
2070 Route 52  
Hopewell Junction, NY 12533