GENERAL LISTING BACKGROUND DOCUMENT FOR THE INORGANIC CHEMICAL LISTING DETERMINATION

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1. INTRODUCTION

1.1 BACKGROUND

The 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA require EPA to make listing determinations for several specified categories of wastes, including "inorganic chemical industry wastes" (see RCRA section 3001(e)(2)). In 1989, the Environmental Defense Fund (EDF) filed a lawsuit to enforce the statutory deadlines for listing decisions in RCRA Section 3001(e)(2). (EDF v. Browner; D.D.C. Civ. No. 89-0598). To resolve most of the issues in the case, EDF and EPA entered into a consent decree, which has been amended several times to revise deadlines for EPA action. Paragraph 1.g (as amended) of the consent decree obligates EPA's Administrator to sign a proposed listing determination for inorganic chemical wastes no later than August 30, 2000, and to sign a final listing determination for inorganic chemical wastes no later than October 31, 2001. As a result of the consent decree, EPA has investigated the inorganic chemical industry to determine whether the wastes generated pose a threat to human health and the environment and to establish a basis for making such a determination. This background document presents some of the information EPA used to make the listing determinations.

The listing determination includes wastes generated from the following 14 inorganic production processes as specified in the consent decree:

1. Antimony oxide
2. Barium carbonate
3. Boric acid
4. Cadmium pigments
5. Inorganic hydrogen cyanide
6. Phosphoric acid from the dry process
7. Phosphorous pentasulfide
8. Phosphorous trichloride
9. Potassium dichromate,
10. Sodium chlorate
11. Phenyl mercuric acetate
12. Sodium dichromate
13. Sodium phosphate from wet process
14. Titanium dioxide (except for chloride process waste solids).

Each of the 14 individual sectors are significantly different from one another in their production processes, waste generation and waste management practices. The EPA is therefore making separate listing determinations for each of the fourteen inorganic chemical sectors. The basis behind each listing determination will be discussed in the Sector Specific Background Documents.

As part of the Agency's current investigation of wastes from the inorganic chemicals industry, the EPA conducted engineering site visits to 22 chemical manufacturing facilities to gain an understanding of the present state of the industry. These 22 facilities were chosen based on the representativeness of processing within each sector and facility availability. Familiarization samples were collected at 10 facilities visited to obtain data on the nature of the wastes generated and to identify potential problems that could arise in future record sampling. Concurrently, the Agency developed, distributed and evaluated a census survey of the industry under RCRA section 3007 authorities. Dynamac Corporation was contracted (EPA Contract No. 68-W-98-231) to assist EPA in the characterization and evaluation of the industry wastes. Record samples of the wastes were collected from 13 facilities.

1.2 EXISTING INORGANIC CHEMICAL LISTINGS

EPA's Office of Solid Waste (OSW) made a previous study of the inorganic chemical industry in the 1980s. This study characterized the industry up to 1985. No listing determinations were made as part of the initial effort. The Agency has, however, proposed and promulgated a number of other hazardous waste listings that apply to the inorganic chemical industry. **Table 1.1** contains a list of current hazardous waste listings associated with the inorganic chemical industry.

Table 1.1 - Current Inorganic Chemical Listings

Hazardous Waste Number	Listing Description	Date of FR Publication
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments	11/12/1980
K003	Wastewater treatment sludge from the production of molybdate orange pigments	11/12/1980
K004	Wastewater treatment sludge from the production of zinc yellow pigments	11/12/1980
K005	Wastewater treatment sludge from the production of chrome green pigments	11/12/1980
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)	11/12/1980
K007	Wastewater treatment sludge from the production of iron blue pigments	11/12/1980
K008	Oven residue from the production of chrome green oxide pigments	11/12/1980
K071	Brine purification muds from the mercury cell process in chlorine production, where separately pre-purified brine is not used	01/16/1981
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production	07/16/1980 (Interim Final)
K106	Wastewater treatment sludge from the mercury cell process in chlorine production	01/16/1981

Initially the wastes categorized as K053 -K059 and K074 were included in the list of hazardous waste under §261.32 but were removed under the final rule promulgated October 30, 1980 (45 FR 72037).

The Agency also regulates wastes that exhibit a hazardous characteristic. Many of the wastes generated by the inorganic chemical manufacturing industry exhibit the Toxicity Characteristic (TC) due to the presence of high TC metal concentrations. The TC metals list is found in 40 CFR 261.24 and includes: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

1.3 OTHER EPA REGULATORY PROGRAMS AFFECTING THE INORGANIC CHEMICAL INDUSTRY

Each of EPA's major program offices has long-standing regulatory controls that apply directly and indirectly to the inorganic chemical industries. Some of the more significant programs with some relevance to this listing determination include the following:

- The Agency indirectly regulates emissions through standards such as the national ambient air quality standards (NAAQS). These standards require the States to control emissions of air pollutants through state permit levels.

- The Clean Air Act's National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for organic hazardous air pollutants from the inorganic chemical manufacturing industry at 40 CFR Part 63 include the following:

  - Subpart H, which regulates pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems, and control devices or systems used to operate an organic HAP for 300 hours or more during a calendar year.

  - Maximum Achievable Control Technology (MACT) standards are currently being developed or have been developed by EPA's office of Air & Radiation that address emissions from the inorganic chemical manufacturing industry:

    - The statutory promulgation date for the cyanide chemicals manufacturing industry MACT standard is November 15, 2000. This will regulate HCN releases from associated processing units.

    - A MACT standard for the phosphoric acid manufacturing industry was promulgated on June 10, 1999. This rule regulates emissions of of the metals: arsenic, beryllium, cadmium, chromium, manganese, mercury, and nickel.

    - The Agency has also promulgated MACT standards for facilities handling wastes generated from the inorganic chemical manufacturing industry, e.g. MACT standards for permitted hazardous waste incinerators (64 FR 52827, September 30, 1999), and MACT standards for cement kilns (64 FR 31989, June 14, 1999 and 64 FR 52827, September 30, 1999).

- The Safe Drinking Water Acts's Underground Injection Control (UIC) Program applies to the inorganic chemical industry when dealing with Class I and Class IV injection wells. The primary standards applying to these injection wells are contained in 40 CFR Part 146,UIC Program Criteria and Standards and Criteria and Part 148, Hazardous Waste Injection Restrictions. For the industries examined in this rulemaking, the UIC wells had no migration exemptions under Section 148.20.

- The Clean Water Act regulates industrial discharges discharged to the nation's waters and the introduction of pollutants into POTWs. Primarily, the inorganic chemical manufacturing industry's discharges are regulated under 40 CFR Part 415, Inorganic Chemical Manufacturing Point Source Category and Part 422, Phosphate Manufacturing Point Source Category. The specific discharge standards are listed below.

- Barium Carbonate Production - Part 415, Subpart Z;
- Boric Acid Production, Part 415, Subpart AB;
- Cadmium Pigments and Salts Production - Part 415, Subpart BL;
- Hydrogen Cyanide Production - Part 415, Subpart AP;
- Potassium Dichromate Production - Part 415, Subpart L;
- Sodium Chlorate Production - Part 415, Subpart BN;
- Sodium Dichromate Production - Part 415, Subpart Q;
- Sodium Phosphates Category - Part 422, Subpart F;
- Titanium Dioxide Production - Part 415, Subpart V.

2. INDUSTRY DESCRIPTION

2.1 INDUSTRY PROFILE

EPA's evaluation of the inorganic chemical industry included only those 14 manufacturing processes that were specifically listed in the consent decree as discussed in **Section 1.1**. The Agency evaluated each of the 14 processes separately and made listing determinations for each of the inorganic chemical industry sectors. The details of the listing determinations are presented in the individual Sector Specific Background Documents. Phenyl mercuric acetate has not been produced in the U.S. since 1992 and is the only manufacturing process not presented in a Sector Specific Background Document.

The inorganic chemical industry investigated by the Agency in 1998 is made up of 14 individual sectors and consists of 58 manufacturing facilities owned by 39 corporations. **Figure 2.1** presents the geographical distribution of these facilities throughout the United States. As can be seen from the figure most of the facilities are located in the eastern half of the country. All facilities identified as manufacturing inorganic chemicals are evaluated as part of the listing determination, except for two specialty chemical facilities that produced very small quantities of chemicals and generated extremely small quantities of wastes. (One facility reported producing small quantities of three chemicals under investigation: antimony oxide, barium carbonate, and titantium dioxide. The other facility produced small quantities of antimony oxide. See Appendix B for the full list of generators.)

The manufacturing processes that were evaluated as part of the listing determinations produce a wide variety of products with a diverse range of uses. These uses range from corrosion inhibitors and wood weather proofing to fire retardants and whiteners for paints. The wastes generated include process wastewater, sludges, and residues, reactor residues or slags, filter cakes, filter wastes, scrubber wastewater, still bottoms, and off-specification product.

2.2 INDUSTRY SECTORS

The manufacturing processes studied under this project are listed below. Each section displays the number of facilities, general information about product usage and the number of waste categories evaluated as part of the listing determinations.

Information for the following sector overviews were gathered from RCRA § 3007 surveys, engineering site visits and record sampling.

Figure 2.1 - Geographical Distribution of U.S. Inorganic Chemical Industry Facilities[1]

1. Refer to Appendix B for a complete listing of facilities and locations.

2.2.1 Antimony Oxide

Six facilities currently manufacture antimony oxide. However, two of the facilities are specialty chemical producers and were not evaluated during this listing determination due to their extremely low production and waste generation volumes. Antimony oxide is used mainly as a flame retardant in plastics and textiles.

2.2.2 Barium Carbonate

Three facilities were identified as currently manufacturing barium carbonate. However, one of the facilities was not evaluated during this listing determination due to their low production and waste generation volumes. This chemical is used in the glass and fine chemical industries.

2.2.3 Boric Acid

Two facilities currently manufacture boric acid. Uses for boric acid are extremely varied ranging from flame retardants to pest control.

2.2.4 Cadmium Pigments

One facility currently manufactures cadmium pigments. Cadmium pigments are used as the basis for pigments in paints.

2.2.5 Inorganic Hydrogen Cyanide

Ten facilities currently manufacture inorganic hydrogen cyanide (HCN). HCN is used as an intermediate in the manufacture of a number of important chemicals including: nylon, clear acrylic plastics, the recovery of gold, agricultural herbicides, animal food supplements, and chelating agents for water treatment.

2.2.6 Phenyl Mercuric Acetate

In 1990, EPA banned the use of phenyl mercuric acetate (PMA) in interior paint and soon after the industry agreed not to use PMA in paint production. No facilities currently manufacture PMA in the U.S. EPA determined that no further evaluation was necessary.

2.2.7 Dry Process Phosphoric Acid

Eight facilities currently manufacture phosphoric acid by the dry process method. Phosphoric acid is used in a variety of products including fertilizers, soaps and detergents and pharmaceuticals.

2.2.8 Phosphorous Pentasulfide

Three facilities currently manufacture phosphorous pentasulfide. This chemical is used in pesticides and in lubricating oils.

2.2.9 Phosphorous Trichloride

Six facilities currently manufacture phosphorous pentasulfide. Its primary use is as a pesticide intermediate.

2.2.10 Potassium Dichromate

One facility currently manufactures potassium dichromate. Sodium dichromate has gradually replaced potassium dichromate for most industrial uses.

2.2.11 Sodium Chlorate

Ten facilities currently manufacture sodium chlorate. This chemical is used by the pulp and paper industry as a bleaching agent.

2.2.12 Sodium Dichromate

Two facilities currently manufacture sodium dichromate. It is used mainly in the production of chromic acid.

2.2.13 Sodium Phosphate from Wet Process Phosphoric Acid

Four facilities currently manufacture sodium phosphate from wet process phosphoric acid. It is used for a wide variety of purposes, including products for the food industry.

2.2.14 Titanium Dioxide

Ten facilities currently manufacture titanium dioxide using the sulfate, chloride, or chloride-ilmenite process. However, one of the facilities was not evaluated during this listing determination due to their low production and waste generation volumes. A majority of the titanium dioxide produced is used in paints, varnishes and lacquers.

3. INFORMATION COLLECTION

3.1 INDUSTRY STUDY

The Agency collected current information about the inorganic chemical industry to establish a basis for the listing determinations made as part of this investigation. The two main sources of information were field work and an industry survey. The field work consisted of engineering site visits, familiarization sampling and record sampling. The industry survey involved the development, distribution and assessment of an industry wide RCRA §3007 survey. The specifics of the information collection activities are discussed below.

3.1.1 Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP) prepared for this project described the quality assurance and quality control (QA/QC) requirements for the data collection activities that were included as part of listing determinations. The QAPP is available in the rule making docket. This QAPP was prepared using *EPA Guidance for Quality Assurance Project Plans (QA/G-5),* dated February 1998. The data collection activities addressed in the QAPP include the collection of familiarization samples, the generation of Sampling and Analysis Plans (SAP) for record sampling and the generation of Record Sampling Reports and Waste Characterization Reports. Some items identified in the QAPP were deferred to site specific SAPs. The SAPs were developed to cover the specifics of each manufacturing process.

A list of target analytes and the associated target detection limits are identified in the QAPP. The target analyte list was developed based on the constituents that were expected to be in the processing wastes as determined from general knowledge of the wastes, the RCRA §3007 surveys and familiarization sampling. Appendix VIII metal constituents from 40 CFR Part 261 were the focus of the analyses. The list was expanded on a sector-by sector basis depending on the constituents expected. The target detection limits were obtained from established health-based criteria which included: maximum contaminant levels (MCLs), maximum contaminant level goals (MCLGs) or Superfund soil screening levels. In cases where health-based criteria do not exist, the target detection limits were estimated from the detection limits reported in the associated analytical methods. Additionally, all samples collected during sampling were subjected to two leaching extraction procedures, the Toxicity Characteristic Leaching Procedure (TCLP) and the Synthetic Precipitation Leaching Procedure (SPLP), to determine the potential for leaching. The following physical properties were also determined for each sample: pH, oxidation/reduction potential (Eh for all samples for metal analysis), specific gravity and percent moisture.

3.1.2 Engineering Site Visits

The EPA began the field work with a series of engineering site visits. The primary purpose of the site visits were to gain first hand knowledge of the manufacturing processes, waste generation and waste management practices and to identify sampling locations for each of the industry sectors.

The Agency selected 22 facilities to visit based on logistics, budgetary considerations and representativeness of processes and wastes generated within an industry sector. Some of the facilities that were visited manufacture more than one inorganic chemical. In those cases, information was collected for each of the manufacturing processes. **Table 3.1** presents the 22 facilities and 25 processes where engineering site visits were conducted.

Table 3.1 - Engineering Site Visit Locations and Dates

Table 3.1 - Engineering Site Visit Locations (continued)

Facility	Site Visit Date
Antimony Oxide	
Amspec Chemical Corporation, Gloucester City, NJ	12/15/98
Laurel Industries Incorporated, La Porte, TX	2/9/99
Barium Carbonate	
Chemical Products Corporation, Cartersville, GA	6/8/99
Boric Acid	
IMC Chemical, Trona, CA	2/17/99
U.S. Borax, Inc., Boron, CA	2/18/99
Cadmium Pigments	
Millennium Specialty Chemicals Inc., Baltimore, MD	12/10/98
Inorganic Hydrogen Cyanide	
DuPont Victoria, Victoria, TX	2/10/99
Rohm and Haas Texas, Deer Park, TX	2/11/99
Phosphoric Acid from Dry Process	
Albright & Wilson, Charleston, SC	12/2/98
FMC Corporation, Carteret, NJ	12/16/98
Rhodia Inc., Morrisville, PA	12/17/98
Phosphorous Trichloride	
Albright & Wilson, Charleston, SC	12/2/98
Rhodia Inc., Morrisville, PA	12/17/98
Phosphorous Pentasulfide	
Rhodia Inc., Morrisville, PA	12/17/98
Solutia Krummrich Plant, Sauget, IL	4/15/99
Sodium Chlorate	
Huron Technologies Corporation, Augusta, GA	3/10/99
CXY Chemicals, USA, Hahnville, LA	4/22/99
Sodium Dichromate	
Occidental Chemical Corporation, Castle Hayne, NC	12/3/98

Facility	Site Visit Date
Elementis Chromium-LP, Corpus Christi, TX	1/29/99
Sodium Phosphate from Wet Process Phosphoric Acid	
Rhodia Inc.-Chicago Height, Chicago Heights, IL	8/3/99
Rhodia Inc.-Waterway, Chicago, IL	8/3/99
Solutia, August, GA	8/10/99
Titanium Dioxide	
Kemira Pigments, Savannah, GA	3/9/99
DuPont Edge Moor, Edge Moor, DE	4/15/99
Millenium Inorganic Chemicals, Baltimore, MD	5/21/99

Engineering site visit reports were generated for each facility visited. The Engineering Site Visit Reports include the following information:

- Purpose of Visit
- Site Visit Chronology
- Process Description
- Waste Stream and Waste Management Practices
- Familiarization Sampling Activities

Engineering Site Visit Reports are available in the rulemaking docket.

3.1.3 RCRA §3007 Questionnaire

EPA developed an extensive questionnaire under RCRA §3007 for distribution to the inorganic chemical industry. A copy of the questionnaire is presented in Appendix A. The purpose of the survey questionnaire was to gather information on the solid and hazardous waste management practices from the fourteen industry sectors. The data obtained was used by the Agency to support engineering analyses in making a determination whether waste streams generated should be managed as hazardous under the RCRA regulations and whether they should be listed as hazardous wastes under 40 CFR 261. The questionnaire was organized to obtain information from the following categories:

- Corporate and Facility Information
- Process Information and Residual Identification
- Waste Characterization
- Waste Generation and Management
- Waste Management Unit Characterization
- General Facility Information
- Certification

The survey was distributed in March of 1999 to 126 manufacturing facilities that were identified as potential manufacturers of at least one of the 14 targeted processes within the inorganic chemical industry. A list of potential manufacturing facilities was generated from a review of data available from various information sources and talking with facilities during engineering site visits. The information sources included:

- SRI International. "1995 Directory of Chemical Producers, United States."
- SRI International. "1996 Directory of Chemical Producers, United States."
- SRI International. "1997 Directory of Chemical Producers, United States."
- *Industry Overview for the Inorganic Chemicals Listing Determination*, SAIC for EPA, September 30, 1997.
- Kirk-Othmer, Third Edition.
- Kirk-Othmer, Fourth Edition.
- Lewis, Peter. *Pigment Handbook: Volume 1, Properties and Economics*, 1988.
- Chemical Sources International, Inc. Chem Sources- U.S.A. 1993 Edition.

Address and contact information was collected and verified by using the internet (Yellow Pages and other search engines) and telephone information directory.

58 facilities returned surveys indicating that they manufacture at least one of the fourteen inorganic chemicals. 68 returned surveys, letters or phone calls indicating that the facility did not engage in the manufacturing of any of the processes of concern.

The completed surveys were reviewed by engineers for completeness and entered into an electronic database. An extensive series of quality assurance checks were run on the database to verify that the information received had been entered correctly. A thorough engineering review of the information from each facility was then conducted. Follow-up letters were sent out to facilities where additional information, clarification or correction of data was needed. Information gained from facility follow-up responses and follow-up telephone interviews were added to the database. The individual sector background documents provide the important information obtained from the 3007 surveys. These sector specific background documents, copies of the completed surveys, and related information are in the rulemaking docket.

3.1.4 Familiarization Sampling and Analysis

The Agency collected 22 familiarization samples of wastes from 10 of the inorganic chemical manufacturing facilities. The purpose of familiarization sampling was to identify unusual analytical matrices and any other sampling problems associated with a particular residual. Familiarization sampling was also used to determine if the analytical methods prescribed in the QAPP were appropriate. QA/QC samples were also collected along with the familiarization waste samples to assess the laboratory's analytical methods. **Table 3.2** summarizes the familiarization samples collected.

Table 3.2 - Familiarization Samples Collected

Facility	Sampling Date	Number of Waste Samples Collected
Antimony Oxide		
Amspec Chemical Corporation, Gloucester City, NJ	12/15/98	1
Laurel Industries Incorporated, La Porte, TX	2/9/99	1
Barium Carbonate		
Chemical Products Corporation, Cartersville, GA	6/8/99	7
Cadmium Pigments		
Millenium Specialty Chemicals Inc., Baltimore, MD	12/10/98	2
Phosphoric Acid from Dry Process		
Albright & Wilson, Charleston, SC	12/2/98	1
FMC Corporation, Carteret, NJ	12/16/98	1
Sodium Chlorate		
Huron Technologies Corporation, Augusta, GA	3/10/99	2
CXY Chemicals, USA, Hahnville, LA	4/22/99	2
Titanium Dioxide		
Kemira Pigments, Savannah, GA	3/9/99	1
Millenium Inorganic Chemicals, Baltimore, MD	5/21/99	4

The analytical data from the familiarization samples were validated according to the guidelines and methods in the QAPP. A Data Validation Report for Familiarization Sampling was prepared for each familiarization sampling event.

A Detailed Analytical Data Report was prepared for each facility where familiarization samples were collected. The report combines the Engineering Site Visit Report and the Data Validation Report for Familiarization Sampling into one document. The reports are available in the rulemaking docket.

3.1.5 Record Sampling and Analysis

EPA conducted record sampling at thirteen inorganic chemical manufacturing facilities. **Table 3.3** summarizes the location and number of waste samples collected during record sampling. QA/QC samples were also collected along with the waste samples to assess the laboratory's analytical methods and potential field contamination.   EPA selected the facilities for record sampling based on whether the EPA had reason to believe the wastes might present risks, based on information on the waste and known management practice, and potential coverage of the wastes under existing programs or regulations.

Site-specific Sampling and Analysis Plans (SAP) were prepared for all facilities prior to each record sampling trip. The SAP includes an identification of each sampling point, identification and description of sampling procedures including number and volume of samples, sample collection equipment, directions for split samples, and QA/QC procedures for field sampling personnel. SAPs are available in the rule making docket.

Record Sampling Reports were prepared for each of the sampling events. This report provides a synopsis and complete description of the sampling event including a description of the sampling event, a list of the personnel present, and number and type of samples taken. The Record Sampling Reports also document any deviations from the QAPP or SAP. A Data Validation Report for Record Sampling was prepared from the validation of the analytical data generated for each sampling event.

A Waste Characterization Report was prepared for each facility where record samples were collected. The report combines the Record Sampling Report and the Data Validation Report for Record Sampling into one document and is available in the rule making docket.

Table 3.3 - Record Sampling Locations

Facility	Sampling Date	Number of Waste Samples Collected
Antimony Oxide		
Laurel Industries Incorporated, La Porte, TX	9/16/99	2
U.S. Antimony Corporation, Thompson Falls, MT	9/23/99	5
Inorganic Hydrogen Cyanide		
Degussa-Huls Mobile Facility, Theodore, AL	8/26/99	6
DuPont Memphis Plant, Memphis, TN	8/12/99 10/26/99	5 3
Rohm and Haas Texas, Deer Park, TX	7/28/99 11/9/99	8 1
Sodium Chlorate		
Eka Chemicals, Columbus, MS	8/9/99	5
Huron Technologies Corporation, Augusta, GA	8/3/99	5
*Kerr-McGee Chemical LLC, Hamilton, MS	8/10/99	5
Sodium Phosphate from Wet Process		

Facility	Sampling Date	Number of Waste Samples Collected
Rhodia Inc.-Chicago Height, Chicago Heights, IL	9/14/99	3
Titanium Dioxide		
Kemira Pigments, Savannah, GA	9/9/99	6
DuPont Edge Moor, Edge Moor, DE	9/7/99	3
DuPont, New Johnsonville, TN	9/14/99	4
*Kerr-McGee Chemical LLC, Hamilton, MS	8/10/99	2
Millenium Inorganic Chemicals, Baltimore, MD	9/30/99	8

* Kerr-McGee Chemical LLC, Hamilton, MS manufactures both sodium chlorate and titanium dioxide. The waste waters from both processes are commingled and the process sludges from both processes are commingled. The wastewater sample and solid sample from the commingled waste streams were collected and used in the evaluation of both inorganic chemical sectors.

Appendix A
1998 RCRA §3007 Survey of the Inorganic Chemical Industry

1998 RCRA §3007 Survey of the Inorganic Chemicals Industry Instructions

This RCRA §3007 questionnaire is being used to gather information about solid and hazardous waste management practices in the U.S. inorganic chemicals industry. The Environmental Protection Agency (EPA) requires this information to determine whether certain residual streams should be managed as hazardous under the Resource Conservation and Recovery Act (RCRA), 42 USC 6901 et seq., and should be listed as such in the Code of Federal Regulations. Under §3007 of RCRA, 42 USC 6927, you are required to provide us with this information. However, if you believe that some parts of the information supplied by you are commercially sensitive, you may claim protection for the data. **Please note that this survey should be completed using available information or best engineering judgment and that you are not required to generate any new data.**

Responses may be typed or handwritten neatly. The signature/certification block should be completed by a senior official having authority over plant operations; it may not be completed by a consultant or any other third party.

The questionnaire consists of 7 categories of questions:

- I. Corporate and Facility Information
- II. Process Information and Residual Identification
- III. Residual Characterization
- IV. Residual Generation and Management
- V. Residual Management Unit Characterization
- VI. General Facility Information
- VII. Certification

Confidentiality: You may make a confidential business information (CBI) claim for each data element that is sensitive data. You may not withhold information from the Agency because you believe it is confidential. Information so designated will be disclosed by EPA only to the extent set forth in 40 CFR Part 2. If you fail to claim the information as confidential upon submission, it may be made available to the public without further notice to you. For each data point claimed to be CBI, complete the confidentiality claim in Appendix B.

We must notify you if we intend to deny your claim, and you have the right to seek judicial review. Otherwise, we must protect the information from disclosure to anyone other than EPA and its authorized representatives, and we may not release it under the Freedom of Information Act. It may, however, be disclosed to Congress or the Comptroller General of the United States at their request, or be released by order of a Federal court. The complete regulations regarding confidential business information are given at 40 CFR Part 2 Subpart B.

You may make a CBI claim with respect to all or any part of any information submitted in response to this request. Claims of confidentiality for information such as company name and address, site topography, and other information that is typically available through public sources are unlikely to be supportable. If a claim is made on such information, the Agency requires that you substantiate your claim; in that event, failure to substantiate your claim will result in a waiver of the claim. You are urged to review all potential confidentiality claims before presenting them to EPA and to make claims only on those portions of your response that you feel are business confidential.

Return the completed survey within 60 days from date of receipt to:

Anthony Carrell (5304W)
Office of Solid Waste
U.S. Environmental Protection Agency
401 M St., S.W.
Washington, D.C. 20460
Telephone: (703) 308-0458

For technical assistance, call the Dynamac technical assistance line at (301) 417-6057 or e-mail at Inorganics@dynamac.com

If you wish to claim any portions of the survey as CBI, please send the completed survey to Regina Magbie (5304W) at the address above.

On September 1, 1989 (54 FR 36592) the Agency established definitions of extraction, beneficiation, and mineral processing to determine if a waste stream was exempt from regulation under RCRA Subtitle C (hazardous waste). Only those 20 mineral processing waste streams noted at 40 CFR 261.4(b)(7) remain exempt from regulation under RCRA Subtitle C. On May 26, 1998 the Agency promulgated land disposal restrictions for newly identified mineral processing wastes. As part of that rulemaking the Agency issued a guidance document entitled "Identification and Description of Mineral Processing Sectors and Waste Streams, April 1998" which states the Agency's position on which waste streams are or are not Bevill exempt. This document has undergone extensive public review.

For purposes of filling out this questionnaire, companies must use the Agency's position on whether a waste stream is or is not Bevill exempt as described in the Agency's April 1998 guidance document. However, filling out the questionnaire information using Agency positions noted in the April 1998 guidance document is in no way an acknowledgment by a company that it agrees or disagrees with the Agency's positions. The use of the April 1998 positions is limited therefore to assuring that the Agency collects information to build the proper record necessary to meet the obligations under the EDF consent decree. Companies will have the opportunity to challenge any draft listing decision as part of the normal listing process.

The Agency will use the complete record to make listing determinations and will compare that record to the Agency's positions on what is Bevill exempt with each company's positions. The questionnaire has provided each company the opportunity to show where a waste is considered by the company to be exempt under Bevill.

All information and data provided in this survey should be based on the same calendar year to provide correlation between residual generation volumes and the residual volumes managed in onsite waste management units, if possible.

Public reporting burden for this collection of information is estimated to be 38 hours per response. This includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to: Director, OPPE Regulatory Information Division, U.S. Environmental Protection Agency (mail code 2137), 401 M St., SW, Washington, D. C. 20460; and the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, D.C. 20503.

I. Corporate and Facility Information

The purpose of this question is to provide general information regarding the name, location, mailing address, and contacts for the facility. In addition, environmental permit numbers are requested to enable the Agency to obtain information otherwise submitted to EPA under different reporting requirements, rather than requiring the facility to report the same information twice.

A. Parent Corporation ______________________________

B. Name of Company/Affiliate ______________________________

C. Other names by which the corporation may be known

____

D. Address of Corporation Headquarters

Street ______________________________

City ______________ State ________ Zip ______

E. Name of Facility ______________________________

F. Address of Facility

Street ______________________________

City ______________ State ________ Zip ______

G. Mailing Address of Facility (if different from above)

Street ______________________________

City ______________ State ________ Zip ______

H. Facility Location (call technical assistance number for obtaining this information, if needed)

Latitude: _____ deg _____ min _____ sec Longitude: _____ deg _____ min _____ sec

I. RCRA Hazardous Waste Generator ID Number: ______________________________

POTW/NPDES Permit Number: ______________________________

J. Name(s) of personnel to be contacted for additional information pertaining to this questionnaire

Name	**Title**	**Telephone**
____________	____________	____________
____________	____________	____________
____________	____________	____________

For Internal Use Only

Facility Number: ____________

Notes: ______________________________
____
____

II. Process Information and Residual Identification

This question asks for more detailed information about the specific unit operations that are associated with the inorganic chemical processes.

Characterization of these units will provide the Agency with basic information regarding the generation of residuals from the inorganic chemical processes. Please check off all of the pertinent boxes from the list of processes below. If your facility produces more than one product, the survey will have to be completed for each product and/or process. If your company does not produce any of these products check "none of the above" and go to Section VII and sign the certification.

G sodium dichromate production
G phosphoric acid production via the dry process
G phosphorous trichloride production
G phosphorous pentasulfide production
G sodium chlorate production
G antimony oxide production
G cadmium pigment production
G barium carbonate production
G boric acid production
G inorganic hydrogen cyanide production
G titanium dioxide production
G potassium dichromate production
G phenyl mercuric acetate production
G sodium phosphate production from wet process phosphoric acid
G none of the above

Residuals generated from these units are referred to as the residuals of concern (RCs). Residuals may be solids, liquids, sludges, or confined gases. Residuals may be recycled within your process or reclaimed; such residuals must be identified regardless of their disposition. Also, residuals may be generated infrequently (e.g., only during unit turn-arounds).

II.A. Process Descriptions and Flow Diagrams

Provide a simplified process flow diagram (PFD) and a brief description for each of the processes checked above.

It is not necessary to provide PFDs for your facility's other process units or for the facility's wastewater treatment facility.

Each process flow diagram should (1) illustrate the major process flows and (2) identify all residuals and their point of generation in the process. Some of the inorganic chemical processes require special information. These additional requirements are presented in the "Process-Specific Information" section below. For each process, use as much detail as is necessary to accomplish the applicable requirements. Appendix A provides example process flow diagrams, illustrating the types of information and level of detail that EPA is requiring. If your processes are similar to any of these examples, you have the option of editing the examples to reflect your operations rather than preparing new PFDs. The general information requirements of the PFDs are as follows.

- Assign each residual a unique Residual Identification Number (RIN). Use a line with an arrow to denote the point in the process from which the residual is generated, and identify the residual by its RIN. RINs should be unique.

- Provide a brief written description of the process including a discussion of major reaction and/or separation processes. The discussion should focus on the generation of the residuals, including residuals that may be subsequently recycled. All the residuals identified in the PFD should be mentioned in the process description. If applicable, describe any process used to collect/handle residual streams (e.g., off-gas scrubbers, filter press).

- Provide a block for each major unit operation in the production process (e.g., pre-treater, reactor, fractionator, crystallizer).

- Identify process inputs (i.e., feedstocks) by name and the process unit from which the input comes. With arrows, indicate the point at which each input is introduced into the process.

- Identify all products. For intermediate products, identify the typical downstream process units.

- Identify all residuals. Residuals may be solids (e.g., spent catalyst), liquids (spent caustics, spent acids), sludges, or confined gases. Residuals may be recycled within your process or reclaimed; such residuals must be identified (i.e., give a RIN) regardless of their disposition. Also, residuals may be generated infrequently (e.g., only during unit turn-arounds). Some examples of residuals within the scope of this questionnaire are catalysts, waste liquor, leaching residual, still bottoms, scrubber wastewaters, and unsalable off-specification product generated during startup or unit upsets.

  Additionally, residuals can be generated during the treatment of other residuals (e.g., filter cake or ash from incineration).

- The following should NOT be identified as residual streams.

Pump gland water	Pipe rust and scale
Boiler water blowdown	Oily rags and gloves
Sanitary wastes	Sample bottles
Storm water	Pump casing sludge
Cooling tower blowdown and sludge	

- Sometimes two or more residual streams are combined prior to treatment or disposal. Each residual that is generated at a unique location should be assigned a unique RIN. For example, each wastewater stream should be assigned an individual RIN, even if the wastewater streams are combined for management.

<u>Process-Specific Information</u>

The following section describes the specific information requirements associated with each inorganic chemical process of concern. The purpose of this section is to focus your responses on the aspects of the processes that are of primary interest to the Agency. However, you should report all residuals generated from your process, as discussed above, even if they are not specifically addressed below.

If residual generation quantities are not reported in Section III for residuals (e.g., scrubber waters, process liquors) which result in process losses, report the make-up quantities or rate as part of the process descriptions.

All Processes:

- Assign a RIN to each of the air pollution control streams, including particulate matter collected from ESP or wet gas scrubbers. Identify all vented gases by name and disposition location but do not assign a RIN.
- Assign a RIN to all wastewaters produced as a result of day-to-day operations. These RINs should include process wastewaters and scrubber solutions. Also assign a RIN to wastewaters produced as a result of scheduled maintenance or cleaning. Please show any specialized waste treatment facility or process used for waste remediation, such as filtration.
- Assign a RIN to any waste streams that are created as a result of scheduled maintenance or cleaning operations. These wastes do not need to appear on the PFD, but should be described elsewhere in the survey including Table III.1.

Wastewater Treatment Operations

EPA is requiring a limited amount of information for wastewaters generated from inorganic production processes and managed in a centralized wastewater treatment system (i.e., managed with wastewaters from other processes). Specifically:

- A PFD for the wastewater treatment system is not required.
- Specify if discharge is to surface water or to a POTW.
- If wastewaters are generated, provide wastewater throughput (on an annual and daily basis) for the wastewater treatment plant in the process description.
- Describe any land based units (e.g., surface impoundments) in the wastewater treatment system. This includes settling ponds, biological treatment ponds, polishing ponds, etc.

Sodium Dichromate Production

Assign a RIN to each of the solid waste streams created during sodium dichromate production. These should include solid waste produced from ore residues, cleaning operations, or other routine operations.

Phosphoric Acid Production via the Dry Process

Assign a RIN to each of the solid waste streams produced from production of phosphoric acid. This will include remediation and filtering wastes from arsenic sulfide removal as well as any calcium phosphate containing sludges from filtration of scrubber waste. This will also include any sludges or residuals produced as a result of phosphoric acid storage. Assign RINs to all other solid waste streams that are produced on a regular or scheduled basis related to the production of Phosphoric Acid via the Dry Process. These will include: filter aids, filter cartridges, filter cloths, and solid wastes produced as a result of scheduled maintenance.

Wastewaters produced as a result of arsenic filtration or other waste removal system should be assigned a RIN. Any specialized treatment facility should be included in the process flow diagram.

Phosphorous Pentasulfide Production

Assign a RIN to the wastewater streams including waste generated from the waterseal surrounding the vacuum still and wastewater from scrubbing operations. Please include any other waste streams that are generated during scheduled maintenance of the operations.

Assign a RIN to each of the solid waste streams created during phosphorous pentasulfide production. These should include phosphorous mud residues created from cleaning out the water seals as well as still pot residues that contain arsenic pentasulfide.

Sodium Chlorate Production

Assign a RIN to each of the liquid waste streams from the production of sodium chlorate. Include wastes from chromium removal process as well as scrubber waste waters. Please include any specialized process equipment in the PFD.

Antimony Oxide Production

Assign a RIN to each of the solid waste streams including reactor slags and scrubber blowdown sludge (from the direct method) or furnace slag (from the indirect method).

Assign a RIN to each of the liquid waste streams.

Cadmium Pigment Production

Assign a RIN to each of the solid wastes produced during pigment production. These will include filtration devices, filter solids, spent filter cartridges, filter aids, black ash filter media, and wastewater treatment sludges. Please show any specialized waste treatment facility or process used for waste remediation.

Barium Carbonate Production

Assign a RIN to each of the liquid waste streams produced from barium carbonate production. These should include all process wastewaters.

Assign a RIN to each of the solid waste streams including unused ore residues and process treatment sludges. Please include any specialized waste treatment systems and wastes on the PFD.

Boric Acid Production

Assign a RIN to each of the wastewaters, if any, created during the production of boric acid. These should include waste liquors from centrifuges and dissolvers. Please show any special process equipment designed to treat waste liquors or other liquid waste streams.

Assign a RIN to each of the solid waste streams, if any, created during boric acid production. These should include filtration wastes, if any, and arsenic sulfide wastes, if any.

Inorganic Hydrogen Cyanide Production

Assign a RIN to all process wastewater and liquid waste streams. These should include ammonia-acid streams, if present. Please show any specialized equipment used to handle or treat the ammonia-acid mixture, if present, or wastewater streams.

Assign a RIN to solid waste streams generated during production of hydrogen cyanide, if any.

Titanium Dioxide Production

Assign a RIN to each of the wastewaters produced during titanium dioxide production. These should include all wastewater streams regardless of origin. These wastewater streams shall include both strong and weak acid wastes as well as scrubber waters. Please show any specialized equipment used in the remediation of the waste streams in the PFD.

Assign a RIN to each of the solid/sludge wastes generated in the titanium dioxide process. These should include metal/ore digestion sludges as well as any other sludge/solid waste streams. Please include any waste streams that are subsequently sold as by-product as part of the waste analysis.

Potassium Dichromate Production

Assign a RIN to all process wastewater and liquid waste streams. These should include mother liquors, if present, and all wastewater streams.

Assign a RIN to any solid waste streams generated during production of potassium dichromate, if any. These should include solid filter aid waste and sodium chloride salts from mother liquors.

Sodium Phosphate Production from Wet Process Phosphoric Acid

Assign a RIN to each of the solid/sludge wastes generated in the production of sodium phosphate from wet process phosphoric acid. These should include filter cake wastes, arsenic sulfide, as well as any other sludge/solid waste streams.

Phenyl Mercuric Acetate Production

Assign a RIN to each of the solid/sludge wastes generated in the production of phenyl mercuric acetate.

III. Residual Characterization

The purpose of this section is to develop detailed information regarding the residuals identified in Section II.A. This information will be central to the Agency's understanding of the characteristics of the RCs, the appropriate scope of the definitions of the RCs, hazard assessments, and, if necessary, land disposal restrictions (LDR) program analyses and regulatory impact analyses.

Copy the blank Table III.1 and complete it for every residual identified in Section II.A.

1. Identify each residual using the Residual Identification Number (RIN) assigned in Section II.A.

2. Indicate the residual's common name within your facility.

3. Classify each residual using the codes presented below.

   01 Solid catalyst
   02 Liquid catalyst
   03 Neutralization sludge
   04 Process sludge
   05 Spent filters or sorbents
   06 Spent caustics, acids or treating solutions
   07 Process wastewaters
   08 Air pollution control scrubber solids
   09 Other residuals, specify

4. If the residual has been identified as a hazardous waste in the facility's RCRA notification, indicate all applicable waste codes. If the residual is characteristically hazardous, please indicate the Dxxx code(s) that the waste exhibits. If the residual is not regulated as hazardous but is managed as hazardous in a hazardous waste management unit(s), use the "AS" code and indicate by footnote why this waste is managed as hazardous.

5. Indicate if the residual is exempt under the Bevill Exclusion (you must use the April 1998 guidance document entitled "Identification and Description of Mineral Processing Sectors and Waste Streams" in determining the exemption). If a RIN is identified in the April, 1998 guidance document as a Bevill-exempt waste, no further information is required for this RIN in this questionnaire. However, if you disagree with EPA's position on any residual, you can attach a justification for your company's position. However, you must complete the questionnaire for each of these residuals.

6. For each residual, provide the following typical physical characteristics (if applicable). Provide supporting documentation (e.g., lab results) if available. Otherwise, these properties should be estimated.

   pH
   Total, Reactive, and Amenable Cyanide
   Total and Reactive Sulfide*
   Vapor Pressure
   Viscosity
   Specific Gravity
   Particle Size Distribution
   Phase Distribution

7. List elements or compounds (inorganic and organic chemicals) that are known by analysis to be present in the residual and specify the concentration of each using weight %, ppm, or mg/L. If you need more space for your response, please continue on a separate sheet of paper. Please submit any available analytical data characterizing the residuals; submit both leachate data (e.g., Toxicity Characteristic Leaching Procedure (TCLP), Synthetic Precipitation Leaching Procedure (SPLP)) and total compositional data where possible. Describe by footnote any difficulties encountered in obtaining these analytical data (e.g., difficulties encountered at the laboratory in analyzing for a particular constituent due to the waste matrix).

* Although EPA has recently withdrawn the testing guidance for reactive cyanide and sulfide, please provide any historical information you have.

Table III.1. Residual Characterization

1. RIN ______________________	**3. Residual Code** ______________________	**CBI?*** Q
2. Common Name ______________________	**4. RCRA Code(s):** ______________________	
5. Please indicate for each RIN if the residual is Bevill exempt under EPA's position as described in the April, 1998 guidance document. (Optional: You can also provide justification as to why your company agrees or disagrees with EPA's positions as an attachment to this questionnaire.) However, you must complete the questionnaire for each of these residuals. ______________________		

6. Properties of Residual		**Particle Size Distribution**		**Phase Distribution & Other Properties**	
pH		> 60 mm	%	Moisture	%
Total CN	ppm	1-60 mm	%	Organic Liquid	%
Amenable CN	ppm	100 µm-1 mm	%	Solids	%
Reactive CN	ppm	10 µm-100 µm	%	Other (specify)	%
Total Sulfide	ppm	< 10 µm	%		
Reactive S	ppm				
Vapor Press.	mmHg				
Viscosity	cP				
Specific Gravity					

7. Residual Characterization

Element or Compounds	Total Concentration (mg/kg)	TCLP Concentration (mg/L)	Other Leaching Procedure Concentration (mg/L), Specify Method

*If CBI is claimed, complete Appendix B; all data in this table will be considered as claimed confidential.

IV. Residual Generation and Management

The purpose of this section is to develop detailed information regarding the residuals identified in the previous question, particularly with respect to how these residuals are managed. This information will be central to the Agency's understanding of the industry wide residual management practices for the RCs, the appropriate scope of the definitions of the RCs, hazard assessments, land disposal restrictions (LDR) program analyses (if necessary), and regulatory impact analysis.

IV.A. Residual Management

Copy the blank Table IV.1, and complete it for every residual identified in Section II.A. The following numbered items describe the information requirements for the corresponding columns in Table IV.1.

1. Specify the Residual Identification Number (RIN).

2. Indicate the quantity (wet basis, as generated and prior to treatment, metric tons) of residual generated during the calendar year 1998. If the residual was not generated in 1998, report the annual quantity most recently generated and the year of generation.

   If a residual was managed by more than one method, complete Table IV.1 for this RIN to account for the total residual quantity to the different management methods. Each residual quantity should correspond to the management method (or sequence of management methods) listed in column 5.

3. Indicate frequency of residual generation using one of the following codes:

A	Continuous	D	Every 32 days to 6 months
B	Every 1 to 7 days (e.g., weekly)	E	Every 6 to 18 months (e.g., annually)
C	Every 8 to 31 days (e.g., monthly)	F	Other, specify

   If the residual is generated less frequently than every 18 months, indicate in column 3 the typical number of years between residual generation events.

   Indicate if the response to questions 2 or 3 are CBI.

4. Indicate the management step. If a series of management steps are used, designate the first step by "1", the second step by "2," etc., and the final step by "F". Note that the last row should always be designated as "F." If only one management step is used, place an "F" in this column.

5. Specify the residual management method applied to the RIN using one of the codes provided below. Note that the management codes are broken into five categories: storage, treatment, recycle, transfer, and disposal. If a residual is subject to a sequence of methods (e.g., storage in a tank, onsite incineration), list the method codes on separate rows.

   If a residual is managed alternatively by more than one method or sequence of methods, list each method or sequence of methods in a separate block. For parallel management methods, allocate the residual quantity reported in item 2 to the different management trains.

Residual Storage Methods

Storage includes any method used to hold the residual onsite temporarily prior to further management.

01-A	Storage in a tank
01-B	Storage in container (e.g., drum)
01-C	Storage in pile with runon/runoff containment
01-D	Storage in pile without runon/runoff containment
01-E	Storage in surface impoundment
01-F	Storage in roll-on/roll-off bin
01-G	Other storage, specify

Residual Treatment Methods

For the purposes of this questionnaire, treatment includes any measure designed to change the character or composition of the residual to make it amenable to disposal or recovery or to reduce its toxicity, hazard, or volume.

02-A	Onsite hazardous waste incineration
02-B	Onsite non-hazardous waste incineration
02-C	Onsite flare
02-D	Onsite boiler
02-E	Onsite industrial furnace
02-F	Other onsite thermal treatment, specify
03-A	Offsite hazardous waste incineration
03-B	Offsite non-hazardous waste incineration
03-C	Other offsite thermal treatment, specify
04-A	Sludge thickening
04-B	Sludge de-watering (centrifuge, filter press)
04-C	Settling
04-D	Filtration
04-E	Emulsion break
04-F	Thermal emulsion break
04-G	Other phase separation, specify
04-H	Evaporation
05-A	Steam stripping
05-B	Washing with solvent
05-C	Washing with water
05-D	Other cleaning/extraction, specify
06-A	Onsite nonhazardous waste land treatment
06-B	Offsite nonhazardous waste land treatment
06-C	Onsite hazardous waste land treatment
06-D	Offsite hazardous waste land treatment
07-A	Onsite stabilization
07-B	Offsite stabilization
08-A	Neutralization
08-B	Biotreatment
08-C	Physical/Chemical treatment
09	Other treatment, specify

Residual Recycle Methods

Recycling/reclamation/reuse measures designed to recover useful constituents or energy, or to beneficially reuse the residual.

10-A	Recovery as pH buffer at wastewater treatment plant
10-B	Other recovery onsite, specify
10-C	Other recycling/reclamation/reuse, specify type and onsite or offsite

Residual Transfer Methods

Residual transfer includes the transfer of residuals to offsite entities for recycling/reclamation/reuse.

11-A	Transfer of acid or caustic for reclamation, regeneration or recovery
11-B	Transfer for use as an ingredient in products that are placed on the land (e.g., fertilizer)
11-C	Transfer to other offsite entity (specify type of recycling/reclamation/reuse)

Residual Disposal Methods

Disposal is the permanent disposition of the residual.

12-A	Discharge to onsite wastewater treatment facility (with land based units)
12-B	Discharge to onsite wastewater treatment facility (tank based system)
12-C	Disposal offsite municipal Subtitle D landfill
12-D	Disposal offsite industrial Subtitle D landfill
12-E	Disposal offsite Subtitle C landfill
12-F	Disposal offsite underground injection (specify class)
12-G	Other discharge or disposal offsite, specify
13-A	Disposal onsite Subtitle D landfill
13-B	Disposal onsite Subtitle C landfill
13-C	Disposal onsite underground injection (specify class)
13-D	Disposal onsite hazardous waste surface impoundment
13-E	Disposal onsite nonhazardous waste surface impoundment
13-F	Other disposal onsite, specify

6. Assign a unique residual management unit number (RMUN) to each residual management unit involved in the residual management process described in column 5. Each management code in column 5 should have a corresponding RMUN in column 6. For example, if a residual is disposed of in an onsite, nonhazardous waste landfill (code 13-A in column 5), a unique RMUN should be assigned to the onsite landfill in column 6. This RMUN will be used to reference the onsite landfill throughout the rest of the questionnaire. If more than one residual is disposed of in this landfill, use the same RMUN for each residual. If another residual is disposed of in a different landfill, the different landfill should be assigned its own unique RMUN.

7. Indicate Yes/No and describe by footnote any planned changes in generation or management of this RIN.

Table IV.1. Residual Generation Rate and Management

1. RIN ________	2. Quantity Generated ____________ (MT) Year of Generation (if not 1998) _________		3. Frequency of Generation ______________	CBI?* Q
4. Management Step	**5. Management Code**	**6. RMUN**	**7. Planned Changes**	**CBI?***
				Q
				Q
				Q
				Q
				Q

1. RIN ________	2. Quantity Generated ____________ (MT) Year of Generation (if not 1998) _________		3. Frequency of Generation ______________	CBI?* Q
4. Management Step	**5. Management Code**	**6. RMUN**	**7. Planned Changes**	**CBI?***
				Q
				Q
				Q
				Q
				Q

1. RIN ________	2. Quantity Generated ____________ (MT) Year of Generation (if not 1998) _________		3. Frequency of Generation ______________	CBI?* Q
4. Management Step	**5. Management Code**	**6. RMUN**	**7. Planned Changes**	**CBI?***
				Q
				Q
				Q
				Q
				Q

*If CBI is claimed, complete Appendix B.

IV.B. Offsite Management Facilities

Copy the blank Table IV.2 and complete it for all the offsite residual management facilities that manage residuals identified in Table IV.1.

Table IV.2. Offsite Residual Management Facilities

Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ City/State/Zip Code: ____ Distance from Facility to residual management facility: ____ CBI?* Q
Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ City/State/Zip Code: ____ Distance from Facility to residual management facility: ____ CBI?* Q
Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ City/State/Zip Code: ____ Distance from Facility to residual management facility: ____ CBI?* Q
Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ City/State/Zip Code: ____ Distance from Facility to residual management facility: ____ CBI?* Q
Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ City/State/Zip Code: ____ Distance from Facility to residual management facility: ____ CBI?* Q

*If CBI is claimed, complete Appendix B.

IV.C. Residual/Residual Management Unit Cross Reference Tables

This section is required for the storage, treatment, and disposal units identified in Table IV.1 (i.e., all RMUNs).

Complete Table IV.3 for all onsite and offsite residual management units. The following numbered items describe the information requirements for the corresponding columns in the table.

Each residual management unit should have been assigned a UNIQUE number in Table IV.1.

1. Indicate the Residual Management Unit Number assigned in Table IV.1.

2. For offsite units, state "OFF." For onsite units, state "ON."

3. Indicate the unit type using the following codes to describe each unit:

   Land-Based Residual Management Unit Codes:

   - L-1 Land treatment
   - L-2 Surface impoundment
   - L-3 Landfill
   - L-4 Deep well injection
   - L-5 Pile
   - L-6 Other (specify)

   Other Residual Management Unit Codes:

   - 1 Tank (including concrete-lined basins)
   - 2 Container
   - 3 Boiler
   - 4 Incineration
   - 5 Other (specify)

4. Indicate the common name used by your facility for this unit.

5. Indicate the RINs of all the residuals managed in each unit.

Table IV.3. Onsite and Offsite Residual Management Unit Identification

1. RMUN	2. Location (ON/OFF)	3. Unit Type	4. Unit Common Name	5. RINs Managed in Unit	CBI?*
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q

*If CBI is claimed, complete Appendix B.

IV.D. Chemical Production and Residual Management Costs

Please provide product yields for 1998 by completing Table IV.4 below. Complete Table IV.4 for each of the products (see boxes checked in Section II) and the amount generated in 1998.

1. Specify the products generated.

2. Specify the total production for each product for 1998 (MT/yr).

Table IV.4. Total Production

1. Product	2. 1998 Total Production (MT/yr)	CBI?*
		Q
		Q
		Q
		Q
		Q

*If CBI is claimed, complete Appendix B.

This section asks for the total annual management costs for each residual generated, any transportation costs, and payment received, if any.

Please provide residual management cost information in Table IV.5.

1. Give the Residual Identification Number (RIN) for each residual generated.

2. Specify the annual transportation cost (if any) to offsite management facilities. ($/MT)

3. Specify the total annual management cost to the generator. ($/MT)

4. Specify any annual payment received. ($/MT)

Table IV.5. Residual Management Cost Table

1. RIN	2. Transportation Cost ($/MT)	3. Management Cost ($/MT)	4. Payment Received ($/MT)	CBI?*
				Q
				Q
				Q
				Q
				Q
				Q
				Q
				Q
				Q

*If CBI is claimed, complete Appendix B.

V. Residual Management Unit Characterization

The purpose of this section is to collect more detailed information characterizing the residual management units identified in Question IV. This section should not be completed for offsite facilities that are not owned wholly or in part by either the facility or its parent company (i.e., facilities that are not captive offsite facilities).

V.A. General Information

1. Specify the Residual Management Unit Number noted in column 1 of Table IV.3.

2. Specify the month and year that the unit was opened.

3. Specify the month and year that the unit is expected to be closed.

4. Estimate the total active life of the unit (years).

5. Indicate the RCRA permit status of the unit using one of the following codes.

   N None
   IS Interim status (40 CFR Part 265)
   B Part B (40 CFR Part 264)
   S Solid Waste Management Unit (SWMU) (as defined by 40 CFR §264.90)

6. Has the unit been identified as a source of contamination requiring a RCRA Field Investigation (RFI)?

Table V.1. Residual Management Unit Characterization

1. RMUN	2. Date Opened (month/year)	3. Closure Date (month/year)	4. Total Active life (years)	5. Permit Status	6. RFI? (Y/N)	CBI?*
						Q
						Q
						Q
						Q
						Q
						Q
						Q
						Q
						Q
						Q

*If CBI is claimed, complete Appendix B.

V.B. Land-Based Units (other than land treatment): Unit Size and Covers

Complete Table V.2 for all onsite and captive offsite land-based management units (except land treatment units) listed in Table IV.3. The following numbered items describe the information requirements for the corresponding columns in Table V.2.

1. Indicate the Residual Management Unit Number (as noted in Table IV.3, column 1).

2. Indicate the surface area of the unit (acres).

3. Indicate the average height of the unit above grade (ft) and the average depth of the unit below grade (ft). For example, if your landfill's finished elevation (excluding final cover) is 5 feet above grade and it extends 10 feet below grade, report “5" in the first column and “10" in the second column.

4. Indicate the total capacity of the unit (cubic yards).

5. Indicate the remaining capacity of the unit as of January 1, 1998 (cubic yards).

6. Indicate the percent of the remaining capacity that was used in 1998.

7. Specify the frequency in which a cover is applied (daily, weekly, biweekly, monthly, other).

8. Are dust suppression techniques used? If yes, specify the type in a footnote.

Table V.2. Land-based Units (other than land treatment): Unit Size

1. RMUN	2. Surface Area (Acres)	3. Height (ft)		4. Total Design Capacity (cu. yd.)	5. Remaining capacity as of 1/98 (cu. yd.)	6. % Remaining capacity used in 1998	7. Frequency in Which Cover is Applied	8. Dust Suppression? Yes/No	CBI*
		above grade	below grade						
									Q
									Q
									Q
									Q
									Q
									Q
									Q
									Q
									Q
									Q

*If CBI is claimed, complete Appendix B.

V.C. Land-based Units: Landfills

Complete Table V.3 for all onsite and captive offsite landfill units listed in Table IV.3. For offsite units, there is no obligation to the generator to collect information about the landfills if unknown. The following numbered items describe the information requirements for the corresponding columns in the table.

1. Specify the Residual Management Unit Number noted in Col. 1 of Table IV.3.
2. Specify the total area of the landfill (acres).
3. Specify the number of cells into which the landfill is divided.
4. Specify the average area of the landfill active at any time (acres).
5. Specify the thickness of the waste distributed over the cell (ft.).
6. Specify the percentage of the area of the total landfill that contains the Residuals of Concern (RC).

Table V.3. Land-based Units: Landfills

1. RMUN	2. Total Area (acres)	3. # of Cells	4. Active Area (acres)	5. Thickness of Waste Distributed Over Cell (ft.)	6. % of Total Landfill that Contain RC(s)	CBI?*
						Q
						Q
						Q
						Q
						Q
						Q
						Q

*If CBI is claimed, complete Appendix B.

V.D. Land-Based Units: Design and Construction

1. Indicate the Residual Management Unit Number (as noted in Table IV.3, column 1).

2. Using the codes below, characterize each layer of the unit's liner in sequence from the uppermost layer to the bottom of the unit. Use a separate line for each layer.

   1 Re-compacted clay liner
   2 Synthetic liner
   3 Natural clay liner
   4 Leachate collection layer
   5 No liner
   6 Other liners (specify)

3. Indicate the thickness of the layer.

4. Indicate the units (inches or millimeters) associated with the thickness measurement in column 3.

Table V.4. Land-based Units: Liner Construction

1. RMUN	2. Liner Construction Code	3. Layer Thickness	4. Thickness Units (inches or mm)	CBI?*
				Q
				Q
				Q

*If CBI is claimed, complete Appendix B.

V.E. Land-Based Units: Land Treatment Units

1. Indicate the Residual Management Unit Number (as noted in Table IV.3, column 1).

2. Indicate the surface area of the unit (acres).

3. Indicate the typical surface area over which a Residual of Concern is applied (acres).

4. If the residual is incorporated into the soil, indicate the method used. If the residual is not incorporated into the soil, indicate code 5 in the table.

   1 Disking
   2 Other surface application (specify type)
   3 Subsurface injection
   4 Other (specify)
   5 Residual NOT incorporated

5. Indicate the depth of incorporation (inches).

6. Specify the frequency of application (daily, weekly, biweekly, monthly, other).

7. Indicate the total annual residual application for 1998 (or the year of generation listed in Table IV.1 for residuals managed in this unit)(MT).

Table V.5. Land Treatment Units

1. RMUN	2. Surface Area (acres)	3. Surface area residual is applied (acres)	4. Method of Soil Incorporation	5. Depth of Incorporation (inches)	6. Frequency of Application	7. 1998 Total Residual Applied (MT)	CBI*
							G
							G
							G
							G
							G
							G

*If CBI is claimed, complete Appendix B.

V.F. Leachate and Run-on/Run-off Control for all Land-Based Units

1. Indicate the Residual Management Unit Number (as noted in Table IV.3, column 1).

2. If known, specify the annual leachate volume (MT).

3. Is there potential for storm water contact with this unit(s), its contents, or spillages and leaks associated with it? (Yes/No)

4. Will stormwater runoff from the residual management unit(s) in column 1 be managed under a storm water permit? (Yes/No)

5. Indicate the severity of the storm event that the unit's run-on/runoff control system is designed to protect against (if unknown, put in a "U").

10 year	50 year	500 year
25 year	100 year	

6. Indicate if the unit(s) is located in a flood plain (Yes/No). If yes, indicate the type of flood plain (e.g., 25, 50, 100 year).

7. Indicate the distance from this unit(s) to the nearest downgradient water body (ft).

8. Indicate the type of the run-on/run-off control system in place (indicate all that apply).

   1 Berms to prevent water running onto the unit
   2 Berms to prevent water running off the unit
   3 Berms to prevent flood water from reaching the unit
   4 Dikes to prevent water from running onto the unit
   5 Dikes to prevent water from running off the unit
   6 Dikes to prevent flood water from reaching the unit
   7 Diversion ditches to prevent water running onto the unit
   8 Diversion ditches to prevent water running off the unit
   9 Diversion ditches to prevent flood water from reaching the unit
   10 Other (specify)

9. Indicate where the run-off is sent.

   1 Onsite wastewater treatment
   2 Offsite wastewater treatment
   3 Discharged without treatment
   4 Other (specify)

10. Provide on a separate sheet a brief description of the run-on/run-off control system, including dimensions of barriers (e.g., height, top width, bottom width, run/rise) and materials of construction. Indicate in column 10 whether you have provided this information. (Yes/No)

Table V.6. Land-based Units: Leachate and Run-on/Run-off Control

1. RMUN	2. Annual Leachate Volume (MT)	3. Contact with Storm Water Possible? (Yes/No)	4. Runoff Under Storm Water Permit? (Yes/No)	5. Run-on/Run-off Storm Severity	6. Flood Plain Type	7. Distance to Nearest Downgradient Water Body (ft)	8. Run-on/Run-off Control System Type	9. Run-off Destination Code	10. Description Attached (Yes/No)	CBI?*
										Q
										Q
										Q
										Q
										Q
										Q
										Q
										Q
										Q

*If CBI is claimed, complete Appendix B.

V.G. Tanks

Complete Table V.7 for all onsite and captive offsite permanent tanks noted in Table IV.3. This section is not required for mobile tanks, such as those brought onsite by contractors providing turnaround services. The following numbered items describe the information requirements for the corresponding columns in the table.

1. Indicate the Residual Management Unit Number (as noted in Table IV.3, column 1).

2. Indicate the tank volume (gallons).

3. Indicate the tank area (ft^2).

4. Is secondary containment provided? (Yes/No)

5. Does the tank have a roof? (Yes/No)

Table V.7. Tank Information

1. RMUN	2. Tank Volume (gal)	3. Tank Area (ft^2)	4. Secondary Containment? (Yes/No)	5. Covered? (Yes/No)	CBI?*
					Q
					Q
					Q
					Q
					Q
					Q

*If CBI is claimed, complete Appendix B.

V.H. Surface Impoundments

Complete Table V.8. for all onsite and captive offsite units listed in Table IV.C, section 3, that are surface impoundments. The following numbered items correspond to the columns in Table V.8.

1. Indicate the Residual Management Unit Number as noted in column 1 of Table IV.3.

2. What is the total annual wastewater flow through the surface impoundment in Metric Tons?

3. What is the annual flow of Residuals of Concern in Metric Tons?

4. What is the total surface impoundment area? (M^2)

5. Is the surface impoundment aerated?

6. Specify the type of liner (e.g., clay, synthetic).

7. Does liner have leak detection system? (Yes/No)

8. Are there plans to close, retrofit, or switch to tanks? (Yes/No) If yes, provide detail in footnote and estimate the quantity of material that would be removed.

Table V.8. Surface Impoundments

1. RMUN	2. Total WW Flow through S.I. (MT/yr.)	3. Residual Flow (MT/yr.)	4. Total S.I. Area (m^2)	5. Aerated?	6. Liner Type	7. Leak Detection System (Y/N)	8. Closure plans?	CBI? *
								Q
								Q
								Q
								Q
								Q
								Q
								Q
								Q
								Q
								Q

*If CBI is claimed, complete Appendix B.

V.I. Deep Well Injection

Complete Table V.9. for all onsite and captive offsite deep well injection residual management units previously identified in Table IV.C, section 3.

1. Indicate the residual management unit number.

2. Indicate the total injection rate (gal/yr) for the well.

3. Indicate the distance from grade to the top of the injection zone (ft).

4. Indicate the regulatory status of the well using the following codes:

   1 Class I nonhazardous waste
   2 Class I hazardous waste
   3 Class I hazardous waste with approved "no migration" petition
   4 Other (specify)

5. Attach a construction design of the well showing the date of completion and information on the hydrogeological characteristics of each formation penetrated by the well (e.g., hydraulic conductivity, effective porosity, thickness, fluid elevation, aquifers and pressure). Indicate in column 5 whether you have provided this information (Yes/No).

Table V.9. Injection Well Characteristics

1. RMUN	2. Injection Rate (gal/yr)	3. Depth from grade to top of injection zone (ft)	4. Regulatory status code	5. Additional information attached? (Yes/No)	CBI?*
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q

*If CBI is claimed, complete Appendix B.

V.J. Containers

Containers are any enclosed storage device that is not a tank (see 40 CFR 260.10), landfill, or surface impoundment.

Have identified residuals been stored or treated onsite in containers? Yes/No (Circle one).

If yes, complete Table V.10 for each RIN stored or treated in containers. If the facility has several onsite and captive offsite container storage areas, provide information only on the primary container storage area for each RIN.

The following numbered items describe the information requirements for the corresponding columns in Table V.10.

1. Indicate the Residual Management Unit Number, as noted in column 1 of Table IV.3.

2. Indicate the size and type of container (e.g., 55-gal. drum, 30 cu.yd. roll-off bin).

3. Is the container closed? (Yes/No)

Table V.10. Containers

1. RMUN	2. Container type and size	3. Closed? (Yes/No)	CBI?*
			Q
			Q
			Q
			Q
			Q
			Q
			Q
			Q
			Q

*If CBI is claimed, complete Appendix B.

V.K. Piles

Have identified residuals been stored or treated in onsite or captive offsite piles at any time since January 1, 1998? Yes/No (Circle one)

If yes, complete Table V.11. for each pile noted in Table IV.1

1. What is the Residual Management Unit Number?

2. Are there dust suppression methods in place? (Yes/No) If yes, specify the type in a footnote.

3. Specify if the pile has:

   01 concrete pad
   02 runoff containment
   03 synthetic liners
   04 cover
   05 none

4. Specify any Run-on/Run-off Controls used with the following codes:

   1 Berms to prevent water running onto the unit
   2 Berms to prevent water running off the unit
   3 Berms to prevent flood water from reaching the unit
   4 Dikes to prevent water from running onto the unit
   5 Dikes to prevent water from running off the unit
   6 Dikes to prevent flood water from reaching the unit
   7 Diversion ditches to prevent water running onto the unit
   8 Diversion ditches to prevent water running off the unit
   9 Diversion ditches to prevent flood water from reaching the unit
   10 Other (specify)

5. Indicate the severity of the storm event that the unit's run-on/run-off control system is designed to protect against.

   10 year 25 year 50 year 100 year 500 year

6. Specify the average volume in the pile. (cubic yards)

Table V.11. Piles

1. RMUN	2. Dust Suppression (Yes/ No)?	3. Concrete Pad/Runoff Containment/ Synthetic Liners/ Cover?	4. Type Run-on/ Run-off Controls	5. Storm Event Design	6. Average Volume in Pile (cu. yd)	CBI?*
						Q
						Q
						Q
						Q
						Q

*If CBI is claimed, complete Appendix B.

VI. General Facility Information (Both Onsite and Facility-owned Offsite)

This section asks for general information on your facility and land use inside and outside the facility. This information will be used in the fate and transport part of EPA's analysis.

Please provide a detailed map of the facility and surrounding area. This map may be a photocopy of one previously sent to a state or federal agency. The map should include items 1 though 4 listed below within 1 mile of the facility boundary, if available.

1. Facility property boundary
2. Location of all residual management units
3. Ground water gradient and direction
4. Prevailing wind direction

VII. Certification

I certify under penalty of law that I have personally examined and am familiar with the information contained herein and, that based on my inquiry of those responsible for obtaining the information, I believe the above to be true and complete, and I am aware that there are substantial penalties for submitting false information.

Signature ______________________________

Date ____________ Telephone ____________________

Name (print) ______________________________

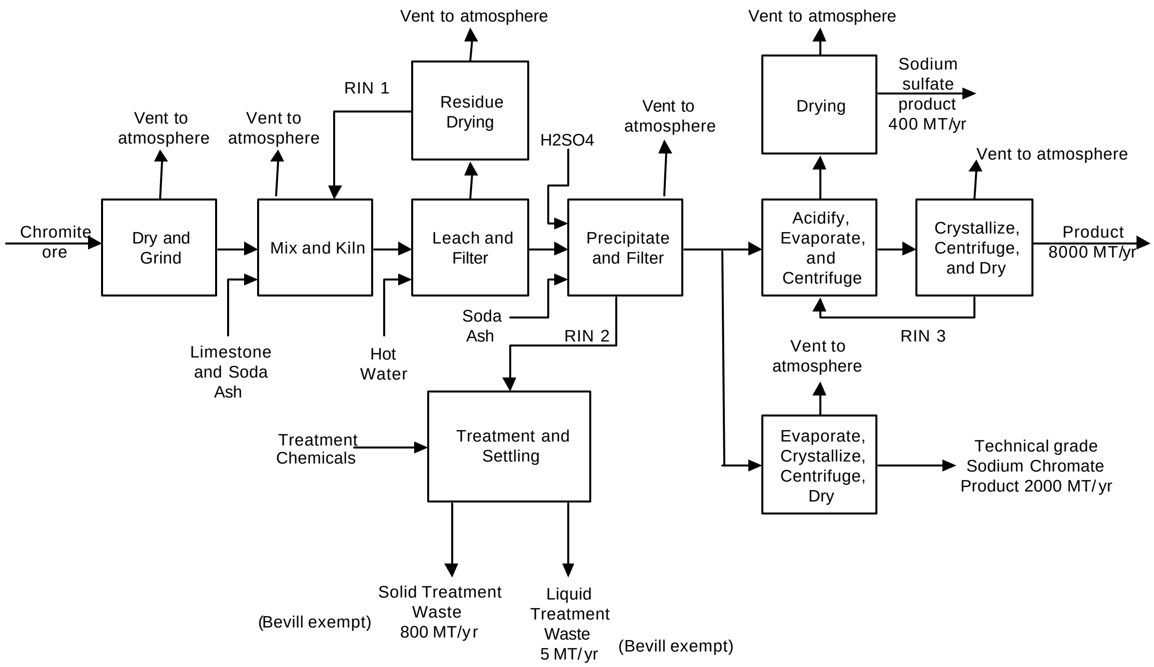
Title ______________________________

Authority for the collection of the above information is contained in the Resource Conservation and Recovery Act, 42 USC 6901 et seq.

APPENDIX A

Examples

Example PFD for Sodium Dichromate Manufacture



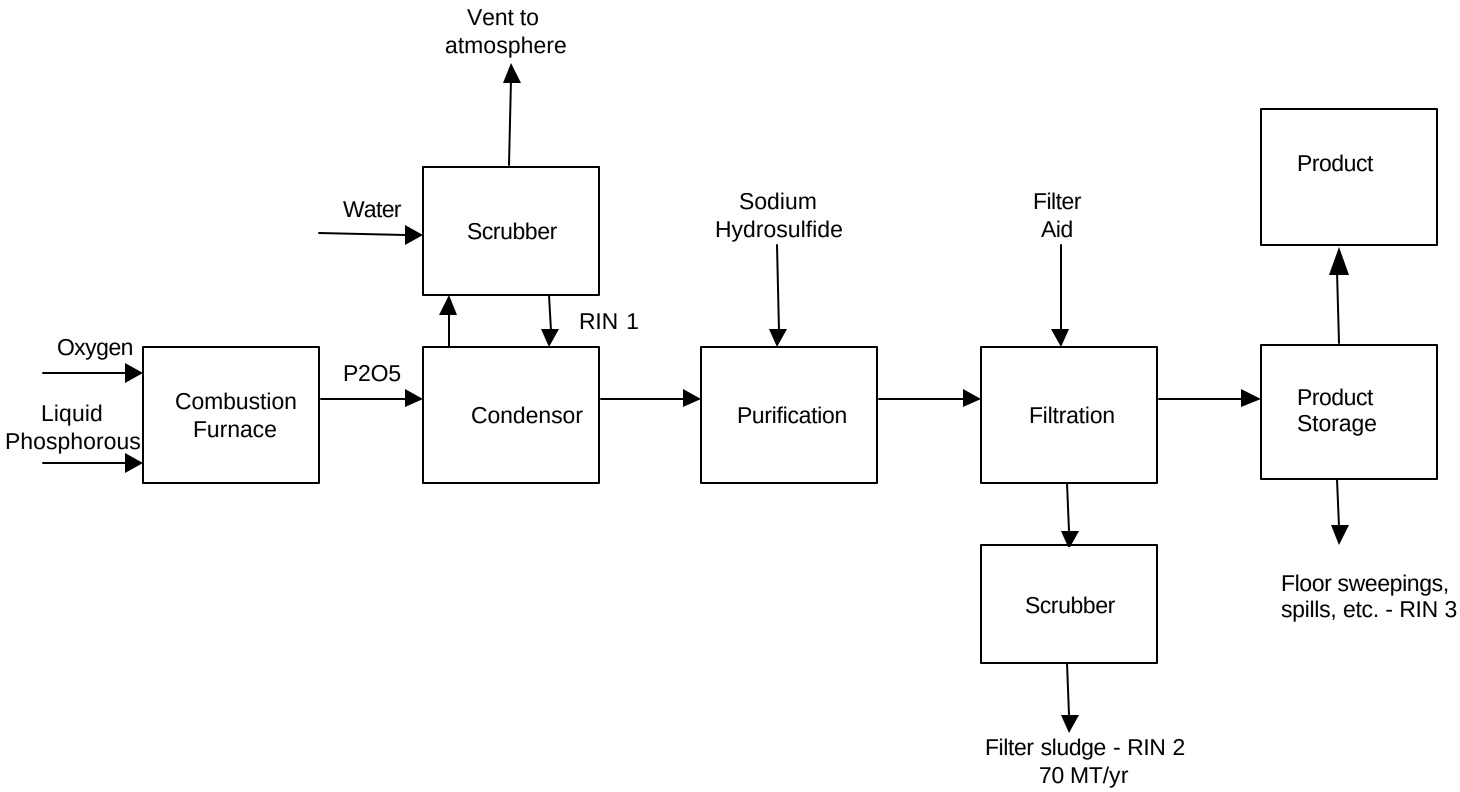
Chromite ore is fed to a drier and grinder to size the chromite ore. The drier is vented to the atmosphere and the exiting air contains fine particulate matter. The chromite ore is then fed to an alkaline roaster where limestone and soda ash are introduced to increase roasting rate. The kiln is vented and the stream is rich with carbon dioxide. After roasting, the mix is leached and filtered allowing the chromium to remain in solution. The filtered residuals are sent to a residue drier and then recycled to the kiln (RIN 1). The residue drier also has a vent that releases small amounts of soda ash and limestone particulates. The chromium solution that remains after leaching is then sent to a precipitation vessel where sulfuric acid and soda ash are added to reduce the pH to 5 to precipitate the remaining ore residues and activate the hexavalent form of chromium. The ore residuals (RIN 2) are then sent to treatment and settling which will be described later. The precipitation stage also produces a carbon dioxide rich stream which is vented to the atmosphere.

The chromium solution filtrate is split to produce two grades of product. Twenty percent of the chromium stream leaving the precipitation step is immediately evaporated and crystallized to produce technical grade Sodium Chromate (Na_2CrO_4). The evaporator used to dry the product produces a gaseous waste stream that contains mostly water vapor and small amounts of particulate product.

The remaining 80% of the chromium precipitate stream is diverted to become Sodium dichromate. This solution is further acidified with sulfuric acid to a pH of 4.0 to produce the dichromate form of chromate. This solution is partially evaporated and centrifuged to separate Sodium Sulfate from the dichromate solution. The sodium sulfate is dried and sold as a by-product. After the removal of the sodium sulfate the dichromate solution is centrifuged and crystallized. Any liquid residuals (RIN 3) are recycled to the evaporator and sodium sulfate removal stage. The crystallized sodium dichromate is then sent to a final drying step and then packaged as product.

The waste treatment and settling unit receives waste from the ore residue precipitant stage and also handles wastes generated from scheduled clean-outs. The waste treatment unit uses flocculating agents to help precipitate the ore residues. This unit also generates two wastes: a solid waste and a liquid waste. The solids are sent to an off-site industrial Subtitle D landfill. The liquid waste is drummed and sent to an off-site publicly owned treatment works (POTW). These wastes are treatment residues from the roasting and leaching of chrome ore and are exempt from hazardous waste regulation by the Bevill exemptions, but are not bevilled prior to treatment.

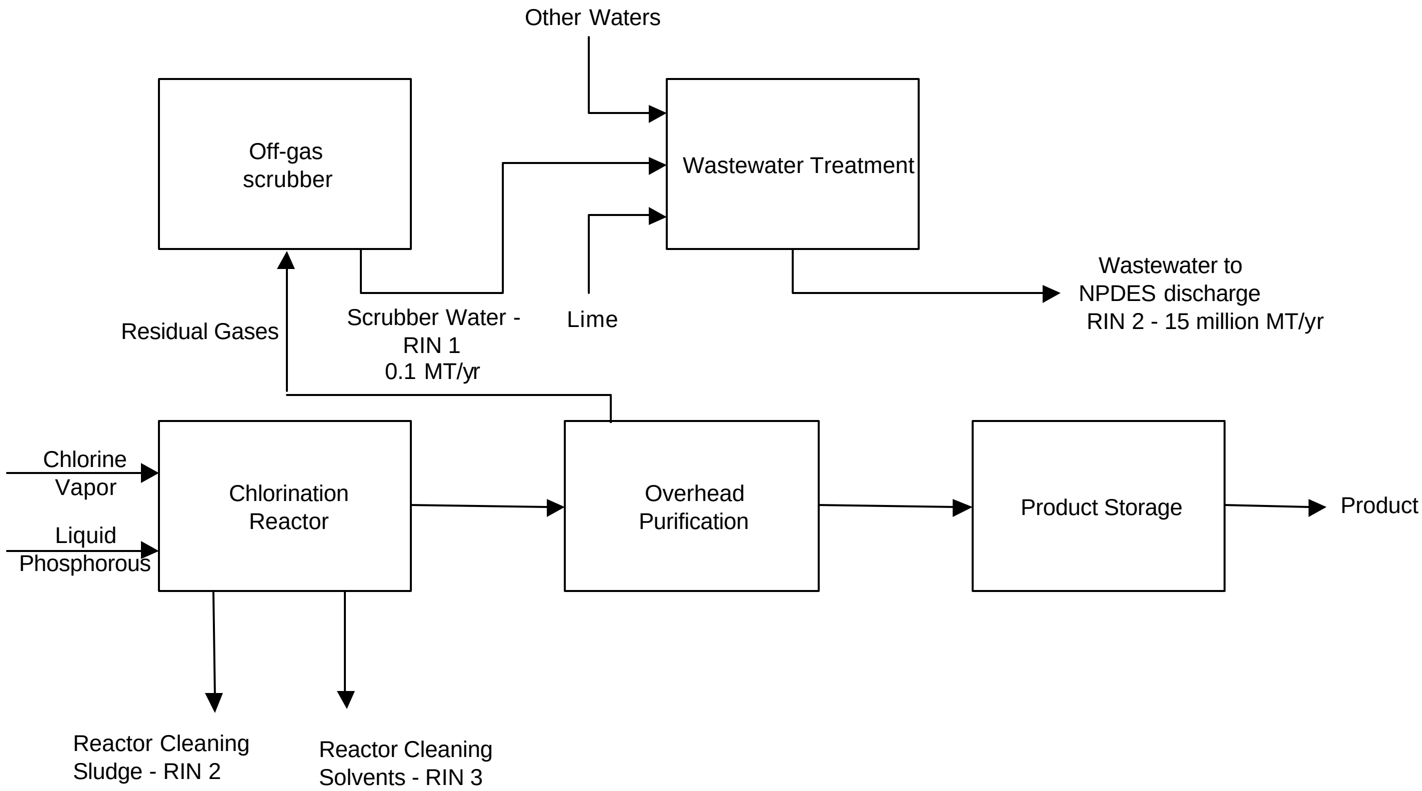
Example PFD for Dry Process Phosphoric Acid Manufacture



Liquid Phosphorous and pure oxygen are fed to a combustion furnace where the phosphorous and oxygen react to form phosphorous pentoxide. This gas is then fed into a condenser where water is sprayed over the gas to create phosphoric acid. Escaping gas is collected in a scrubber with fresh water as the collection agent. The scrubber water (RIN 1), now phosphoric acid, is returned to the condenser. The scrubber is vented and releases an airborne waste stream to the atmosphere which contains trace phosphoric acid. The phosphoric acid from the condenser is sent to purification where sodium hydrosulfide is added to precipitate arsenic sulfide and calcium sulfide. The precipitates from the purification are then filtered with the help of a filter aid. The product is then packaged in drums for sale. Escaping gases from filter waste solids are scrubbed to remove hydrogen sulfide, and the remaining sludge waste is then sent to an offsite Subtitle C landfill (RIN 2).

A solid waste stream is also generated from product storage (RIN 3). This waste is mostly inert material which is collected in sludge form and also sent to the offsite Subtitle C landfill.

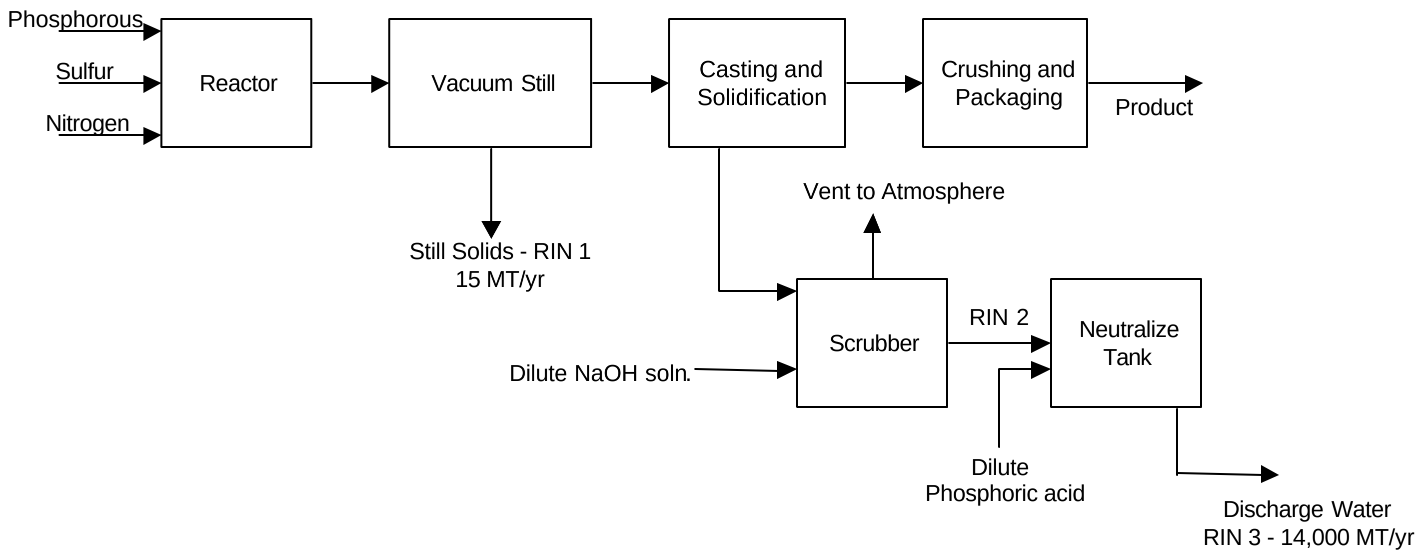
Example PFD for Phosphorous Trichloride Manufacture



The production begins as liquid phosphorous is sprayed into a reactor simultaneously fed with chlorine gas. The ensuing chemical reaction produces phosphorous trichloride. The reacted phosphorous trichloride is then sent to be purified by distillation. Residual gases from the distillation are scrubbed with water to produce hydrochloric acid and phosphoric acid. These acidic waters (RIN 1) are sent to onsite wastewater treatment. The wastewater treatment plant uses lime to neutralize the acids and this liquid is sent to a Subtitle D surface impoundment prior to NPDES discharge. Total wastewater flow through the WWTP is 15 million MT/yr.

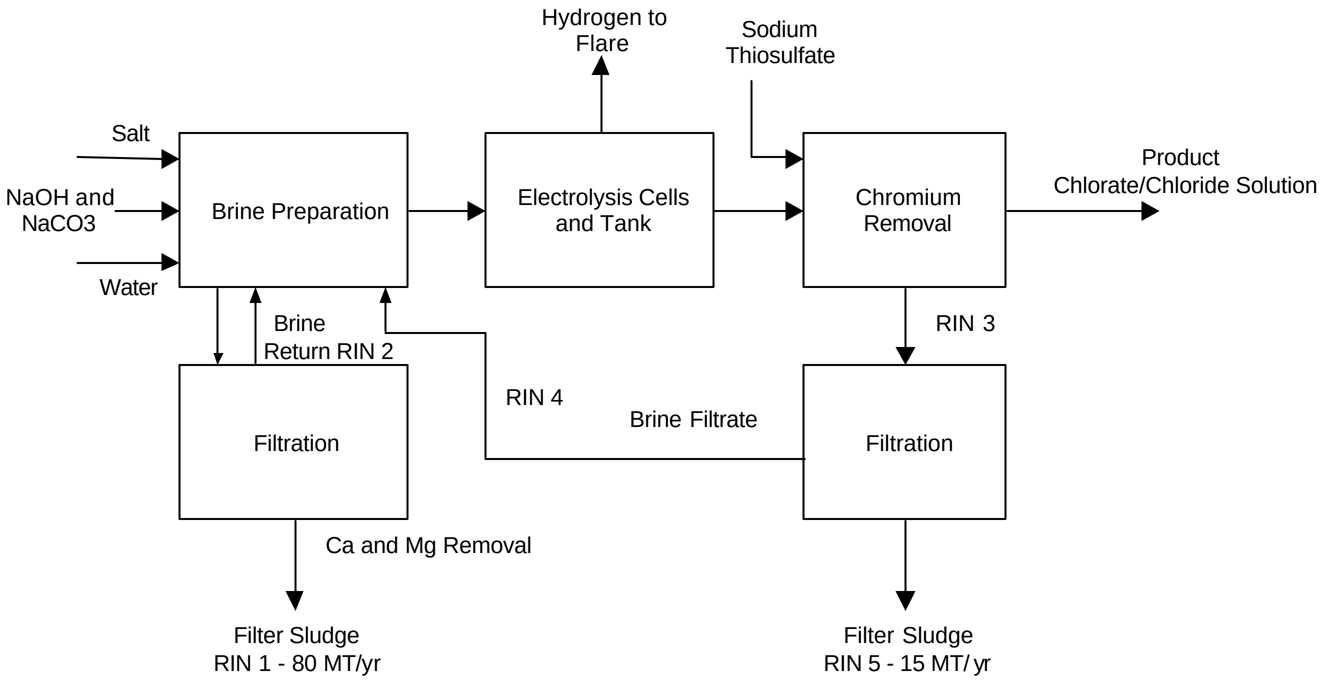
Another residual is produced during regular plant turnaround. Reactor cleaning produces an arsenic bearing sludge (RIN 2). Reactor cleaning also uses many solvents which result in arsenic bearing waste streams (RIN 3). RIN 2 is drummed and shipped to a Subtitle C landfill; RIN 3 is drummed and shipped to offsite solvent recovery.

Example PFD for Phosphorous Pentasulfide Manufacture



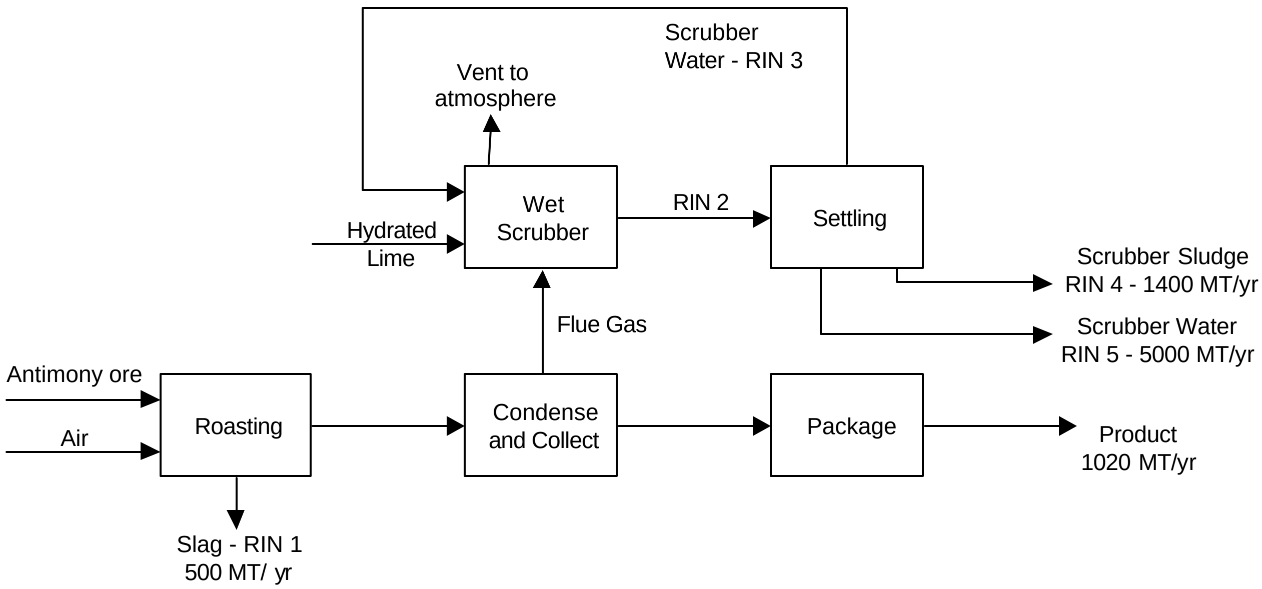
The production of phosphorous pentasulfide begins by feeding liquid phosphorous and liquid sulfur into a cast iron reactor. The reactor temperature starts at 200° Celsius and quickly rises due to the exothermic reaction taking place. The reactor is continually filled with nitrogen gas to prevent oxidation of sulfur. The reactor batches are forced, by nitrogen gas, into an electrically heated vacuum still where the liquid product is distilled leaving a residue in the still consisting of glassy phosphates and carbon and iron sulfide compounds. This still is cleaned out in turn-over operations once every 2 months (RIN 1). The residue is sent to an on-site Subtitle D landfill. The purified product is cast into cones and then crushed and packaged. During casting, the liquid product ignites when it contacts air and emits phosphorous pentasulfide and sulfur dioxide. These contaminants are scrubbed and the wastewater (RIN 2) from the scrubber is sent to a neutralization tank prior to discharge (RIN 3). The neutralized wastewater is sent to WWTP which realizes a total flow of 25 million MT/yr. The scrubber vent is nearly clean and is vented to atmosphere.

Example PFD for Sodium Chlorate Manufacture



Sodium chlorate is manufactured by first preparing a brine mixture from rock salt. This salt is treated by addition of sodium hydroxide and sodium carbonate to reduce the calcium and magnesium levels. The removed calcium and magnesium are sent through a filtration process and are produced as waste (RIN 1), while the liquid from the filter (RIN 2) is returned to the Brine Preparation tank. The brine is then fed to an electrolysis unit where sodium chloride oxidizes with three water molecules to produce the product along with hydrogen gas. The hydrogen gas is very pure and is sent to flare. The sodium chlorate solution is then sent to a chromium removal stage where, with the addition of sodium thiosulfate, the chromium precipitates out in the form of chromium (III) oxide (RIN 3). This precipitant is filtered and the brine filtrate (RIN 4) is returned to the brine preparation tank. The filter solids generated from filtration (RIN 5) are shipped to an offsite Subtitle C landfill. The final product is a chlorate/chloride mixture.

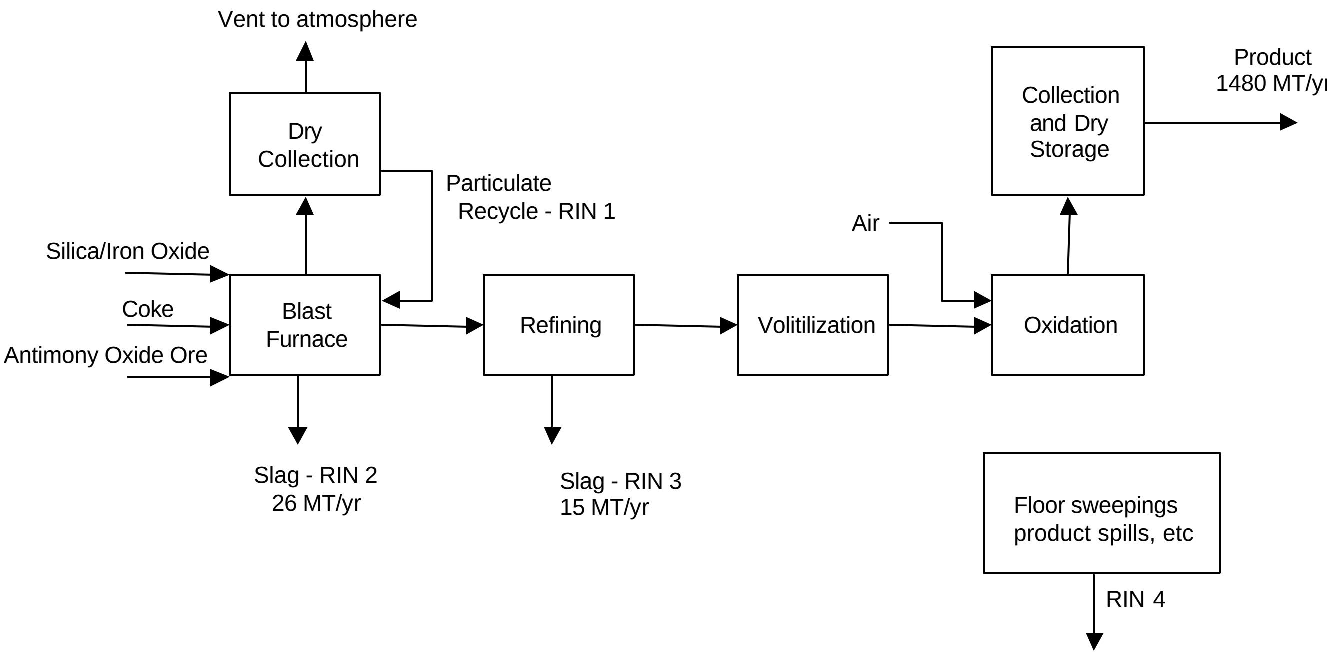
Example PFD for Antimony Oxide by the Direct Method



The production begins by feeding antimony sulfide ore into a furnace to be burned in air. The resulting reaction creates antimony oxide and sulfur dioxide. The ore creates a slag that must be removed periodically (RIN 1) and contains antimony, arsenic, and some lead. This slag is shipped to an offsite secure Subtitle C landfill. After the product antimony oxide is condensed and collected after roasting, it is packaged as a technical grade product.

The sulfur dioxide and other gasses produced during condensing and collection are sent to a wet scrubber where hydrated lime is added to remove most of the sulfur dioxide. Escaping gases are vented to the atmosphere with low levels of sulfur dioxide and particulates. The spent scrubbing liquid (RIN 2) is sent to a settling tank, allowing the scrubber water (RIN 3) to be recycled to the scrubber, while the sludge (RIN 4) generated is put in drums and shipped off-site and disposed of in a Subtitle C landfill. Periodically a portion of the scrubber water must be purged. About 5000 MT of scrubber water (RIN 5) is removed each year and sent to WWTP. The total wastewater flow through the WWTP is approximately 20 million MT per year.

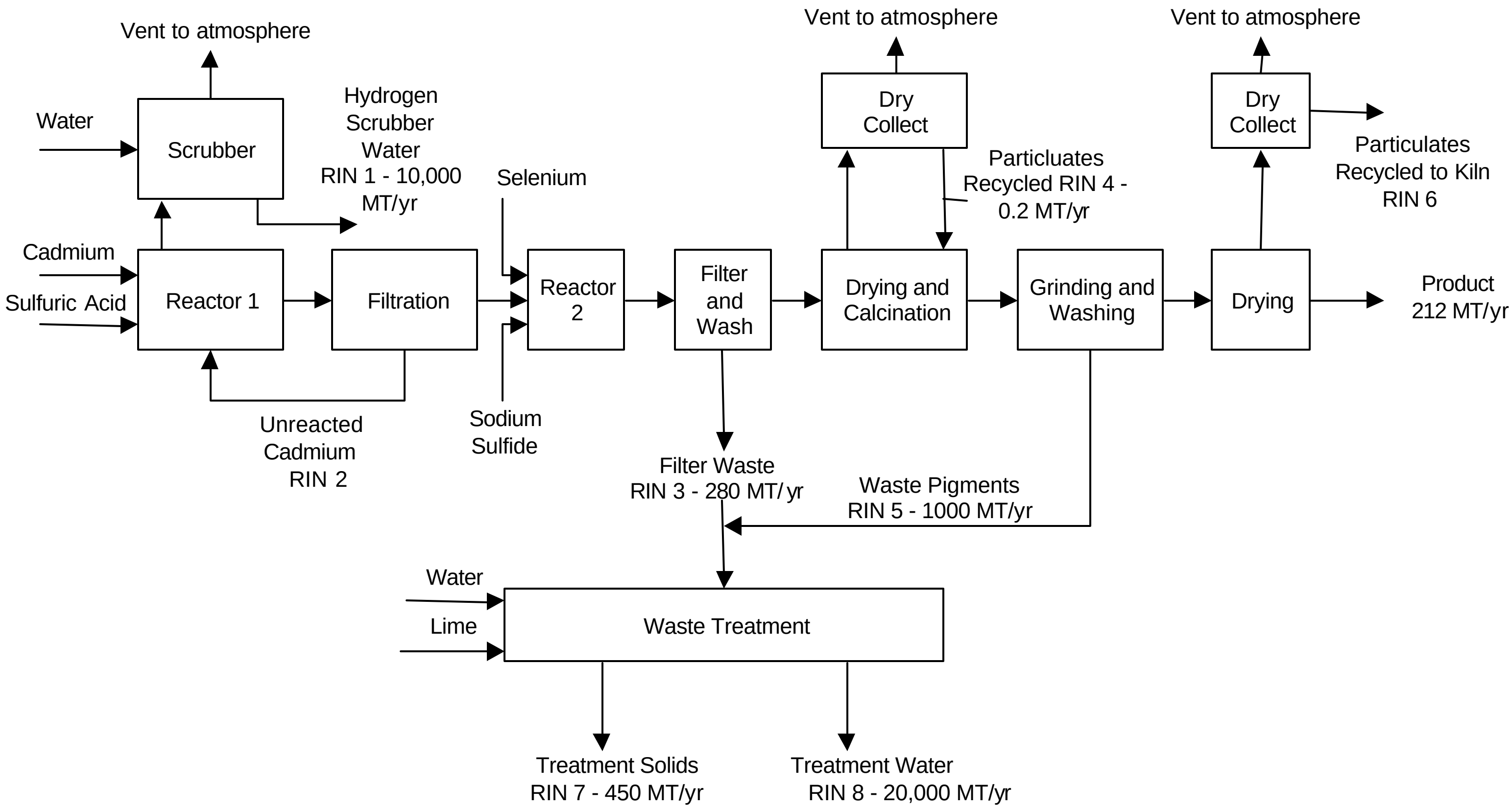
Example PFD for Antimony Oxide by the Indirect Method



Antimony oxide is manufactured by first feeding a combination of coke, antimony oxide ore, iron oxide, and silica to a blast furnace. These constituents react to release elemental antimony in liquid form. Blast furnace off-gasses, mostly carbon dioxide, are vented into a baghouse, where ore particulates are recovered and off-gases are vented to the atmosphere. The off-gas particulates (RIN 1)) are recycled to the blast furnace. The extracted liquid antimony is then refined before oxidation. The refining step generates a slag (RIN 3). After being refined the liquid antimony is volatilized and then sent to the oxidation process where air is forced through liquid antimony. The oxidized product is then allowed to cool and condense in the collection and dry storage facility before being drummed for shipping. The slag (RIN 2 and 3) is sold to an offsite lead recovery operation.

Floor sweepings and product spills (RIN 4) are collected in drums and either recycled to the furnace for reprocessing or sent offsite for treatment and disposal.

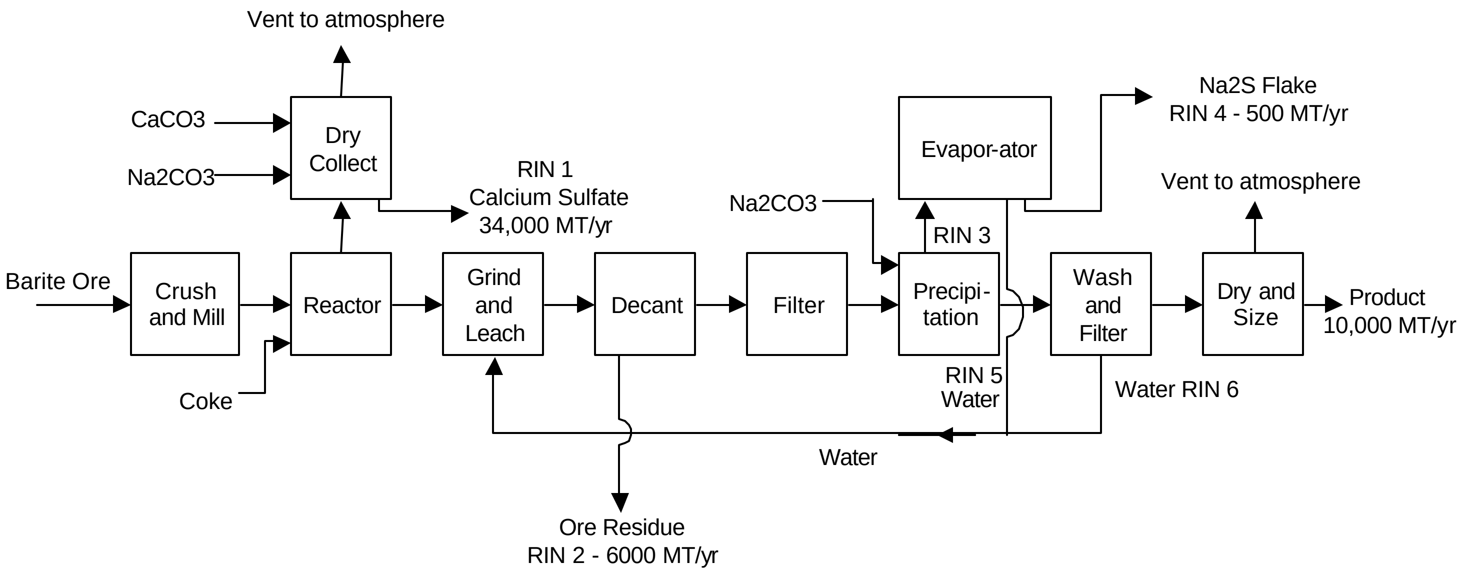
Example PFD for Cadmium Pigments Manufacture



This facility produces one cadmium pigment, Cadmium Red. Production of Cadmium Red begins by reacting cadmium metal with sulfuric acid. The off-gasses, which contain hydrogen, water vapor, cadmium sulfide, and some sulfuric acid, are water scrubbed. Off gas vapors are vented to the atmosphere, while the spent scrubber liquid (RIN 1) is sent to waste treatment. The reaction products are sent to filtration, where unreacted cadmium (RIN 2) is separated and returned to the reaction vessel. The cadmium sulfide is then sent to a second reactor, where selenium is added to provide the red coloration and sodium sulfide is added to precipitate out sodium sulfate. The reaction products are once again filtered; filter sludges (RIN 3) are washed and then sent to waste treatment (discussed below) while the liquid product is sent to be dried. The drying and calcination kiln has a vent that leads to a dry collection store. The store collects particulate product (RIN 4) and returns it to the kiln; off-gasses from the store are vented to the atmosphere. After the product is dried, it is ground to the proper size and washed with water. The wash waters (RIN 5) are sent to waste treatment while the product is again dried and then packaged. The drier vent is sent to a baghouse; particulates (RIN 6) are collected and sent to the kiln, while off-gas is vented to atmosphere.

The waste treatment facility described above accepts wastes RIN 3 and RIN 5. These wastes are acidic, and as such, are treated with lime to adjust the pH to precipitate cadmium and zinc salts. The water is then filtered and discharged to an offsite POTW (RIN 8). Total wastewater flow to the POTW is 20 million MT/yr. The treatment solids (RIN 7) are sold to an off-site firm to recover the cadmium metal.

Example PFD for Barium Carbonate Manufacture

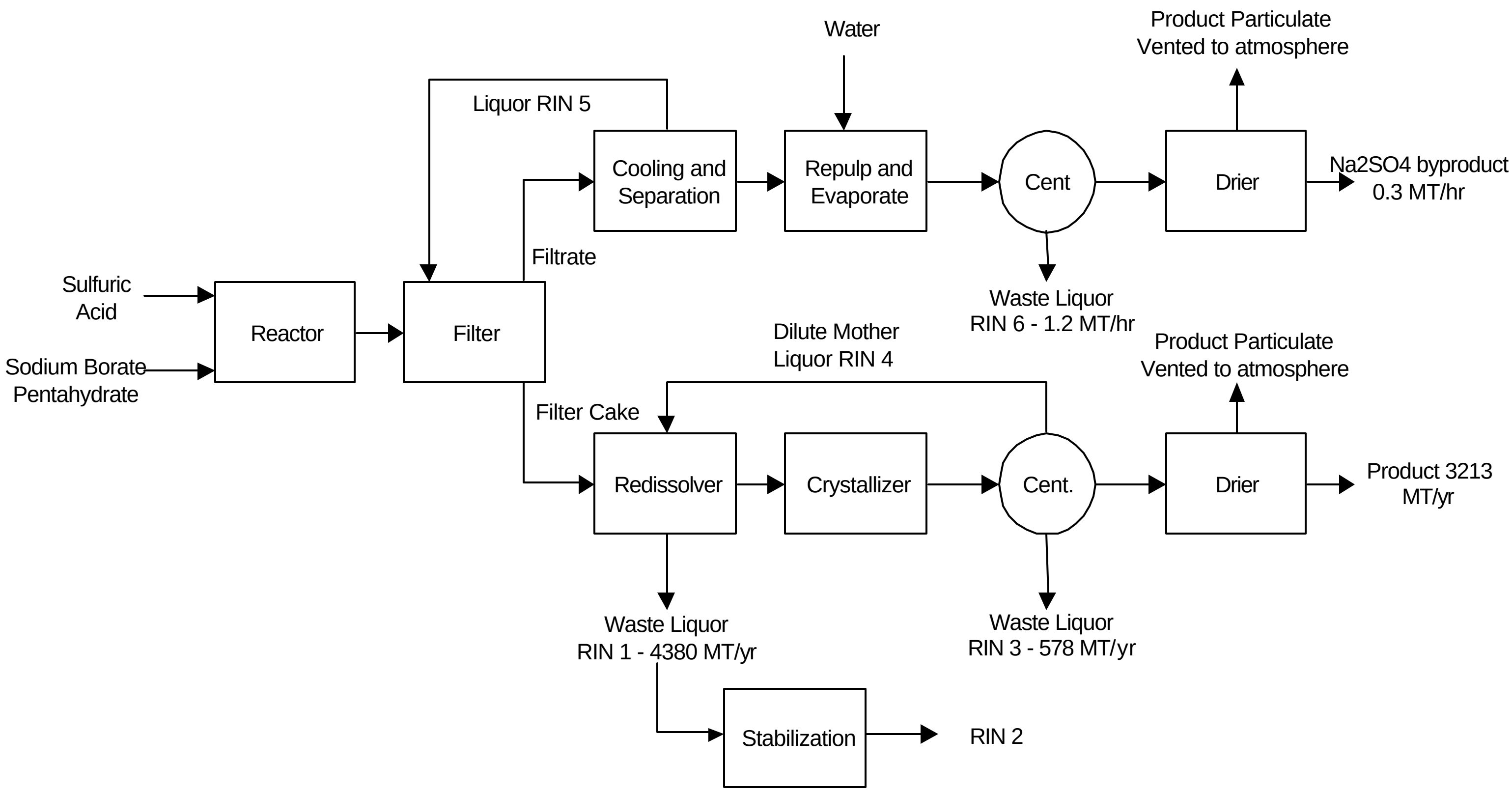


The first step of barium carbonate manufacture is the crushing and milling of barite ore to 100 mesh. The ore is then fed to a baking kiln along with coke in a ratio of 5:4. This mixture is baked at high temperature for about ten minutes where the reactions release sulfur dioxide, carbon monoxide, carbon dioxide, as well as other constituents. The airborne wastes are scrubbed with calcium carbonate and sodium carbonate to precipitate calcium sulfate and sodium sulfate. The calcium/sodium sulfate residue (RIN 1) is collected and sent to a Subtitle D landfill. The remaining airborne wastes are vented to the atmosphere.

The solid remaining in the kiln is ground and leached with hot water. The barium sulfide solution is then decanted and clarified using three serial clarifiers. The ore residue is removed during the decantation process, dried, and then sent to an onsite Subtitle D landfill (RIN 2).

The clarified barium sulfide is then sent to a precipitation tank where soda ash is added to produce barium carbonate. As a byproduct of this reaction, sodium sulfide and hydrogen sulfide are produced (RIN 3). These byproducts are sent to an evaporation tank where the solids are collected and sent to an offsite Subtitle C landfill (RIN 4). Water from the evaporator (RIN 5) is recycled to the leaching process. The barium carbonate precipitate is then washed and filtered in preparation for drying. The filter water (RIN 6) is recycled to the leaching process, while the barium carbonate solid is sent to drying. The drier is vented and allows small amounts of product particulates to escape. The dry product is then sized and packaged.

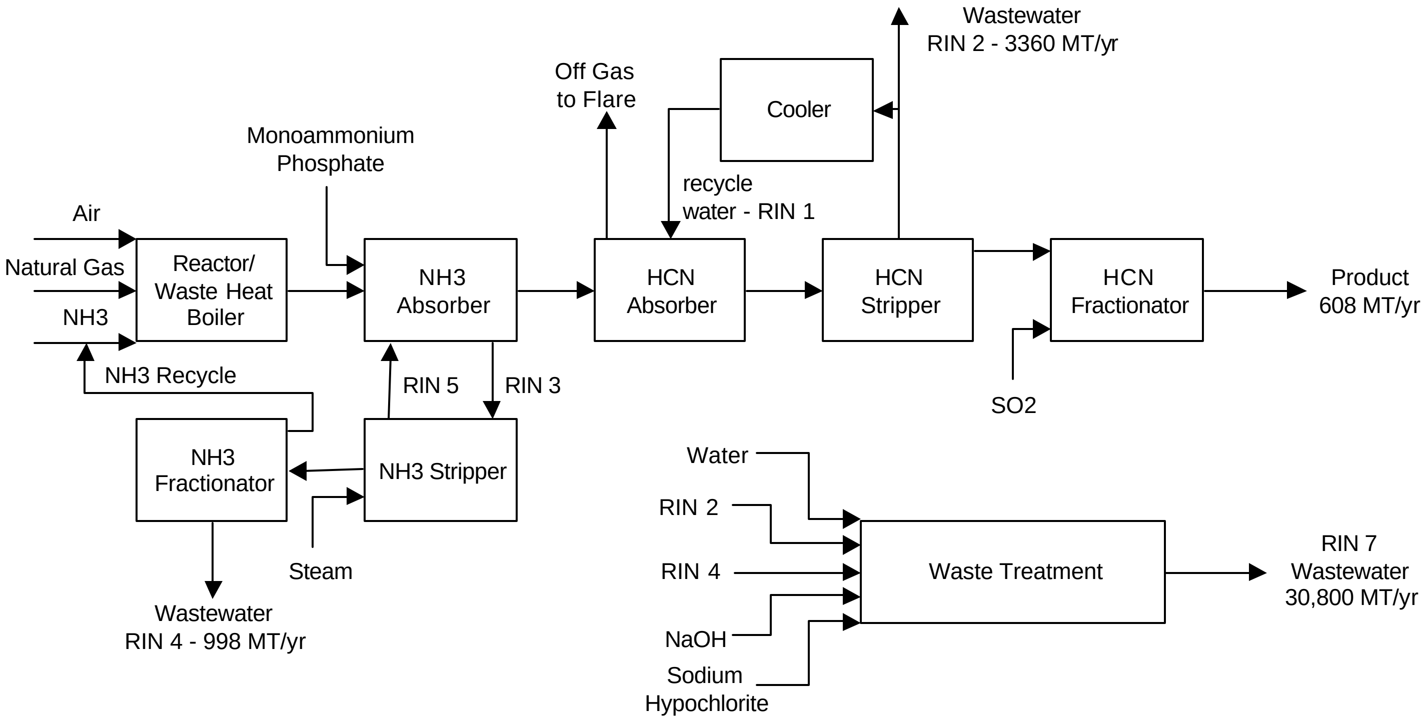
Example PFD for Boric Acid Manufacture



Orthoboric acid production begins by reacting sodium borate pentahydrate with sulfuric acid. The resulting reaction creates orthoboric acid with sodium sulfate and water. The boric acid, which is a solid after reaction, is then filtered. The filter cake, which is primarily boric acid is cleaned and crystallized. Excess liquor is cleaned from the acid by means of recycled wash water from a later cleaning step. The liquor water (RIN 1) is sent to be stabilized onsite, (RIN 2) and is then sent to an offsite Subtitle C landfill. The boric acid then is crystallized and centrifuged to remove the final traces of mother liquor from the product (RIN 3). The waste liquor from this step is transferred to an on-site WWTP with an on-site surface impoundment. The total flow in the surface impoundment is 1 million MT/yr. The dilute mother liquor (RIN 4) is recycled to the redissolver step. The final product is then dried and packaged.

The filtrate from the reactor is sent to be cooled to remove the byproduct of sodium sulfate. The sodium sulfate drops out of solution upon cooling and is sent to the next stage, while the remaining liquor (RIN 5) is recycled to the filter. The sodium sulfate is then returned to a slurry via waterwash and is evaporated before being sent to centrifuge for drying and separation. The liquid that is produced from the centrifuge is drummed (RIN 6) and sent off site for incineration. The sodium sulfate crystals are then dried further and packaged.

Example PFD for Hydrogen Cyanide Manufacture



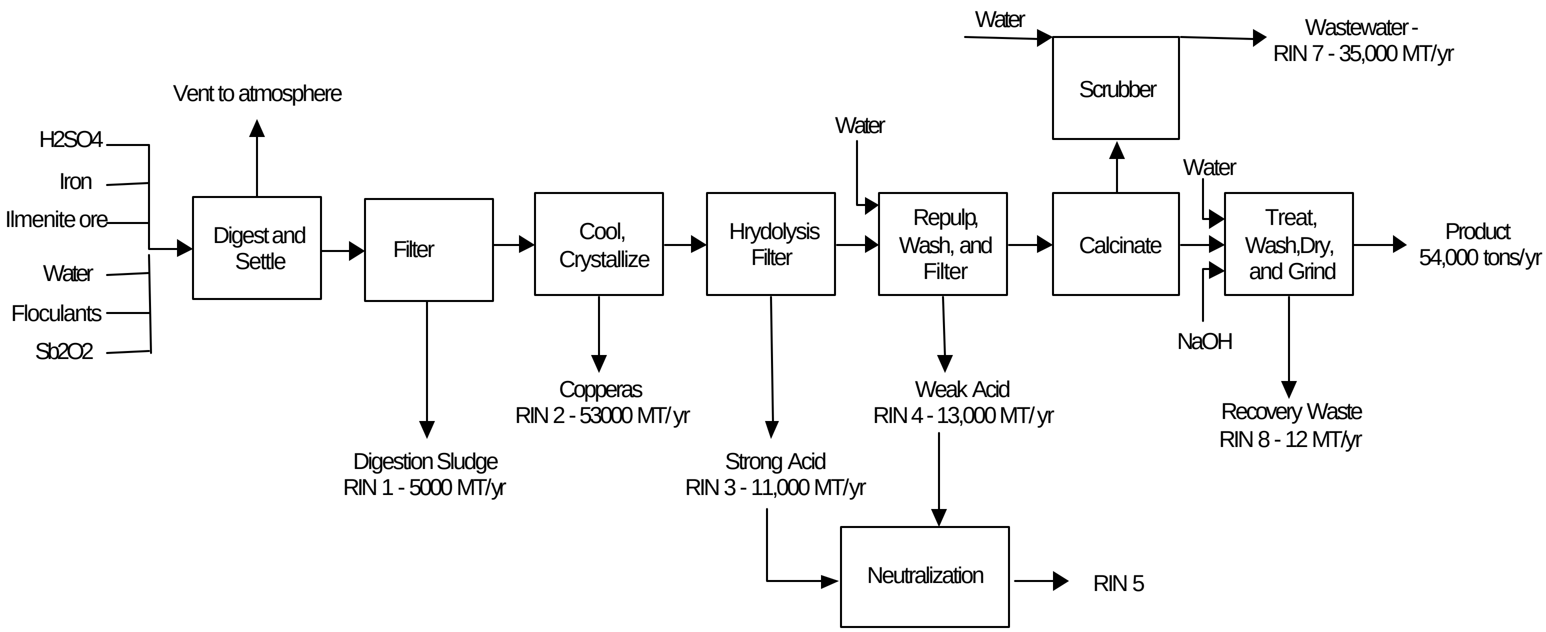
Andrussow Process with ammonia recycle

Ammonia, natural gas, and air are fed into the primary reactor and heated over platinum and rhodium catalyst to 1100° Celsius. The products are moved through the reactor and quenched immediately to 350° Celsius via a waste heat boiler. The products and unreacted reactants then move to an ammonia absorber where a monoammonium phosphate solution is added. This converts the ammonia to diammonium phosphate and the liquid is removed and taken to the ammonia recovery system, which will be described later. The product off-gas is sent from the ammonia absorber to the hydrogen cyanide absorber where cold water is added to entrain the hydrogen cyanide. The excess unreacted gasses are sent to flare. The hydrogen cyanide-water mixture is then sent to a cyanide stripper where excess water is removed from the liquid. Wastewater (RIN 1) is partially recycled to the cyanide absorber and the remainder is sent to waste water treatment (RIN 2). After being stripped to near purity, the hydrogen cyanide- water mixture has sulfur dioxide added in a fractionator to act as an inhibitor. This mixture is the final product.

The ammonia recovery system accepts diammonium phosphate (RIN 3) from the ammonia absorber. The system consists of a steam stripper and a fractionator. From the stripper, the overhead containing water and ammonia is condensed and sent to a fractionator where the water is removed and sent to wastewater treatment (RIN 4). The stripper bottoms (RIN 5) are recycled to the ammonia absorber. The ammonia gas is then mixed with fresh ammonia for recycle into the primary reactor. Spent Pt/Rd catalyst (RIN 6 not shown on the PFD) is removed from the reactor every 2 years and sent offsite for metals reclamation.

The wastewater treatment facility accepts wastewaters RIN 2 and RIN 4 from the process. The total wastewater flow for the WWTP is 30,800 MT/yr. The wastewater is fed into a retention pond where the pH is adjusted to 10. Next, sodium hypochlorite is added to chlorinate the waste for cyanide destruction. After settling for 9 hours the liquid is discharged to an offsite POTW (RIN 7).

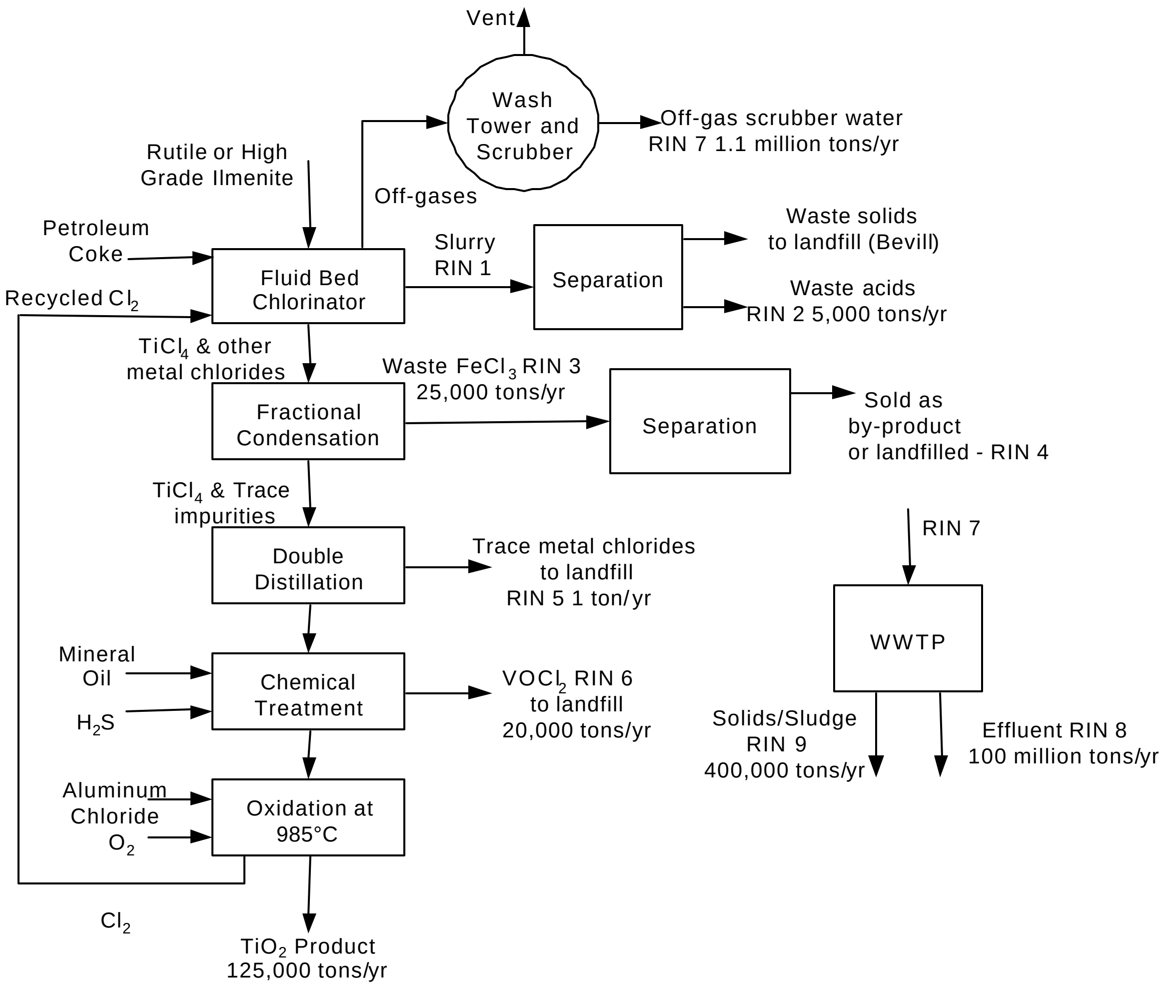
Example PFD for Titanium Dioxide Manufacture using the Sulfate Process



The sulfate process begins by feeding dried ilmenite ore into a batch reaction still with concentrated sulfuric acid. The acid digests the ore over the period of an hour resulting in a green, thick, titanyl sulfate sludge. The reactor is then flooded with warm water and steam creating a slurry of titanyl sulfate which is pumped into settling tanks. Scrap iron is then added to the mixture to reduce the ferric ions in the slurry to the ferrous state. Sodium hydrosulfide is then added to precipitate all of the heavy metal sulfides, flocculating agents are added to precipitate all of the suspended solids, and antimony oxide is added to control the quality of the final product. The solution is then filtered to remove the precipitants and vacuum crystallized to cool the purified liquid. The titanium liquor is then hydrolyzed to titanium dioxide hydrate by boiling and seeding with the hydrate product. The hydrate then precipitates from the acid solution and the pulp is removed via a rotary filter. The solid product is then leached to remove the final traces of the acid solution and then sent to be calcinated. Calcination takes place in a rotary kiln at 850° Celsius to dehydrate the titanium dioxide. The final product is then sent to treatment, where surface treatments are added to improve dispersability. The product is again dried, then sized and packaged.

This process creates a number of residuals. Ore digestion creates two RINs: vented gases and a digestion ore sludge. The vented gases are released to the atmosphere. Digestion sludge is removed after flocculation and primary filtration of the titanyl sulfate (RIN 1). This digestion sludge is rich in heavy metals, chromium, and alumina, and is drummed and sent to an offsite Subtitle C landfill. The centrifugation of the titanyl sulfate solution also produces an acidic waste (RIN 2), which is commercially sold as copperas. The filtering of the titanium dioxide hydrate solution produces a large quantity of strongly acid waste (RIN 3). This waste is sent to a neutralization tank along with the weak acid produced from the cleaning of the hydrate (RIN 4). Waste water from the neutralization tank (RIN 5) is released upon neutralization to the WWTP, while the solids (RIN 6 not shown on the PFD) are filtered and sent to an offsite Subtitle D landfill. Scrubber water is also produced which contains particulate product from the calcinator (RIN 7) which is sent to an onsite WWTP. The final treatment step in the titanium dioxide process produces a small amount of wastewater containing product and some additives (RIN 8). This waste is sent to an onsite Subtitle D surface impoundment for storage and then to WWT. Total wastewater flow for the facility is approximately 20 million MT/yr.

Example PFD for Titanium Dioxide Manufacture using the Chloride Process

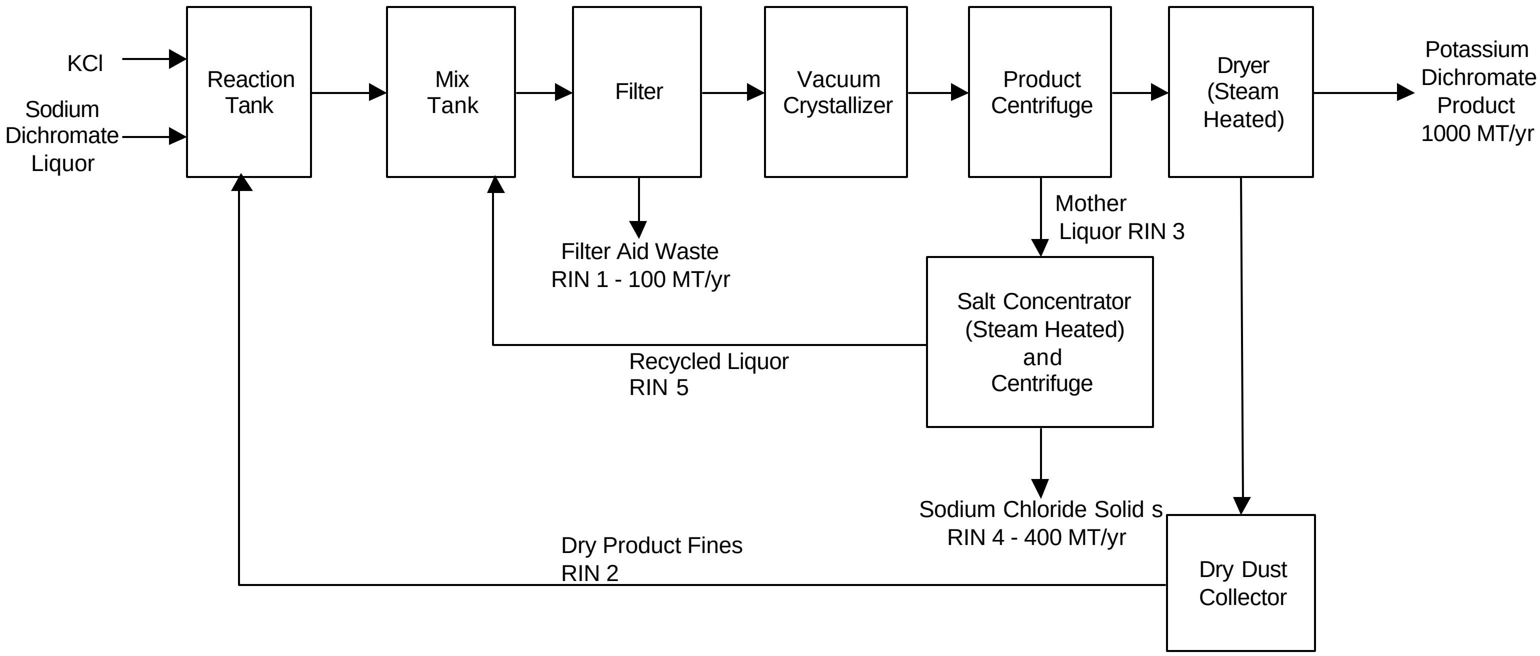


The chloride process begins with the conversion of rutile or high-grade ilmenite into titanium tetrachloride ($TiCl_4$). This step occurs in a fluidized bed chlorinator in the presence of chlorine gas at a temperature of approximately 900/C. Petroleum coke is also added as a reductant. The volatile metal chlorides ($TiCl_4$) product stream is collected and the waste steam undergoes treatment. This waste stream (RIN 1) is generated as a combined acids/solids slurry. The two waste forms (solids and liquids) are separated with the chloride process waste solids (Bevill exempt) landfilled while the acids (RIN 2) are deep-well injected.

After chlorination, the gaseous product stream is purified in order to separate the titanium tetrachloride from the other metal chlorides. The separation is carried-out in three separate steps which are: fractional condensation, double distillation, and chemical treatment. Waste ferric chloride ($FeCl_3$) (RIN 3) is produced as an acidic waste stream during fractional condensation. This waste stream is treated with lime (RIN 4)and either landfilled or sold as a by-product. Several additional trace metal chlorides (RIN 5) are removed as a result of double distillation and subsequently landfilled. During chemical treatment, vanadium oxychloride ($VOCl_3$) is removed as a low-volume non-special waste through complexing with mineral oil and reducing with hydrogen sulfide (H_2S) to $VOCl_2$ (RIN 6) and subsequently landfilled. In the final step, the titanium tetrachloride is oxidized to TiO_2 product. The chlorine gas driven-off from this oxidation step is recycled to the fluidized bed chlorinator.

Finally, the off-gases from the chlorinator are sent through a water tower and scrubber system in which off-gas scrubber water (RIN 7) is produced and subsequently managed in the WWTP. After processing, the gas stream is vented to the atmosphere. Wastewater treatment effluent (RIN 8) and sludge/solids (RIN 9) are sent to separate on-site impoundments before the effluent is discharged through an NPDES outfall.

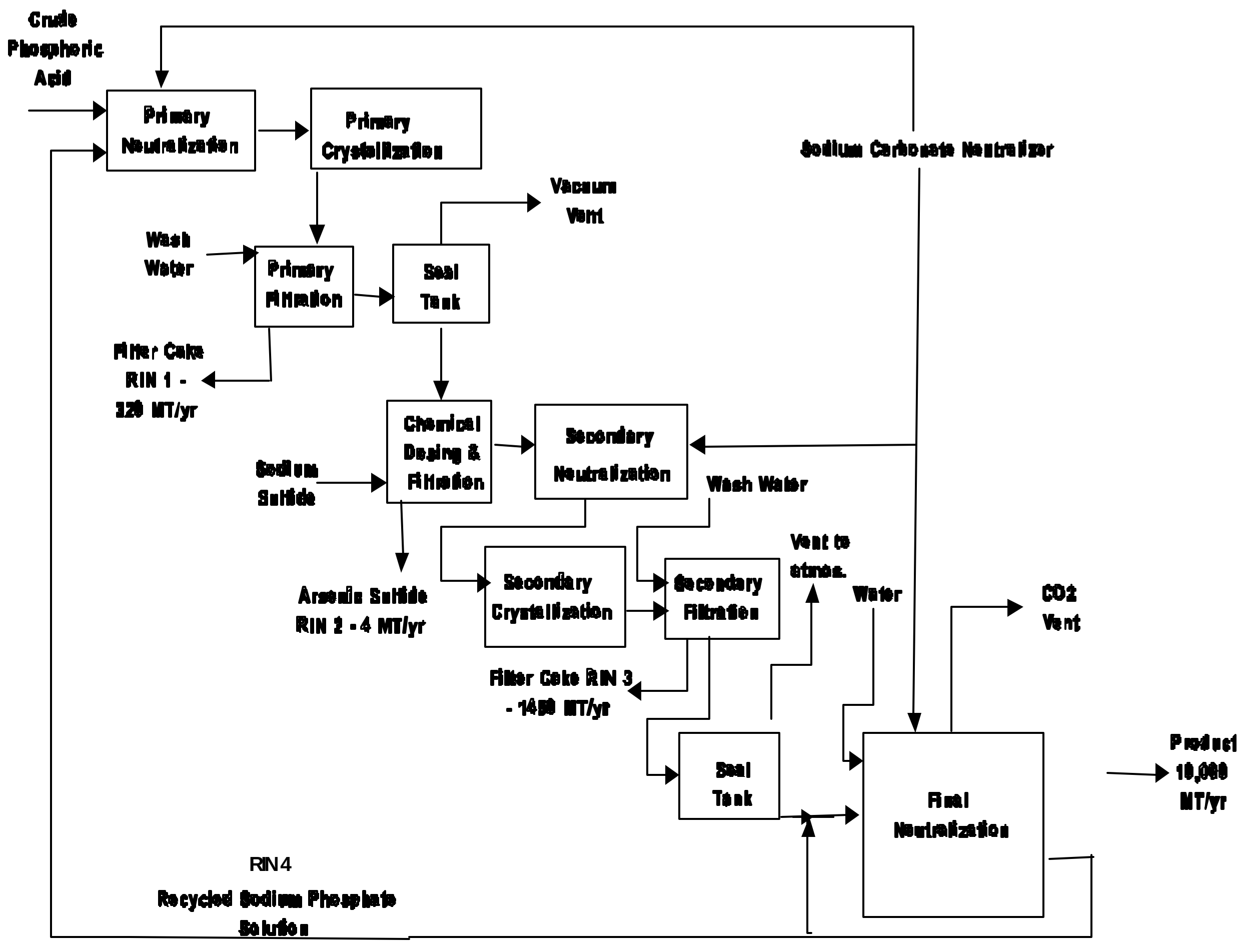
Example PFD for Potassium Dichromate



Potassium dichromate is made by the reaction of potassium chloride and sodium dichromate liquor in solution. The solution is then pH adjusted, saturated and filtered. Filtering produces solid filter aid waste (RIN 1) which is drummed and shipped to a Subtitle C landfill. The material is then vacuum cooled to precipitate crystalline potassium dichromate which is recovered by centrifuging. The resulting potassium dichromate solution is then evaporated to recover the product. Next, the material is dried, sized and packaged. The product fines (RIN 2) produced during the drying and packaging is sent to a dust collection area where it is settled and returned to the reaction tank via conveyor.

The mother liquor (RIN 3) from the product centrifuge is then concentrated to precipitate sodium chloride which is removed as a solid waste (RIN 4) from a salt concentrator and centrifuge. The waste solid sodium chloride is contaminated with chromate salts and is considered hazardous and is subsequently transported to an offsite Subtitle C landfill. The recycled liquor (RIN 5) from the centrifuge is recycled back to the mix tank.

Example PFD for Wastes from the Production of Sodium Phosphate from Wet Process Phosphoric Acid



Sodium phosphate from the wet feedstock method is produced by a series of precipitation reactions followed by a final neutralization step to release the product. Wet phosphoric acid is fed into the system with sodium carbonate until a pH of approximately 2.0 is reached. This step precipitates sodium fluorisilicate. Primary filtration results in a filter cake (RIN 1) which is shipped to a Subtitle C landfill. The precipitant is removed by centrifugation and the remaining solution is sent to a secondary precipitation train. Arsenic salts are removed by treatment with sodium sulfide (arsenic precipitant). The arsenic sulfide (RIN 2) is containered and shipped to a Subtitle C landfill. This step also removes any remaining fluorides that escaped the previous precipitation step. The solution is then neutralized to a pH of 5 with sodium carbonate to remove iron and aluminum phosphates. The solution is sent to the secondary crystallizer, then filtered to remove the precipitants (RIN 3). The precipitants are then managed in an on-site Subtitle D landfill. The remaining product acid is then sent to final neutralization with sodium carbonate. The pH is neutralized to approximately 8.5 if the desired product is trisodium phosphate. Excess sodium phosphate solution (RIN 4) from the final neutralization step is recycled to the primary neutralization tank.

Table III.1. Example Response to Section III.A Residual Characterization

1. RIN __1____	**3. Residual Code** 04____________________________________	**CBI?*** Q
2. Common Name ____Digestion sludge____________________	**4. RCRA Code(s):** D007____________________________________	
5. Please indicate for each RIN if the residual is Bevill exempt under EPA's position as described in the April, 1998 guidance document. (Optional: You can also provide justification as to why your company agrees or disagrees with EPA's positions as an attachment to this questionnaire.) However, you must complete the questionnaire for each of these residuals. **No**____		

6. Properties of Residual		**Particle Size Distribution**		**Phase Distribution & Other Properties**	
pH	3.5	> 60 mm	10%	Moisture	65%
Total CN	NA ppm	1-60 mm	65%	Organic Liquid	%
Amenable CN	NA ppm	100 µm-1 mm	20%	Solids	35%
Reactive CN	NA ppm	10 µm-100 µm	65%	Other (specify)	%
Total Sulfide	NA ppm	< 10 µm	5%		
Reactive S	NA ppm	100 µm-1 mm	%		
Vapor Press.	NA mm Hg				
Viscosity	NA cP				
Specific Gravity	1.0				

7. Residual Characterization

Element or Compounds	Total Concentration (mg/kg)	TCLP Concentration (mg/L)	Other Leaching Procedure Concentration (mg/L), Specify Method
Arsenic	250	0.1	
Barium	200	10	
Cadmium	ND	ND	
Chromium	200	25	20/SPLP
Lead	10	0.5	
Iron	32000	NA	
Magnesium	640	NA	
Silver	ND	ND	
Titanium	24000	NA	
Zinc	1300	NA	
Sodium	250000	NA	

*If CBI is claimed, complete Appendix B.
NA - data not available ND - not detected

Table IV.1. Example Response to Section IV.A
Residual Generation Rate and Management

1. RIN ____1____	2. Quantity Generated ____5,000____ (MT) Year of Generation (if not 1998) _________		3. Frequency of Generation _______B_______	CBI? Q
4. Management Step	**5. Management Code**	**6. RMUN**	**7. Planned Changes (Y/N)**	**CBI?**
1	01-B	10	N	Q
F	13-B	20	N	Q
				Q
				Q

1. RIN ____2____	2. Quantity Generated _____5,000____ (MT) Year of Generation (if not 1998) _________		3. Frequency of Generation ______B________	CBI? Q
4. Management Step	**5. Management Code**	**6. RMUN**	**7. Planned Changes (Y/N)**	**CBI?**
F	10-C (Offsite metals reclamation)	30	N	Q
				Q

1. RIN ____3____	2. Quantity Generated ____53,000____ (MT) Year of Generation (if not 1998) _________		3. Frequency of Generation _____A_________	CBI? Q
4. Management Step	**5. Management Code**	**6. RMUN**	**7. Planned Changes (Y/N)**	**CBI?**
1	08-A	40	N	Q
F	12-A	50	N	Q

Table IV.2. Example Response to Section IV.B.
Offsite Management Facilities

Residual Management Unit Number (RMUN): 30 Name of Facility: Thoroughburn, Inc. Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): Route 6 ____ City/State/Zip Code: Warm Springs, Nevada 08012 Distance from Facility: 150 miles CBI? Q
Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ ____ City/State/Zip Code: ____ Distance from Facility: ____ CBI? Q
Residual Management Unit Number (RMUN): ____ Name of Facility: ____ Hazardous Waste Facility ID Number (if any): ____ Facility Location (Street, Route Number, or Other Specific Identifier): ____ ____ City/State/Zip Code: ____ Distance from Facility: ____ CBI? Q

Table IV.3. Example Response to Section IV.C.
Onsite and Offsite Residual Management Unit Identification

1. RMUN	2. Location	3. Unit Type	4. Unit Common Name	5. RINs Managed in Unit	CBI?
10	On	2	Container (Drum)	1	Q
20	On	L-3	Subtitle C Landfill	1	Q
30	Off	5 (HTMR)	Thoroughburn Metal reclamation	2	Q
40	On	1	Neutralization tank	3	Q
50	On	L-6	WWTP	3	Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q

Table IV.4. Example Response to Section IV.D.
Total Production

1. Product	2. 1998 Total Production (MT/yr)	CBI?
Titanium dioxide	54,000	Q
		Q
		Q

Table IV.5. Example Response to Section IV.E
Residual Management Cost Table

1. RIN	2. Transportation Cost ($/MT)	3. Management Cost ($/MT)	4. Payment Received ($/MT)	CBI?
2	50	200		Q
				Q
				Q

Table V.1. Example Response to Section V.A.
Residual Management Unit Characterization

1. RMUN	2. Date Opened (month/year)	3. Closure Date (month/year)	4. Active life (years)	5. Permit Status	6. RFI (Y/N)?	CBI?
10	1/1990	1/2020	30	B	N	Q
20	6/1985	6/2010	25	S	N	Q
40	2/1985	2/2000	15	N	N	Q
50	10/1987	10/2017	30	N	N	Q
70	4/1979	4/1999	20	S	N	Q
80	1/1982	1/2007	25	S	N	Q
						Q
						Q
						Q
						Q

Table V.2. Example Response to Section V.B.
Land-Based Units (other than land treatment): **Unit Size**

1. RMUN	2. Surface Area (Acres)	3. Height (ft)		4. Total Design Capacity (cu. yd.)	5. Remaining capacity as of 1/98 (cu. yd.)	6. % Remaining capacity used in 1998	7. Frequency in Which Cover is Applied	8. Dust Suppression? (Y/N)	9. Water Monitoring/ Hydrology	CBI?
		above grade	below grade							
20	12	10	15	484,000	100,000	10	Daily	Y[1]	no	Q
70	6	3	32	338,800	50,000	15	Daily	Y[1]	no	Q
80	24	10	15	968,000	250,000	1	Daily	Y[1]	no	Q
										Q
										Q
										Q
										Q
										Q
										Q
										Q

*If CBI is claimed, complete Appendix B.

1. Daily Cover Applied, and grass cover for completed cells

Table V.3. Example Response to Section V.C.
Land-based Units: Landfills

1. RMUN	2. Total Area (acres)	3. # of Cells	4. Active Area (acres)	5. Thickness of Waste Distributed Over Cell (ft.)	6. % of Total Landfill that Contain RC(s)	CBI?
20	40	4	12	4	45	Q
80	65	6	24	8	20	Q
						Q
						Q
						Q

Table V.4. Example Response to Section V.D.
Land-Based Units: Design and Construction

1. RMUN	2. Liner Construction Code	3. Layer Thickness	4. Thickness Units (inches or mm)	CBI?
20	2	10	mm	Q
	4	10	mm	
	3	60	inches	
70	5	500	mm	Q
80	3	400	inches	Q

Table V.5. Example Response to Section V.E.
Land Treatment Units

1. RMUN	2. Surface Area (acres)	3. Surface area residual is applied (acres)	4. Method of Soil Incorporatio n	5. Depth of Incorporatio n (inches)	6. Frequency of Application	7. 1998 Total Residual Applied (MT)	CBI?
140	80	10	1	12	Monthly	2100	Q
							Q
							Q

							Q

Table V.6. Example Response to Section V.F.
Leachate and Run-on/Run-off Control

1. RMUN	2. Annual Leachate Volume (MT)	3. Contact with Storm Water Possible? (Yes/No)	4. Runoff Managed Under a Storm Water Permit? (Yes/No)	5.Run-on/Run-off Storm Severity	6. Flood Plain Type	7.Distance to Nearest Downgradient Water Body (ft)	8. Run-on/Run-off Control System Type	9. Run-off Destination Code	10. Description Attached (Yes/No)	CBI?
20	10	Yes	Yes	50	100	50	1	1	Y	Q
70	NA	Yes	Yes	U	50	10	3	1	Y	Q
80	NA	Yes	Yes	U	50	25	1	3	Y	Q
										Q
										Q
										Q
										Q
										Q

NA - leachate not collected

Table V.7. Example Response to Section V.G.
Tanks

1. RMUN	2. Tank Volume (gal)	3. Tank Area (ft^2)	4. Secondary Containment? (Yes/No)	5. Covered? (Yes/No)	CBI?
40	5000	40	No	Yes	Q
					Q
					Q
					Q
					Q
					Q

Table V.8. Example Response to Section V.H.
Surface Impoundments

1. RMUN	2. Total WW Flow through S.I. (MT)	3. Residual Flow (MT)	4. Total S.I. Area (m^2)	5. Aerated?	6. Liner Type	7. Leak Detection System (Y/N)	8. Closure plans?	CBI?
70	200,000	35,000	97,000	Yes	None	No	No	Q
								Q
								Q
								Q
								Q
								Q
								Q
								Q
								Q
								Q

**Table V.9. Example Response to Section V.I.
Deep Well Injection**

1. RMUN	2. Injection Rate (gal/yr)	3. Depth from grade to top of injection zone (ft)	4. Regulatory status code	5. Additional information attached? (Yes/No)	CBI?
110	75 million	100	1	Yes	Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q
					Q

**Table V.10. Example Response to Section V.J.
Containers**

1. RMUN	2. Container type and size	3. Closed? (Yes/No)	CBI?
10	Drum, 500 cu. yd	Yes	Q
			Q
			Q
			Q
			Q
			Q

Table V.11. Example Response to Section V.K. Piles

1. RMUN	2. Dust Suppression (Yes/ No)?	3. Concrete Pad/Runoff Containment/ Synthetic Liners?	4. Type Runon/ runoff controls	5. Storm Event Design	6. Average Volume in Pile (cu. yd)	CBI?
150	No	Pad w/ synthetic liner	5	50 year	10,000	**Q**
						Q
						Q
						Q
						Q
						Q
						Q

APPENDIX B

Claim of Confidentiality

Substantiating the Claim of Confidentiality

You may make a confidential business information (CBI) claim for each data point that is sensitive data. The following series of questions needs to be filled out for each data point that is claimed to be CBI. If however, the identical supporting information is used to substantiate multiple data points then all the data points may be claimed on the same form. Attach additional pages as needed.

1. Identify the data point(s) that this claim is substantiating.
   Page Number:____________________
   Table:____________________
   Row:____________________
   Column:____________________
   Description:____________________

2. For what period of time do you request that the information be maintained as confidential? If the occurrence of a specific event will eliminate the need for confidentiality, please specify that event.

   ____
   ____
   ____
   ____
   ____

3. Information submitted to EPA becomes stale over time. Why should the information you claim as confidential be protected for the period of time specified in your answer to question #1?

   ____
   ____
   ____
   ____
   ____

4. What measures have you taken to protect the information claims as confidential? Have you disclosed the information to anyone other than a governmental body or someone who is bound by an agreement not to disclose the information further? If so, why should the information still be considered confidential?

   ____
   ____
   ____
   ____
   ____

5. Has any governmental body made a determination as to the confidentiality of the information? If so, please attach a copy of the determination.

   ____
   ____
   ____
   ____
   ____

6. Is the information contained in any publicly available material such as promotional publications, annual reports, articles, permits, etc.? Is there any means by which a member of the public could obtain access to the information?

7. For each section of information claimed as confidential, discuss with specificity why release of the information is likely to cause substantial harm to your competitive position. Explain the nature of these harmful effects, why they should be viewed as substantial, and the causal relationship between disclosure and such harmful effects. How could your competitors make use of this information to your detriment?

8. Please discuss any other information you deem relevant.

Appendix B
List of Inorganic Chemical Manufacturing Facilities

Facility	Location	RCRA_ID
Antimony Oxide Production		
Amspec Chemical Corporation	Gloucester City, NJ	NJD000312371
Cerac, Inc.[1]	Milwaukee, WI	WID006429005
Great Lake Chemical Company-Laredo	Laredo, TX	TXD981054273
Laurel Industries	La Porte, TX	TXD980870232
Schumacher[1]	Carlsbad, CA	CAD982053092
United States Antimony Corporation	Thompson Falls, MT	MTD050261833
Barium Carbonate Production		
Cerac, Inc.[1]	Milwaukee, WI	WID006429005
Chemical Products Corporation	Cartersville, GA	GAD003275468
Osram Sylvania Products Inc.	Towanda, PA	PAD003044609
Boric Acid Production		
IMCC Chemicals Inc.	Trona, CA	CAD048456941
U.S. Borax Boron Operations	Boron, CA	CAD008323255
Cadmium Pigment Production		
Millennium Specialty Chemicals - Colors & Silica	Baltimore, MD	MDD003093507
Inorganic Hydrogen Cyanide Production		
Cyanco - Winnemucca	Winnemucca, NV	
Degussa-Huls, Mobile Facility	Theodore, AL	ALD075045575
Dow - Versene	Freeport, TX	TXD008092793
DuPont - Memphis	Memphis, TN	TND007024672
DuPont Sabine River Works	Orange, TX	TXD008079642

Facility	Location	RCRA_ID
DuPont - Victoria	Victoria, TX	TXD008123317
FMC Green River	Green River, WY	WYD009077496
Novartis Crop Protection, Inc.	St. Gabriel, LA	LAD053783445
Rhone-Poulenc Rhodimet Unit	Institute, WV	WVD005005509
Rohm and Haas Texas, Inc.	Deer Park, TX	TXD065096273
Phosphoric Acid Production via the Dry Process		
Albright & Wilson Americas	Charleston, SC	SCD003358389
FMC Carteret	Carteret, NJ	NJD002454163
FMC-Lawrence	Lawrence, KS	KSD007124506
Rhodia Inc. - Morrisville	Morrisville, PA	PAD002336410
Rhodia Inc. - Nashville	Nashville, TN	TND004036570
Solutia, Inc. - Augusta	Augusta, GA	GAD001700699
Solutia Inc. - Carondelet Plant	St. Louis, MO	MOD001700848
Solutia Inc. - Trenton	Trenton, MI	MID009708678
Phosphorous Pentasulfide Production		
FMC-Lawrence	Lawrence, KS	KSD007124506
Rhodia Inc. -Morrisville	Morrisville, PA	PAD002336410
Solutia Inc., William G. Krummrich Plant	Sauget, IL	ILD000802702
Phosphorous Trichloride Production		
Akzo Nobel Chemicals Inc.	Gallipolis Ferry, WV	WVD009708702
Albright & Wilson Americas	Charleston, SC	SCD003358389
FMC Nitro	Nitro, WV	WVD005005087

Facility	Location	RCRA_ID
Monsanto - Luling	Luling, LA	LAD001700756
Rhodia Inc. - Morrisville	Morrisville, PA	PAD002336410
Zeneca AG Products - Cold Creek Plant	Bucks, AL	ALD095688875
Potassium Dichromate Production		
Sentury Reagents	Rock Hill, SC	SCD982085136
Sodium Chlorate Production		
442 Corporation	Perdue Hill, AL	ALD980803910
CXY Chemicals, USA	Hahnville, LA	LAR000005926
Eka Chemicals, Inc. - Columbus	Columbus, MS	MSD980709646
Eka Chemicals, Inc. - Moses Lake	Moses Lake, WA	WAD988468286
Elf Atochem North America, Inc. - Portland	Portland, OR	ORD009031840
Georgia Gulf Corporation	Plaquemine, LA	LAD057117434
Huron Technologies Corporation	Augusta, GA	GA0000081281
Kerr-McGee Chemical LLC - $NaClO_3$	Hamilton, MS	MSD007025117
Sterling Pulp Chemicals, Inc.	Valdosta, GA	GA0001122159
Western Electrochemical Company	Cedar City, UT	UTD988072294
Sodium Dichromate Production		
Elementis Chromium LP	Corpus Christi, TX	TXD098818339
Occidental Chemical Corporation - Castle Hayne	Castle Hayne, NC	NCD057454670
Sodium Phosphate Production from Wet Process Phosphoric Acid		
Rhodia Inc. - Chicago Heights	Chicago Heights, IL	ILD005110143
Rhodia Inc - Waterway	Chicago, IL	ILD180011108

Facility	Location	RCRA_ID
Solutia, Inc. - Augusta	Augusta, GA	GAD001700699
Solutia Inc. - Carondelet Plant	St. Louis, MO	MOD001700848
Titanium Dioxide Production		
Cerac, Inc.[1]	Milwaukee, WI	WID006429005
DuPont - DeLisle	Pass Christian, MS	MSD096046792
DuPont - Edge Moor	Edge Moor, DE	DED000800284
DuPont - New Johnsonville	New Johnsonville, TN	TND004044491
Kemira Pigments, Inc.	Savannah, GA	GAD003288803
Kerr-McGee Chemical, LLC - TIO2	Hamilton, MS	MSD007025117
Louisiana Pigment Company, L.P.	Westlake, LA	LAD985185149
Millennium Inorganic Chemicals - Ashtabula Plant 1	Ashtabula, OH	OHD076741149
Millennium Inorganic Chemicals - Ashtabula Plant 2	Ashtabula, OH	OHD061029682
Millennium Inorganic Chemicals - Hawkins Point Plant	Baltimore, MD	MDD003093515

1. Facility was not evaluated during this listing determination due to their low production and waste generation volumes.