



11-13-08

Document Control Office (7407M)
Office of Pollution Prevention and Toxics (OPPT)
Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460-0001
ATTN: Nanoscale Materials Stewardship Program

Dear Mr. Allwood:

Here are the submissions for three related substances (with one confidential and one sanitized versions per substance) that I spoke to you about by phone. As I mentioned, we've been trying to get these submitted to you earlier, but it does not appear that you have received them. Hopefully, this time will work.

If you have any questions about this submission please let me know.

Regards,

Dave Penney, Ph.D.

Senior Toxicologist
Product Safety

Sasol North America Inc.

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Houston Texas 77079
Telephone: (+1) 281 588 3000
www.sasolnorthamerica.com

NT-08-0058

315370

U.S. ENVIRONMENTAL PROTECTION AGENCY

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NANOSCALE MATERIALS STEWARDSHIP PROGRAM
DATA SUBMISSION FORM

Total number of pages in the Form

42

When completed send this form to

U.S. E.P.A.
DOCUMENT CONTROL OFFICER (7407M)
1200 PENNSYLVANIA AVE. NW
WASHINGTON, D.C. 20460
ATTN: NANOSCALE MATERIALS STEWARDSHIP PROGRAM

This form has been developed for optional use by participants in the U.S. EPA's Nanoscale Materials Stewardship Program (NMSP). This form is based on the standard Premanufacture Notice (PMN) form (EPA FORM 7710-25), with many of the pages in this form adapted directly from the PMN form, irrelevant sections removed, and additional pages seeking nanoscale materials-specific information inserted, along with specific instructions.

Paperwork Reduction Act Notice: The public reporting and record keeping burden for this collection is estimated to average about 154.3 hours per response for the Basic NMSP, and 2,500 hours for the In-Depth NMSP, including the 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 to: Director, Collection Strategies Division (Mail Code 2822T), U.S. Environmental Protection Agency, Washington, DC 20460. Include the OMB control number above in any correspondence, but do not submit the form or report to this address.

GENERAL INSTRUCTIONS

- As much of this form is adapted from the PMN form, it may be instructive to refer to the "Instruction Manual for Reporting Under the TSCA §5 New Chemicals Program" (available from the Toxic Substances Control Act (TSCA) Information Service, 202-554-1404, or 202-554-5603 (fax) or at <http://www.epa.gov/opptintr/newchems/pubs/pmnforms.htm>). Where referencing these instructions might be helpful in completing this form, EPA directs you to the "PMN Form Instructions Manual."
- Having based this form on the PMN form, the form structure is geared more towards the manufacturer or importer of the chemical substance as opposed to others who may participate in the NMSP, such as researchers. EPA recognizes that not everyone will have all of the information identified in this form available to them.
- For purposes of completing this form, you should consider "manufacture, process or use" to also capture activities related to the development of a chemical substance and researchers should provide information in that context to the extent that it is available. Researchers may not, however, have the detailed use information described in Part I or the detailed manufacturing, processing, and use operations information described in Part II. If you decide to use the form, please remember that you do not have to complete a section if it is not applicable.
- This form is optional for NMSP participants. It was developed in an effort to help participants identify the type of information that would be of interest and provide a simplified mechanism for submitting that information. You do not have to use this form. You may report to EPA in any format you choose.
- To the extent practicable, EPA has included instructions to help you complete the form. Please use the form as a guide to determine what data is available for reporting to EPA. EPA encourages participants to provide as much information as possible, including why information is not available.
- Please provide the information requested in this form to the extent it is known or reasonably ascertainable. Particularly as related to the health and environmental effects of the manufacture, processing, distribution in commerce, use, or disposal of the substance, all test data in your possession or control and a description of all other known data should be provided. Reasonable estimates or modeling data may be given in the absence of actual data. Standard literature citations may be submitted for data in the open scientific literature. If the data do not appear in the open literature, please submit a copy of the complete test data report (written in English). Clearly identify whether test data is on the substance, on an analog, or from models.
- Any answer may be left blank or filled with "N/A," if the information is not available, or the question is not applicable. IT IS NOT NECESSARY TO DO ADDITIONAL TESTING IN ORDER TO COMPLETE THIS FORM.
- Attach additional sheets as needed. Label each continuation sheet with the corresponding section heading. List all attachments including data and optional information on page 15.
- Only one nanoscale material should be submitted per form.
- Any information may be claimed as confidential. To assert a claim on the form, mark (X) the confidential box next to the information claimed as confidential. To assert a claim in an attachment, circle or bracket the information claimed as confidential. If information is claimed as confidential, a sanitized version (including attachments) should be provided. For additional instructions on claiming information as confidential, refer to the PMN Form Instructions Manual. Submission of confidential information on this form constitutes consent for disclosure of the information to EPA contractors under the security procedures used in handling information submitted under TSCA.

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NOTICES

- Participation in and submission of data to the EPA under this program is voluntary.
- Use of this form by program participants is also voluntary.
- Participation in and submission of data to EPA under this program does not imply an intent to manufacture or import the nanoscale material for a commercial purpose.
- Completion and submission of this form to EPA under the NMSP does not satisfy any requirement under 40 CFR part 720 to submit a PMN or under 40 CFR part 721 to submit a Significant New Use Notice. For information on PMN submissions, see <http://www.epa.gov/opptintr/newchems/index.htm>. If you have any questions about the TSCA Inventory status of the nanoscale materials you may be manufacturing or importing, EPA encourages you to consult with EPA before beginning any commercial activities. If you have or intend to submit a PMN to EPA, you may ask EPA to include that submission under the NMSP and do not need to submit a duplicate copy of the PMN to EPA under the NMSP.

TEST DATA

Available hazard and exposure test data would be most useful if the physical/chemical properties of the nanoscale material relevant to assessing test results are obtained at the initiation of testing. Additional relevant information on preparation of the nanoscale material for administration and storage history of the material between production and administration will assist in interpretation. When possible, interpret data in the context of accompanying positive and negative nanoscale substance control data from the same test system. **Indicate which of the following data are included in this submission:**

- Physical / Chemical properties
 Health effects
 Environmental effects
 Test data not in the possession or control of the submitter
 Structure / activity relationships
 Environmental fate Other
 Other

Mark (x) if any of the provided data is claimed as confidential

HOW LONG DID IT TAKE YOU TO COMPLETE THIS FORM?

Please provide an estimate of the amount of time in work hours it took you to complete this form. EPA estimates that it could take up to 154.3 burden hours for someone to complete this form in its entirety, including time to review instructions, search existing data sources, gather and maintain the data needed, and complete and review the collection of information. Your estimate will help inform the Agency's evaluation of the use of this optional form and the Agency's estimates.

Hours:

80

COMMENTS

Please provide feedback or suggestions you may have about this optional form.

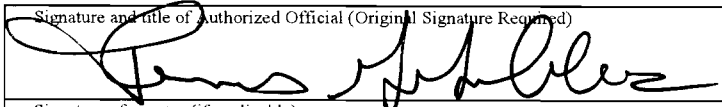
A fillable pdf version would have been very helpful.

SUBMITTERS STATEMENT

1. All information provided in this form is accurate as of the date of submission.
2. I understand that this is not a PMN, and as such, does not satisfy any requirement under 40 CFR part 720 to submit a PMN.
3. I am primarily a (select one): Manufacturer Importer Researcher Other Participant (specify): _____

Mark X in this box if you are willing to allow EPA to forward this data, including confidential portions, to other government entities. If release of data is limited, please list entities with whom you would allow EPA to share data. EPA will contact you before releasing any data.

Please Mark (X) in the "Confidential" box next to the signature you claim as confidential

Signature and title of Authorized Official (Original Signature Required) 	Date 11/05/08	Confidential
Signature of agent - (if applicable)	Date	

Part I – GENERAL INFORMATION

Section A -- SUBMITTER IDENTIFICATION

Confidential

Mark () the "Confidential" box next to any subsection you claim as confidential

1a. Person Submitting Notice (in U.S.)	Name of authorized official						
	Tom Grumbles						
	Company						
	Sasol North America Inc.						
Mailing address (number and street)							
900 Threadneedle, Houston, TX 77079							
City, State, ZIP Code							
b. Agent (if applicable)	Name of authorized official		Position				
	Company						
	Mailing address (number and street)						
	City, State, ZIP Code		Telephone	Area Code	Number		
c. If you are submitting this notice as part of a joint submission, mark (X) this box. <input type="checkbox"/>							
Joint Submitter (if applicable)	Name of authorized official		Position				
	Company						
	Mailing address (number and street)						
	City, State, ZIP Code		Telephone	Area Code	Number		
2. Technical Contact (in U.S.)	Name of authorized official		Position				
	Joseph Pawela		Research Scientist				
	Company						
	Sasol North America Inc.						
	Mailing address (number and street)						
2201 Old Spanish Trail							
City, State, ZIP Code		Telephone	Area Code	Number			
Westlake, Louisiana 70669			337	494-5314			

Part I – GENERAL INFORMATION – Continued

Section B -- CHEMICAL IDENTITY INFORMATION:

Mark (X) the "Confidential" box next to any item you claim as confidential

Please complete either item 1 (Class 1 or 2 substances) or item 2 (Polymers) as appropriate, then complete all other items in this section. It is recognized that systematic nomenclature has not been fully developed for nanoscale materials, therefore it is not necessary to provide the "correct Chemical Abstract name" nor the "CAS Registry Number," if it does not exist. Please fill out these sections to the best of your ability in light of the limitations.

If another person will submit chemical identity information for you (for either Item 1 or 2), mark (X) the box at the right.

Identify the name, company, and address of that person in a continuation sheet.

Confidential

1. Class 1 or 2 chemical substances (for definitions of class 1 and class 2 substances, see the PMN Form Instructions Manual. It is also noted that a nanoscale material may or may not be accurately described as a Class 1 or Class 2 substance. If the choice is not obvious, this section may be left blank. In addition, a brief explanation may be given for why a particular classification is or is not appropriate

a. Class of substance - Mark (X) 1 Class 1 or 2 Class 2

b. Chemical name (Currently correct Chemical Abstracts (CA) Name that is consistent with TSCA Inventory listings for similar substances. If a Chemical Abstracts Name is not available, please use a name that is most in agreement with CA nomenclature

Boehmite

c. Please identify which method you used to develop or obtain the specified chemical identity information reported in this notice: (check one).

Method 1 (CAS Inventory Expert Service - a copy of the Identification report obtained from the CAS Inventory Expert Services must be submitted as an attachment to this notice)

Method 2 (Other Source)

d. Molecular formula (including molecular shape / physical form) and CAS Registry Number (if a number already exists for the substance)

Al(OH)O

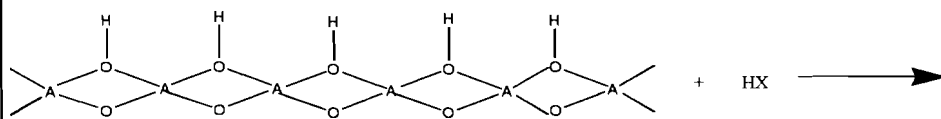
CAS#

1318-23-6

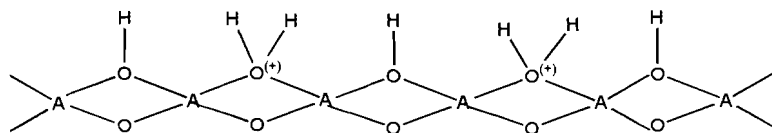
e. For a class 1 substance, provide a complete and correct chemical structure diagram. For a class 2 substance - (1) List the immediate precursor substances with their respective CAS Registry Numbers. (2) Describe the nature of the reaction or process. (3) Indicate the range of composition and the typical composition (where appropriate). (4) Provide a correct representative or partial chemical structure diagram, as complete as can be known, if one can be reasonably ascertained.

1) Boehmite powder (Dispal®) is slurried in water. The boehmite powder has a small amount of acid on the surface that assists in the boehmite dispersing in water to form a dispersion that the particles in the dispersion are nanoscale.

2)



X=Nitrate or Formate



Mark (X) this box if you attach a continuation sheet.

I -- GENERAL INFORMATION -- Continued

Section B -- CHEMICAL IDENTITY INFORMATION -- Continued

2. Polymers (For a definition of polymer, see the PMN Form Instructions Manual.) Confidential

a. Indicate the number-average weight of the lowest molecular weight composition of the polymer. Indicate maximum weight percent of low molecular weight species (not including residual monomers, reactants, or solvents) below 500 and below 1,000 absolute molecular weight of that composition.

Describe the methods of measurement or the basis for your estimates: GPC Other : (Specify) _____

i) lowest number average molecular weight: _____

ii) maximum weight % below 500 molecular weight: not a polymer

iii) maximum weight % below 1000 molecular weight: _____

Mark (X) this box if you attach a continuation sheet.

b. Make separate confidentiality claims for monomer or other reactant identity, composition information, and residual information. Mark (X) the "Confidential" box next to any item you claim as confidential

(1) - Provide the specific chemical name and CAS Registry Number (if a number exists) of each monomer or other reactant used in the manufacture of the polymer.

(2) - Mark (X) this column if entry in column (1) is confidential.

(3) - Indicate the typical weight percent of each monomer or other reactant in the polymer.

(4) - Mark (X) the identity column if you want a monomer or other reactant used at two weight percent or less to be listed as part of the polymer description on the TSCA Chemical Substance Inventory.

(5) - Mark (X) this column if entries in columns (3) and (4) are confidential.

(6) - Indicate the maximum weight percent of each monomer or other reactant that may be present as a residual in the polymer as manufactured for commercial purposes.

(7) - Mark (X) this column if entry in column (6) is confidential.

Monomer or other reactant and CAS Registry Number (1)	Confidential (2)	Typical composition (3)	Identity Mark (X) (4)	Confidential (5)	Maximum residual (6)	Confidential (7)
		%			%	
		%			%	
		%			%	
		%			%	
		%			%	
		%			%	
		%			%	

Mark (X) this box if you attach a continuation sheet.

c. Please identify which method you used to develop or obtain the specified chemical identity information reported in this notice (check one).

Method 1 (CAS Inventory Expert Service) Method 2 (other source)

d. The currently correct Chemical Abstracts (CA) name for the polymer that is consistent with TSCA Inventory listings for similar polymers.

e. Provide a correct representative or partial chemical structure diagram, as complete as can be known, if one can be reasonably ascertained. Alternatively, if applicable, provide a correct representative structure for the polymer as part of a composite. [Note: the components of a composite are separate chemical identities. For example in a composite of starch molecules between layers of clay treated with surfactants, the starch, clay, and surfactants might be on the TSCA Inventory, but since the interactions between the components are weak electrical interactions, there is no chemical substance.]

Not applicable, not a polymer

Mark (X) this box if you attach a continuation sheet.

Part I -- GENERAL INFORMATION -- Continued

Section B -- CHEMICAL IDENTITY INFORMATION -- Continued

3. Impurities

- (a) - Identify each impurity that may be reasonably anticipated to be present in the chemical substance as manufactured for commercial purpose. Provide the CAS Registry Number if available. If there are unidentified impurities, enter "unidentified."
 (b) - Estimate the maximum weight % of each impurity. If there are unidentified impurities, estimate their total weight %.

Impurity and CAS Registry Number (a)	Maximum percent (b)	Confidential
	%	
	%	
	%	
	%	
	%	

Mark (X) this box if you attach a continuation sheet.

4. Synonyms - Enter any chemical synonyms for the new chemical identified in subsection 1 or 2.

Boehmite, Pseudoboehmite, Aluminum oxide hydroxide, Alpha alumina monohydrate

Confidential

Mark (X) this box if you attach a continuation sheet.

5. Trade identification - List trade names for the new chemical substance identified in subsection 1 or 2.

Dispal® Sol alumina

Mark (X) this box if you attach a continuation sheet.

6. Generic chemical name - If you claim chemical identify as confidential, you must provide a generic name for your substance that reveals the specific chemical identity of the new chemical substance to the maximum extent possible. Refer to the TSCA Chemical Substance Inventory, 1985 Edition, Appendix B for guidance on developing generic names.

Mark (X) this box if you attach a continuation sheet.

7. Byproducts - Describe any byproducts resulting from the manufacture, processing, use, or disposal of the new chemical substance. Provide the CAS Registry Number if available.

Byproduct (1)	CAS Registry Number (2)	Confidential
None		

Mark (X) this box if you attach a continuation sheet.

Part I -- GENERAL INFORMATION -- Continued

Section C -- PRODUCTION, IMPORT, AND USE INFORMATION:

Mark (X) the "Confidential" box next to any item you claim as confidential.

1. Production volume -- Estimate the **maximum** production volume during the next 12 months of production. If applicable please also estimate the maximum production volume for any consecutive 12-month period during the first three years of production. Estimates should be on 100% new chemical substance basis.

Maximum first 12-month production (kg/yr) (100% new chemical substance basis)	Maximum 12-month production (kg/yr) (100% new chemical substance basis)	Confidential
Currently in production	<input type="checkbox"/>	X

2. Use Information -- Make separate confidentiality claims for the description of the category of use, the percent of production volume devoted to each category, the formulation of the new substance, and other use information. Mark (X) the "Confidential" Box next to any item you claim as confidential. If you are a researcher, please consider providing potential uses, or mark N/A and move to item 3 below.

- a. (1) -- Describe each intended category of use of the new chemical substance by function and application..
- (2) -- Mark (X) this column if entry column (1) is confidential business information (CBI).
- (3) -- Estimate the percent of total production for the first three years devoted to each category of use.
- (4) -- Mark (X) this column if entry in column (4) is confidential business information (CBI).
- (5) -- Estimate the percent of the new substance as formulated in mixtures, suspensions, emulsions, solutions, or gels as manufactured for commercial purposes at sites under your control associated with each category of use.
- (6) -- Mark (X) this column if entry in column (6) is confidential business information (CBI).
- (7) -- Indicate % of product volume expected for the listed "use" sectors. Mark more than one box if appropriate
- (8) -- Mark (X) this column if entry(ies) in column (8) is (are) confidential business information (CBI).

Category of use (1) <small>(by function and application i.e. a dispersive dye for finishing polyester fibers)</small>	CBI (2)	Production % (3)	CBI (4)	% in Formulation (5)	CBI (6)	% of substance expected per use (7)				CBI (8)
						Site-limited	Con-*sumer	Indus-trial	Com-mercial	
					X					X
					X					X
					X					X
					X					X
					X					X

* If you have identified a "consumer" use, please provide on a continuation sheet a detailed description of the use(s) or potential uses of this chemical substance in consumer products. In addition include estimates of the concentration of the new chemical substance as expected in consumer products and describe the chemical reactions by which this substance loses its identity in the consumer product.

Mark (X) this box if you attach a continuation sheet.

b. Generic use description If you claim any category of use description in subsection 2a as confidential, enter a generic description of that category. Refer to the PMN Form Instructions Manual for examples of generic use descriptions.

Mark (X) this box if you attach a continuation sheet.

3. Hazard Information -- Include in the notice a copy or reasonable facsimile of any hazard warning statement, label, material safety data sheet, or other information which will be provided to any person who is reasonably likely to be exposed to this substance regarding protective equipment or practices for the safe handling, transport, use, or disposal of the new substance. List in part III hazard information you include.

Mark (X) this box if you attach hazard information.

Part II-- HUMAN EXPOSURE AND ENVIRONMENTAL RELEASE

Section A -- INDUSTRIAL SITES CONTROLLED BY THE SUBMITTER

Mark (X) the "Confidential" box next to any item you claim as confidential

Complete section A for each type of manufacture, processing, or use operation involving the chemical substance at chemical sites you control. (including sites used for development purposes only). See also the PMN Form Instructions manual for related definitions in that context.

1. Operation description
 a. Identity -- Enter the identity of the site at which the operation will occur. Confidential

Name
 Lake Charles Chemical Complex - Sasol North America

Site address (number and street)
 2201 Old Spanish Trail

City, County, State, ZIP code
 Westlake, LA 70669

If the same operation will occur at more than one site, enter the number of sites. Identify the additional sites on a continuation sheet, and if any of the sites have significantly different production rates or operations, include all the information requested in this section for those sites as attachments. —————→

Mark (X) this box if you attach a continuation sheet.

b. Operation Type --

Mark (X)

Manufacturing Processing Use Development

c. Amount and Duration -- Complete 1 or 2 as appropriate

1. Batch	Maximum kg/batch (100% chemical substance)	Hours/batch	Batches/year	X
2. Continuous	Maximum kg/day (100% chemical substance)	Hours/day	days/year	

d. Process description

- (1) Diagram the major unit operation steps and chemical conversions. Include interim storage and transport containers (specify- e.g. 5 gallon pails, 55 gallon drum, rail car, tank truck, etc.).
- (2) Provide the identity, the approximate weight (by kg/day or kg/batch on a 100% new chemical substance basis), and entry point of all starting materials and feedstocks (including reactants, solvents, catalysts, etc.), and of all products, recycle streams, and wastes. Include cleaning chemicals (note frequency if not used daily or per batch).
- (3) Identify by number the points of release, including small or intermittent releases, to the environment of the new chemical substance. If releasing to two media at the same step, assign a second release number for the second medium

See process diagram on continuation sheet

Mark (X) this box if you attach a continuation sheet.

Part II-- HUMAN EXPOSURE AND ENVIRONMENTAL RELEASE -- Continued

Section A -- INDUSTRIAL SITES CONTROLLED BY THE SUBMITTER -- Continued

- 2. Occupational Exposure** -- Please provide the description of worker activity, physical form of the new chemical substance, number of workers exposed, and duration of activity. Researchers should only describe unique activities and not standard laboratory practices. Make separate confidentiality claims by marking (X) the "Confidential" box next to any item you claim as confidential.
- (1) -- Describe the activities (i.e. bag dumping, tote filling, unloading drums, sampling, cleaning, etc.) in which workers may be exposed to the substance.
 - (2) -- Mark (X) this column if entry in column (1) is confidential business information (CBI).
 - (3) -- Describe any protective equipment and engineering controls used to protect workers.
 - (4) -- Indicate the physical form(s) of the new chemical substance (e.g., solid: crystal, granule, powder, or dust) and % new chemical substance (if part of a mixture) at the time of exposure.
 - (5) -- Mark (X) this column if entry in column (4) is confidential business information (CBI).
 - (6) -- Estimate the maximum number of workers involved in each activity for all sites combined.
 - (7) -- Mark (X) this column if entry in column (8) is confidential business information (CBI).
 - (8) and (9) -- Estimate the maximum duration of the activity for any worker in hours per day and days per year.
 - (10) -- Mark (X) this column if entries in columns (8) and (9) are confidential business information (CBI).

Worker activity (i.e., bag dumping, filling drums) (1)	CBI (2)	Protective Equipment/ Engineering Controls (3)	Physical forms(s) and % new substance (4)	CBI (5)	# of Workers Exposed (6)	CBI (7)	Maximum duration		CBI (10)
							Hrs/day (8)	Days/yr (9)	

Mark (X) this box if you attach a continuation sheet.

- 3. Environmental Release and Disposal** -- Please provide the release number and the amount of the new chemical substance released and other release and disposal information. Researchers should report this information if available, or may skip to item 4. Make separate confidentiality claims for each item by marking (X) the "Confidential" box next to each item you claim as confidential.
- (1) -- Enter the number of each release point identified in the process description, part II, section A, subsection 1d(3).
 - (2) -- Estimate the amount of the new substance released (a) directly to the environment or (b) into control technology (in kg/day or kg/batch).
 - (3) -- Mark (X) this column if entries in columns (1) and (2) are confidential business information (CBI).
 - (4) -- Identify the media (stack air, fugitive air (optional-see Instruction Manual), surface water, on-site or off-site land or incineration, POTW, or other (specify)) to which the new substance will be released from that release point.
 - (5) -- a. Describe control technology, if any, and control efficiency that will be used to limit the release of the substance to the environment. For releases disposed of on land, characterize the disposal method and state whether it is approved for disposal of RCRA hazardous waste. On a continuation sheet, for each site describe any additional disposal methods that will be used and whether the waste is subject to secondary or tertiary on-site treatment. b. Estimate the amount released to the environment after control technology (in kg/day).
 - (6) -- Mark (X) this column if entries in columns (4) and (5) are confidential business information (CBI).
 - (7) -- Identify the destination(s) of releases to water. Please supply NPDES (National Pollutant Discharge Elimination System) numbers for direct discharges or NPDES numbers of the POTW (Publicly Owned Treatment Works). Mark (X) if the POTW name or NPDES # is confidential business information (CBI).

Release Number (1)	Amount of new substance released		CBI (3)	Media of release e.g. stack air (4)	Control technology and efficiency (you may wish to optionally attach efficiency data)		CBI (6)
	(2a)	(2b)			(5a)	(5b)	

(7) Mark (X) the destination(s) of releases to water. POTW provide name(s) below: _____ Navigable waterway Other - Specify _____ provide NPDES # _____

Mark (X) this box if you attach a continuation sheet.

Part II-- HUMAN EXPOSURE AND ENVIRONMENTAL RELEASE -- Continued

Section B -- INDUSTRIAL SITES CONTROLLED BY OTHERS

Complete section B for typical processing or use operations involving the chemical substance at sites you do not control. If you do not have this information you may skip this section. Refer to the PMN Form Instructions Manual for additional information about which sites to include. *Complete a separate section B for each type of processing, or use operation involving the chemical substance.* If the same operation is performed at more than one site describe the typical operation common to these sites. Identify additional sites on a continuation sheet.

1. Operation Description -- To claim information in this section as confidential, circle or bracket the specific information that you claim as confidential.
 (1) -- Diagram the major unit operation steps and chemical conversions, including interim storage and transport containers (specify - e.g. 5 gallon pails, 55 gallon drums, rail cars, tank trucks, etc). On the diagram, identify by letter and briefly describe each worker activity. (2) -- Provide the identity, the approximate weight (by kg/day or kg/batch, on an 100% chemical substance basis), and entry point of all feedstocks (including reactants, solvents and catalysts, etc) and all products, recycle streams, and wastes. Include cleaning chemicals (note frequency if not used daily or per batch). (3) -- Identify by number the points of release, including small or intermittent releases, to the environment of the new chemical substance. (4) Please enter the # of sites (remember to identify the locations of these sites on a continuation sheet):

_____ 2 _____
 # of sites

See process diagram on continuation sheets

Mark (X) this box if you attach a continuation sheet.

2. Worker Exposure/Environmental Release
 (1) -- From the diagram above, provide the letter for each worker activity. Complete 2-8 for each worker activity described.
 (2) -- Estimate the number of workers exposed for all sites combined.
 (4) -- Estimate the typical duration of exposure per worker in (a) hours per day and (b) days per year.
 (6) -- Describe physical form of exposure and % new chemical substance (if in mixture), and any protective equipment and engineering controls, if any, used to protect workers.
 (7) -- Estimate the percent of the substance as formulated when packaged or used as a final product.
 (9) -- From the process diagram above, enter the number of each release point. Complete 9-13 for each release point identified.
 (10) -- Estimate the amount of the substance released (a) directly to the environment or (b) into control technology to the environment (in kg/day or kg/batch).
 (12) -- Describe media of release i.e. stack air, fugitive air (optional-see PMN Form Instructions Manual), surface water, on-site or off-site land or incineration, POTW, or other (specify) and control technology, if any, that will be used to limit the release of the substance to the environment.
 (14) -- Identify byproducts which may result from the operation.
 (3), (5), (8), (11), (13) and (15) -- Mark (X) this column if any of the proceeding entries are confidential business information (CBI).

Letter of Activity (1)	# of Workers Exposed (2)	CBI (3)	Duration of Exposure		CBI (5)	Protective Equip. / Engineering Controls/ Physical Form and % substance (6)	% in Formulation (7)	CBI (8)	Release Number (9)	Amount of Substance Released		CBI (11)	Media of Release & Control Technology (12)	CBI (13)
			(4a)	(4b)						(10a)	(10b)			
							100							

(14) -- Byproducts: _____ (15)

Mark (X) this box if you attach a continuation sheet.

Part II-- HUMAN EXPOSURE AND ENVIRONMENTAL RELEASE – Continued

SECTION C – RISK MANAGEMENT PRACTICES (Use this section both for sites controlled by submitter (Section A) and by others (Section B). Make copies as necessary.)

If you have a Risk Management Plan, please provide a copy or complete this section.

Mark (X) in this box if you have attached a copy of your Risk Management Plan and skip to Section F.

1. Details of protective equipment / engineering controls.

Please provide the following information (Researchers should only identify unique equipment and controls or activities):

- (a) – The worker activities listed in Section A.2 or B.1 for which protective equipment/engineering controls are in use.
- (b) – A brief description of the rationale for selecting the protective equipment/engineering controls, including internal exposure control limits, data and the methods used to generate the data that informed the decision.
- (c) – A brief description of the cleaning, reuse, and/or disposal of the protective equipment
- (d) – A brief description of any data (personal and/or area), units (e.g., mass conc., surface area, or particle number conc.) and any exposure monitoring methods used.

Mark (X) in the “CBI” column next to any item you claim as confidential. CBI

(a) Worker activity / Protective equipment / Engineering Control
All work in the plant is done in accordance with General Safety Rules and specific PPE procedures in compliance with the 29 CFR 1910.132 regulations

(b) Rationale for selecting equipment / controls, associated internal exposure control limit / data / methods
PPE selection is done in accordance with specific plant procedures regarding the selection of PPE in accordance with 29 CFR 1910.132. This includes hazard assessments specific to the tasks and substances involved in the operations. Employee training including PPE inspections and maintenance are included in the procedures.

Exposure controls are determined based on job safety analysis, hazard evaluations of the materials and processes involved and where appropriate the use of employee exposure evaluations.

Mark (X) this box if you attach a continuation sheet.

(c) Cleaning, reuse, and/or disposal of protective equipment

These procedures are specified in plant PPE procedures in compliance with 29 CFR 1910.132

Mark (X) this box if you attach a continuation sheet.

(d) Exposure monitoring data (personal and/ or area), units (e.g., mass conc., surface area, or particle number conc.), and methods used

In general air sampling is done for respirable and total dust exposure based on NIOSH/OSHA procedures with analysis of the air samples conducted at certified Industrial Hygiene laboratories.

Mark (X) this box if you attach a continuation sheet.

2. Details of control technology.

To assist EPA in gaining a better understanding of the need for and the types of control technology used at the release points in the manufacture and handling of engineered nanoscale materials, please provide the following information for each release point for which control technology is used:

- (1) – The Release Number, as identified in the process description, part II, section A, subsection 1d(3) (page 8).
- (2) – A brief description of the rationale for selecting the control technology.
- (3) – Data and measurement methods of waste treatment efficiency studies

Release Number (1)

Mark (X) in the “CBI” column next to any item you claim as confidential. CBI

1 (2) Rationale for selecting control technology
Established technology for capture of micron size particulate matter. The material is not nanoscale at this point in the production process, and baghouse technology is suitable for capturing fine powders which are in the micron size range.

(3) Data and measurement methods of waste treatment or purification studies

Mark (X) this box if you attach a continuation sheet.

Mark (X) this box if you attach a continuation sheet.

Part II-- HUMAN EXPOSURE AND ENVIRONMENTAL RELEASE -- Continued

Section D – Lifecycle

Mark (X) the "CBI" box next to any item you claim as confidential.

CBI

1. In addition to the information already given, provide a brief overview of the lifecycle of the material, including all workplaces that manufacture, process, or use the material, methods of packaging and transporting the material, all expected general population, environmental, and consumer uses, and the expected manufacturing and processing methods of the material or any consumer products containing the material. If not included in Sections A or B above, include a description of the end of life disposal or disposition of products containing the nanoscale material.

Mark (X) this box if you attach a continuation sheet.

Section E – Misc. Health, Exposure, Hazard Information

Mark (X) the "CBI" box next to any item you claim as confidential.

CBI

1. Describe any training, hazard communication (e.g. MSDS), etc. specific to the nanoscale material that is provided to workers.

No such training or hazard communication is provided since the material does not exist in a nanoscale form during production.

Mark (X) this box if you attach a continuation sheet.

2. Estimate the total number of individuals—other than previously described workers—(e.g. general public, consumers) who may be exposed to the material and the duration of the exposure.

Consumers are not expected to be exposed to the material while in the nanoscale. Industrial workers who perform peptization of the material may be exposed to the material in an intermediate form that is in the nanoscale; however that material is always in aqueous dispersion and thus not respirable. Total industrial workers exposed to such dispersions may total approximately 1,000.

Mark (X) this box if you attach a continuation sheet.

3. Describe any other procedure, equipment, etc. being used to mitigate exposure to the material.

Mark (X) this box if you attach a continuation sheet.

4. Describe product labeling and any customer training specific to the nanoscale material.

Labeling and customer training pertinent to the nanoscale properties of the material are not provided, since it does not exist in the nanoscale as supplied.

Mark (X) this box if you attach a continuation sheet.

Describe other risk management practices specific to the nanoscale material.

Mark (X) this box if you attach a continuation sheet.

SECTION F - INFORMATION ABOUT POTENTIAL BENEFITS

To claim information in this section as confidential circle or bracket the specific information that you claim as confidential.

In this section you may provide information not reported elsewhere in this form regarding your efforts to reduce or minimize potential risks associated with activities surrounding manufacturing, processing, use and disposal of the substance. Please include new information pertinent to pollution prevention, including source reduction, recycling activities and safer processes or products available due to the chemical substance. Source reduction includes the reduction in the amount or toxicity of chemical wastes by technological modification, process and procedure modification, product reformulation, raw materials substitution, and/or inventory control. Recycling refers to the reclamation of useful chemical components from wastes that would otherwise be treated or released as air emissions or water discharges, or land disposal. Descriptions of pollution prevention, source reduction and recycling should emphasize potential risk reduction subsequent to compliance with existing regulatory requirements and can be either quantitative or qualitative. EPA is interested in the information to assess overall net reductions in toxicity or environmental releases and exposures, not the shifting of risks to other environmental media or non-environmental areas (e.g., occupational or consumer exposure). In addition, information on the relative cost or performance characteristics of the substance to potential alternatives may be provided. **See the PMN Form Instructions Manual and Pollution Prevention Guidance Manual for guidance and examples.**

Describe the expected or potential net benefits, such as (1) an overall reduction in risk to human health or the environment; (2) a reduction in the volume manufactured; (3) a reduction in the generation of waste materials through recycling, source reduction or other means; (4) a reduction in potential toxicity or human exposure and/or environmental release; (5) an increase in product performance, a decrease in the cost of production and/or improved operation efficiency of the chemical substance in comparison to existing chemical substances used in similar application; or (6) the extent to which the chemical substance may be a substitute for an existing substance that poses a greater overall risk to human health or the environment.

Common uses of the final products created from these materials are known to significantly improve the environment.

CBI



Mark (X) this box if you attach a continuation sheet.



DISPAL® 23N4-20 ALUMINA SOL

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Trade name DISPAL® 23N4-20 ALUMINA SOL

Synonyms Aluminum Oxide Hydroxide, Alpha Alumina Monohydrate, Gamma- AlOOH [Crystallographic Designation], Water Dispersible (Pseudo) Boehmite Alumina, Al₂O₃ (x)H₂O

Use Industrial, coatings

Manufacturer/Supplier Sasol North America Inc.

Address 900 Threadneedle, Houston, TX 77079

Telephone

CHEMTREC North America Transportation Emergency (24-hr)	(800) 424-9300
CHEMTREC World Wide	(703) 527-3887
Other Emergencies (24-hr)	(337) 494-5142
MSDS and Product Information (8:00am-4:30pm CST)	(281) 588-3491
Health and Safety Information (8:00am-4:00pm CST)	(281) 588-3492

E-mail address info@us.sasol.com

SECTION 2 HAZARDS IDENTIFICATION

Emergency Overview

Appearance white liquid

Odour odourless

Precautions CAUTION! MAY CAUSE RESPIRATORY, EYE AND SKIN IRRITATION Product dust may be irritating to eyes, skin and respiratory system. Handle in accordance with good industrial hygiene and safety practice

Environmental precautions Do not discharge product into the aquatic environment without pretreatment (biological treatment plant). The methods for determining biodegradability are not applicable to inorganic substances

Potential Health Effects

Eyes Irritating to eyes

Skin May cause skin irritation and/or dermatitis High standards of skin care and personal hygiene should be exercised at all times.

Inhalation Irritating to respiratory system

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea

DISPAL® 23N4-20 ALUMINA SOL

(See Section 11 for Toxicological Information)

SECTION 3 COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Components</u>	<u>CAS-No.</u>	<u>Weight %</u>
Boehmite	1318-23-6	22 - 25
Water	7732-18-5	75 - 78
Nitric Acid	7697-37-2	<0.4

See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications

SECTION 4 FIRST AID MEASURES

- Eye contact** Rinse immediately with plenty of water for at least 15 minutes. If eye irritation persists, consult a specialist.
- Skin contact** Wash off with plenty of water. Take off all contaminated clothing immediately. If skin irritation persists, call a physician. Wash contaminated clothing before re-use.
- Inhalation** Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.
- Ingestion** If swallowed, call a poison control centre or doctor immediately. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

SECTION 5 FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

- Flash point** not applicable
- Autoignition temperature** not applicable
- Flammable limits in air % by volume** Lower explosion limit: not applicable
Upper explosion limit: not applicable
- Fire and explosion** This is an inert material and will not produce a dust explosion
- Extinguishing media** Non-flammable material
- Fire fighting instructions** In the event of fire, wear self-contained breathing apparatus.
- Further information** Keep containers and surroundings cool with water spray



DISPAL® 23N4-20 ALUMINA SOL

SECTION 6 ACCIDENTAL RELEASE MEASURES

Steps to be taken in case of spill or leak Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Clean up promptly by sweeping or vacuum. Do not allow product to contaminate groundwater, lakes, streams, ponds, or soil.

SECTION 7 HANDLING AND STORAGE

Safe handling advice Normal measures for preventive fire protection.

Storage/Transport pressure Ambient

Load/Unload temperature Ambient

Further information on storage conditions Avoid moisture.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING MEASURES

Air contaminant levels should be controlled below the PEL or TLV for this product (see Exposure Guidelines)

PERSONAL PROTECTIVE EQUIPMENT

Eyes Safety glasses with side-shields

Skin Wear suitable protective clothing, gloves and eye/face protection.

Inhalation NIOSH-approved acid gas air-purifying respirator or air-supplied equipment if above PEL



DISPAL® 23N4-20 ALUMINA SOL

EXPOSURE GUIDELINES

<u>Components</u>	<u>Exposure limit(s)</u>
Nitric Acid	OSHA PEL 2 ppm ACGIH TLV (8-hour) 2 ppm
Aluminum oxide	OSHA PEL 15 mg/m3 Total dust OSHA PEL 5 mg/m3 Respirable dust ACGIH TLV (8-hour) 10 mg/m3

ACGIH classes alumina as a nuisance dust

PEL=	Permissible Exposure Limits	TWA=	Time Weighted Average (8 hr.)
TLV=	Threshold Limit Value	STEL=	Short Term Exposure Limit (15 min.)
EL=	Excursion Limit	WEEL=	Workplace Environmental Exposure Level

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	liquid
Colour	white
Odour	odourless
Form	liquid
Boiling point/range	100 °C 212 °F
Vapor density	none
Solubility (water)	dispersible
Viscosity	45 cSt @ 25 °C
Melting point/range	not applicable
Density	1.1 - 1.3 g/cm3

SECTION 10 STABILITY AND REACTIVITY

Conditions to avoid	None.
Hazardous decomposition products	In case of incomplete combustion an increased formation of oxides of nitrogen (NOx) is to be expected
Incompatibility with other materials	None.



DISPAL® 23N4-20 ALUMINA SOL

Hazardous polymerization None

SECTION 11 TOXICOLOGICAL INFORMATION

Eyes Primary irritation (rabbit): 7 - 11 (Maximum score is 110)

Skin Primary irritation (rabbit): 0.8 (Maximum score is 8.0)

Inhalation no data available

Ingestion Acute oral LD50 (rat): > 5,000 mg/kg

CARCINOGENICITY

Contains no ingredient listed as a carcinogen

SECTION 12 ECOLOGICAL INFORMATION

Aquatic toxicity Do not discharge product into the aquatic environment without pretreatment (biological treatment plant)

Water dispersible sols are created by acid treatment of solid aluminas. The pH ranges from 3.0 - 4.0. These materials would be exposed to the water environment only if a spill occurred. Such an event would cause immediate damage and possibly death of fish and other aquatic organisms.

Biodegradation The methods for determining biodegradability are not applicable to inorganic substances

SECTION 13 DISPOSAL CONSIDERATIONS

Waste Code Any unused product or empty containers may be disposed of as non-hazardous in accordance with state and federal requirements. Re-evaluation of the product may be required by the user at the time of disposal, since the product uses, transformations, mixtures, contamination, and spillage may change the classification. If the resulting material is determined to be hazardous, please dispose in accordance with state and federal (40 CFR 262) hazardous waste regulations.

Disposal methods Dispose of only in accordance with local, state, and federal regulations.

Empty containers. Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, triple-rinsed, properly bunged and promptly returned to a drum reconditioner, or properly disposed.

DISPAL® 23N4-20 ALUMINA SOL

SECTION 14 TRANSPORT INFORMATION

DOT Not classified as dangerous in transport
 IATA Not classified as dangerous in transport.
 IMDG Not classified as dangerous in transport

SECTION 15 REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

OSHA classification
 Nonhazardous

TSCA Inventory Listing

Components

CAS-No.

Boehmite
 Water
 Nitric Acid

1318-23-6
 7732-18-6
 7697-37-2

SARA 302 Status

Components

CAS-No.

Weight %

Contains no chemicals subject to SARA 302 reporting

SARA 311/312 Classification

No SARA Hazards

SARA 313 Chemical

Components

CAS-No.

Weight %

Contains no chemicals subject to SARA 313 reporting

CERCLA Hazardous Substance

Components

CERCLA RQ

Weight %

Contains no chemicals subject to CERCLA.

DISPAL® 23N4-20 ALUMINA SOL

INTERNATIONAL REGULATIONS

Workplace Hazardous Materials Information System (WHMIS) Classification

This material is not a controlled product as defined by Canada's Workplace Hazardous Materials Information System (WHMIS)

European Union

Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 1999/45/EC.

Australian Inventory of Chemical Substances (AICS) Listing

Listed on the AICS

Japanese Minister of International Trade and Industry (MITI) Inventory Listing

Listed on MITI.

Canadian Domestic Substance List (DSL) Inventory Listing

Listed on the DSL.

European Inventory of Existing Commercial Chemical Substances (EINECS) Listing

Listed on EINECS.

Philippines Inventory List (PICCS)

Listed on PICCS.

Korean Inventory List

Listed on the ECL

China Inventory List

Listed on the China inventory

STATE REGULATIONS

**California Safe Drinking Water Act (Prop 65) Listing
Components**

CAS-No.

Contains no chemical subject to California Prop 65

SECTION 16 OTHER INFORMATION

HAZARD RATINGS

	<u>Health</u>	<u>Flammability</u>	<u>Reactivity</u>
HMIS	1	0	0
NFPA	1	0	0



DISPAL® 23N4-20 ALUMINA SOL

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[Print Form](#)

NMSP Worksheet - Physical and Chemical Properties

OMB Control No. 2070-0170; Expires: 01/31/2011

Instructions: You are not required to complete this worksheet. It is an optional summary presentation of the data you are submitting, and is intended to assist in the review of the physical and chemical properties data. This worksheet is also intended to help in the understanding of the types of characterization data typically available for engineered nanoscale materials. If data is not provided, please help us understand why it wasn't provided.

Please complete the following worksheet by identifying the property measured; the value of the property; the units in which the property is measured or estimated (as necessary); whether it is a measured or estimated value; the name of the method used to obtain the data; the page on which the data is provided, or if not provided, an indication of why it wasn't provided; and, whether or not the value is claimed as confidential. If non-standard methods were used in the collection of data, EPA would also be interested in receiving a brief description of the alternate method.

The physical state of the neat substance should be measured for the neat (100% pure) chemical substance. Properties that are measured for mixtures or formulations should be so noted (i.e., % substance in ___). In addition, please provide any nanoscale material specific chemical and physical characterization data.

Property	Value	Measured or Estimated (M or E)	Method Used <small>Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.</small>	Provided on page	If not provided, why not? Mark (X) all that apply:	Mark (X) for Confidential
					1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain)	
Part 1 - General Physical and Chemical Properties						
Physical state of neat substance	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	M	Visual Observation		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Vapor pressure @ Temperature 25 °C	Torr: 1.00	E			1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Density/relative Density	g/cm3: 3.04	E	Literature Reference: www.webmineral.com		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Pour Density	Unknown				1. <input checked="" type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Solubility in Water @ Temperature °C	g/L: Unknown				1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Solubility in Water @ Temperature °C Solvent:	g/L: Unknown				1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>

NMSP Worksheet - Physical and Chemical Properties (Continued)

OMB Control No. 2070-0170; Expires: 01/31/2011

Property	Value	Measured or Estimated (M or E)	Method Used	Provided on page	If not provided, why not? Mark (X) all that apply:	Mark (X) for Confidential
			Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.		1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain)	
Part 1 - General Physical and Chemical Properties (Continued)						
Melting Temperature	2,015 °C	E	Literature Value: CRC Handbook <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Boiling / Sublimation Temperature @ 760 torr pressure	2,980 °C	E	Literature Value: CRC Handbook <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Spectra	X-Ray Diffraction	M	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Tunneling Electron Microscope Images	N/A	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input checked="" type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Dissociation Constant	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Octanol / Water Partition Coefficient	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input checked="" type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Henry's Law Constant	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Volatilization from Water	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Volatilization from Soil	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>

NMSP Worksheet - Physical and Chemical Properties (Continued)

OMB Control No. 2070-0170; Expires: 01/31/2011

Property	Value	Measured or Estimated (M or E)	Method Used <small>Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.</small>	Provided on page	If not provided, why not? Mark (X) all that apply:	Mark (X) for Confidential
					1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain)	
Part 1 - General Physical and Chemical Properties (Continued)						
pH @ Concentration: 20%	4.1	M	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Flammability	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input checked="" type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Explodability	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input checked="" type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Adsorption / Coefficient	Unknown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Part 2 - Specific Physical and Chemical Properties						
General Characteristics						
Crystal Structure	Orthorhombic Dipyrimite	E	Literature Reference: www.webmineral.com <input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Agglomeration State	Agglomerated	M	TEM & Quasielectric Light Scattering <input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Particle Characteristics						
Particle Size Distribution	Please provide a graph with percentage of particles in each diameter class. For elongated particles, provide a length distribution graph showing the percentage of particles in each length class	M	ASTM C1070-86E1 <input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>

NMSP Worksheet - Physical and Chemical Properties (Continued)

OMB Control No. 2070-0170; Expires: 01/31/2011

Property	Value	Measured or Estimated (M or E)	Method Used	Provided on page	If not provided, why not? Mark (X) all that apply: 1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain)	Mark (X) for Confidential
			Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.			
Part 2 - Specific Physical and Chemical Properties (Continued)						
Particle Characteristics (Continued)						
Mean Particle Size (diameter and/or length)	119 nm	M	ASTM C1070-86E1 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Standard Deviation from Mean	0.025 micron	M	ASTM C1070-86E1 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Largest Particle Size (diameter and/or length)	226 nm	E	ASTM C1070-86E1 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Smallest Particle Size (diameter and/or length)	59 nm	E	ASTM C1070-86E1 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Aspect Ratio	Unknown		<input type="checkbox"/>		1. <input checked="" type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/> Spherical Powder Particle	<input type="checkbox"/>
Average Aerodynamic Diameter	Unknown nm		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Average Particle Mass	Unknown g		<input type="checkbox"/>		1. <input checked="" type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Particle Shape	Spherical		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>

NMSP Worksheet - Physical and Chemical Properties (Continued)

OMB Control No. 2070-0170; Expires: 01/31/2011

Property	Value	Measured or Estimated (M or E)	Method Used	Provided on page	If not provided, why not? Mark (X) all that apply:	Mark (X) for Confidential
			Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.		1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain):	
Part 2 - Specific Physical and Chemical Properties (Continued)						
Surface Characteristics						
Surface Area	m ² /g: 215	M	ASTM D3663-03 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Average Particle Surface Area	m ² :		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input checked="" type="checkbox"/> Not relevant to slurry	<input type="checkbox"/>
Surface Charge (Zeta Potential)	mV: 40 @ pH <6.0	M	ASTM D4187-82 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Porosity	0.322	M	ASTM D4641-94 <input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Surface Chemical Composition	Unknown		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Surface / Volume Ratio	Unknown		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Fate and Transport Characteristics						
Diffusion Rate	Unknown		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Gravitational Setting Rate	Unknown		<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input checked="" type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>

NMSP Worksheet - Physical and Chemical Properties (Continued)

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Property	Value	Measured or Estimated (M or E)	Method Used	Provided on page	If not provided, why not? Mark (X) all that apply:	Mark (X) for Confidential
			Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.		1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain)	
Part 2 - Specific Physical and Chemical Properties (Continued)						
Fate and Transport Characteristics (Continued)						
Sorption Rate		<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Deposition Rate		<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Wet and Dry Transport		<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Biodegradation Rate	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Bioaccumulation	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Biotransportation	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Influence of Redox / Photochemical Reaction	Unknown	<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify other items)						
		<input type="checkbox"/>	<input type="checkbox"/>		1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>

NMSP Worksheet - Physical and Chemical Properties (Continued)

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Property	Value	Measured or Estimated (M or E)	Method Used	Provided on page	If not provided, why not? Mark (X) all that apply:	Mark (X) for Confidential
			Provide the Name of the method used. Mark (X) in the box if a nonstandard method was used and attach a description of the non-standard method.		1-Not Applicable 2-No Known Method 3-Method requires too much test material 4-Method is too expensive 5-Other (explain)	
Part 2 - Specific Physical and Chemical Properties (Continued)						
<i>Other (Please specify other items)</i>						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/> 5. <input type="checkbox"/>	<input type="checkbox"/>
Additional Information:						

Mark (X) if you attached anything to this Worksheet.

See PRA Notice on page 1 of the NMSP Optional Form.

Definition of Particle Size

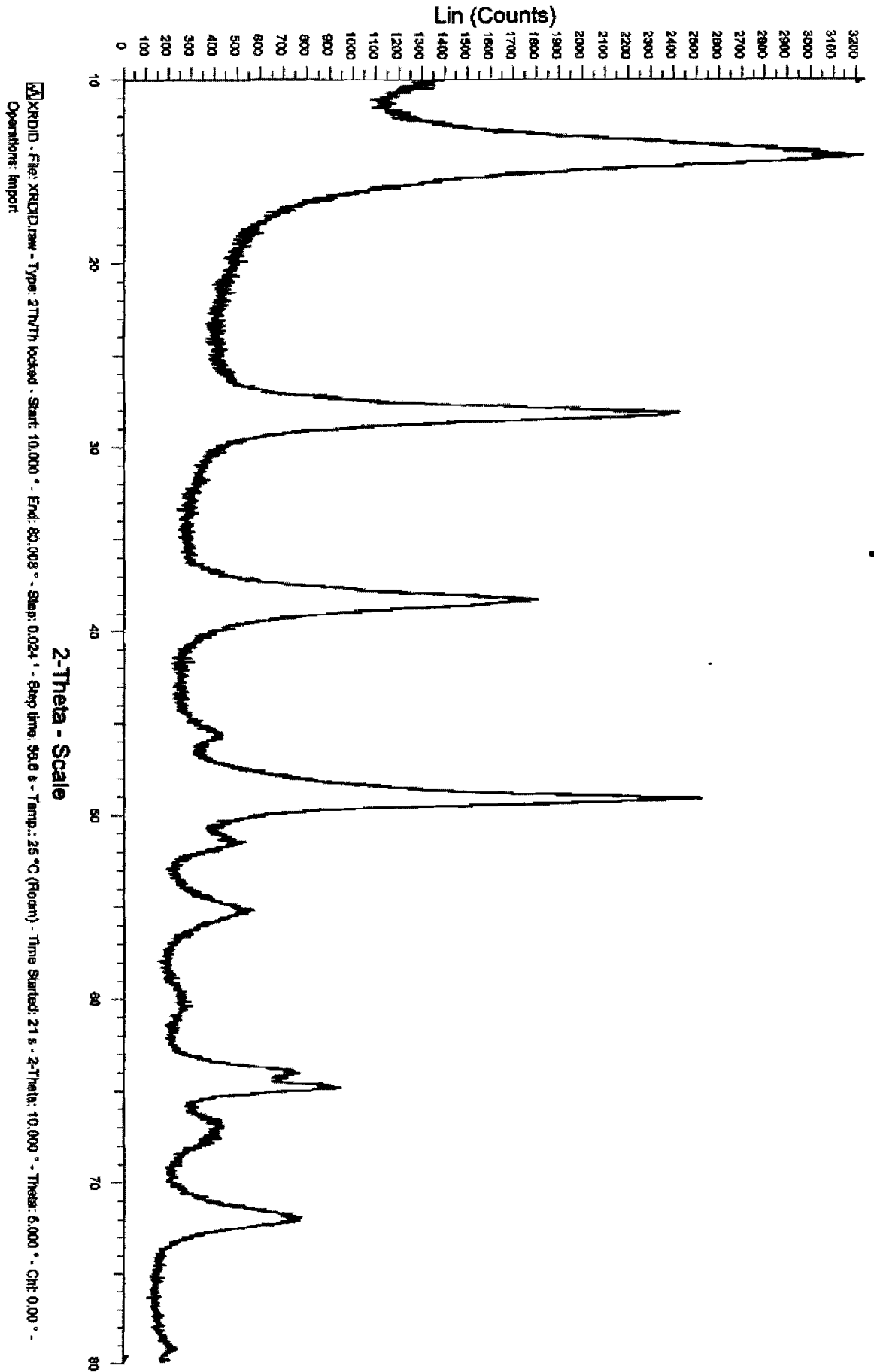
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The definition of particle size can sometimes be ambiguous. For purposes of this data submission, we consider three particle sizes:

1. Powder Particle Size: The chemical substance is produced as a spray-dried powder, with a median particle size in the micron range. . The properties of this agglomerated particle will determine pour viscosity, and other bulk properties.
2. Dispersed Particle Size: The powder as produced can be chemically dispersed, or "peptized" to the nano-scale. TEM images of these dispersed particles reveal that most of the material is agglomerated. The principal property of interest from the peptized material is the dispersed particle size. A dispersed particle size distribution is attached.
3. Crystallite Size: The agglomerates described in item #2, above, are comprised of individual crystallites which are sometimes referred to as the primary particles. The primary particle, or crystallite, of the chemical substance rarely exists as a discrete entity. The characteristics of this primary particle determine the surface area, pore volume, and pore size distribution of the chemical substance. This crystallite size is clearly in the nano-scale size range; but it should be remembered that the chemical substance rarely if ever exists in this form.

□

Dispal 23N4 XRDID



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□

The dispersed particle size is best quantified by quasi-elastic light scattering analysis (QEL). This method provides an estimate of dispersed particle size, assuming a spherical shape. While this assumption is not strictly observed, comparison of light scattering analysis with TEM images for various materials of this same chemistry gives order of magnitude agreement. This dispersed particle is the structure present when the chemical substance exists as a peptized intermediate in processing by customers. A typical QEL analysis of a peptized dispersion is shown on the following page. Effective diameter is 123.5 nm, with a substantial component smaller than 100 nm.

BIC Brookhaven Instruments Corp
 ZetaPlus Particle Sizing Software Ver 3.95

Date: Nov 3, 2008

Time: 09:16:36

Batch: 0

Sample ID **Dispal 23N4 Sol (Combined)**

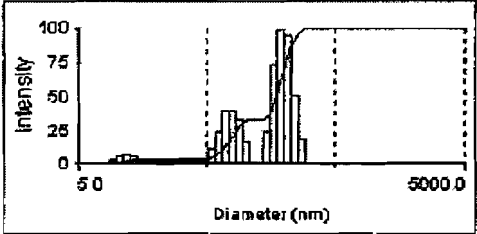
Operator ID **JEP**

Notes **Solvent = H2O**

Measurement Parameters:			
Temperature	= 25.0 deg C	Runs Completed	= 3
Liquid	= Water	Run Duration	= 00:01:00
Viscosity	= 0.890 cP	Total Elapsed Time	= 00:03:00
Ref Index Fluid	= 1.330	Average Count Rate	= 436.9 kcps
Angle	= 90.00	Ref Index Real	= 1.590
Wavelength	= 659.0 nm	Ref Index Imag	= 0.000
Baseline	= Auto (Slope Analysis)	Dust Filter Setting	= 30.00

Dispal 23N4 Sol (Combined)

Effective Diameter: 120.2 nm
Polydispersity: 0.240
Baseline Index: 8.9/ 75.52%
Elapsed Time: 00:03:00



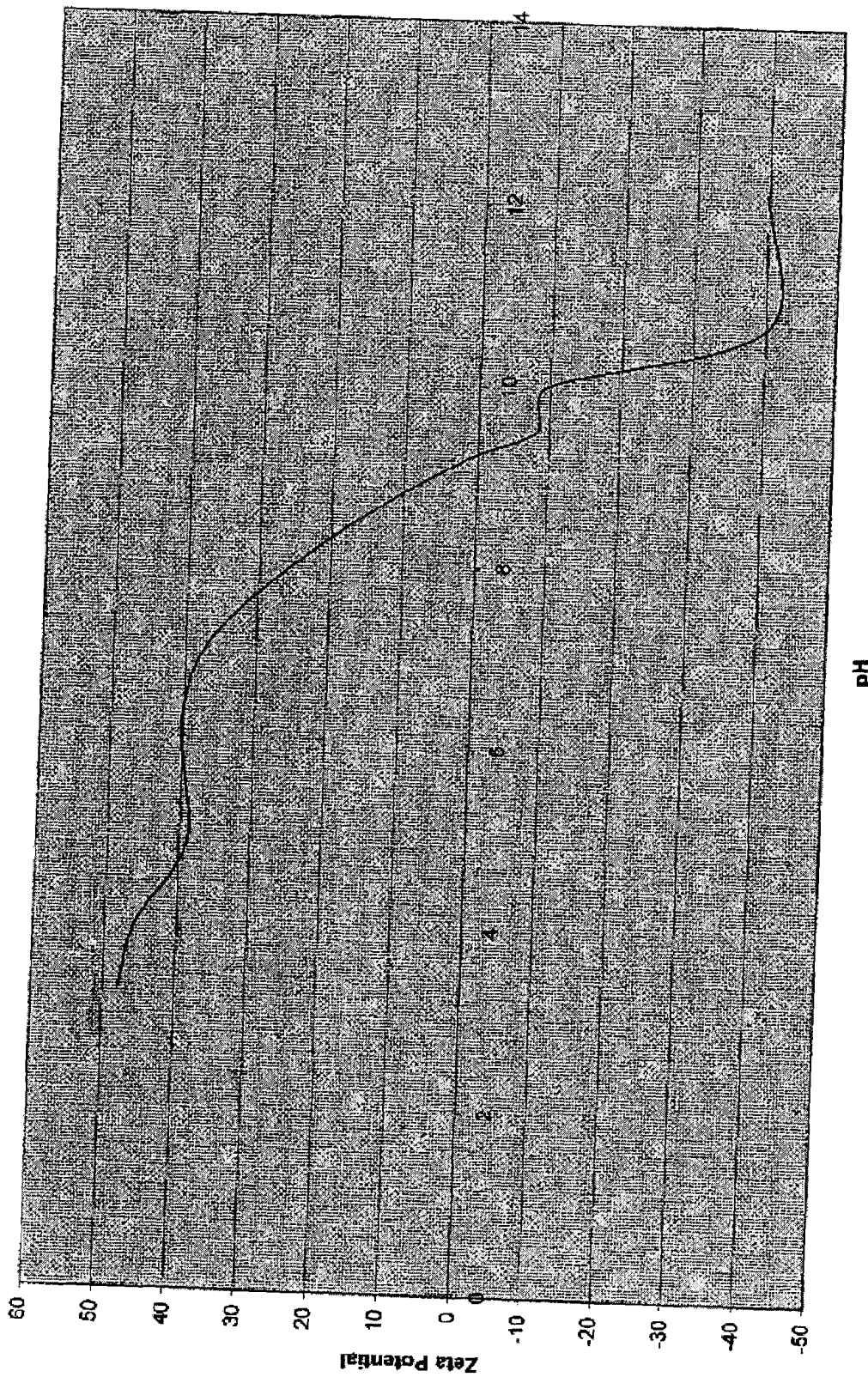
Multimodal Size Distribution

Run	Eff. Diam (nm)	HalfWidth (nm)	Polydispersity	Baseline Index
1	123.1	62.9	0.261	9.5 / 76.11%
2	119.3	54.2	0.207	8.8 / 87.70%
3	118.1	59.6	0.255	9.4 / 82.74%
Mean	120.2	58.9	0.241	8.6 / 75.52%
Std. Error	1.5	2.5	0.017	0.9 / 4.35
Combined	120.2	58.9	0.240	8.9 / 75.52%

Continuation Sheet - Worksheet on Physical and Chemical Properties (continued)

The surface charge (zeta potential) of the peptized chemical substance is shown vs. pH in aqueous solution for a variety of acids on the following page.

Dispal 23M4



pH

Part I -- GENERAL INFORMATION -- Continued**Section B -- CHEMICAL IDENTITY INFORMATION -- Continued**

3. Impurities

- (a) - Identify each impurity that may be reasonably anticipated to be present in the chemical substance as manufactured for commercial purpose. Provide the CAS Registry Number if available. If there are unidentified impurities, enter "unidentified."
 (b) - Estimate the maximum weight % of each impurity. If there are unidentified impurities, estimate their total weight %.

Impurity and CAS Registry Number (a)	Maximum percent (b)	Confidential
TiO ₂ (CASRN 13463-67-7)	0.3%	
MnO ₂ (CASRN 1313-13-9)	0.00003%	
NiO (CASRN 1313-99-1)	0.00002%	
ZnO (CASRN 1314-13-2)	0.00001%	
Cr ₂ O ₃ (CASRN 1308-38-9)	0.00002%	
Na ₂ O	0.01%	
Fe ₂ O ₃	0.01%	
SiO ₂	0.01%	
Residual alcohols (mixture of predominantly linear, primary alcohols ranging from C ₂ -C ₂₂ carbon chain length)	0.3 %	

Continuation Sheet - Consumer Uses

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If you have identified a "consumer" use, please provide on a continuation sheet a detailed description of the use(s) of this chemical substance in consumer products. In addition include estimates of the concentration of the new chemical substance as expected in consumer products and describe the chemical reactions by which this substance loses its identity in the consumer product.

□

Precautions

CAUTION! MAY CAUSE RESPIRATORY, EYE AND SKIN IRRITATION. Product dust may be irritating to eyes, skin and respiratory system. Handle in accordance with good industrial hygiene and safety practice.

Environmental

precautions

Product is an inorganic solid that is not bioavailable to aquatic biota and non-toxic. This material is not expected to be biodegradable.

POTENTIAL HEALTH EFFECTS

Eyes Irritating to eyes.

Skin Repeated or prolonged contact can cause redness, irritation and scaling of the skin (dermatitis). Normal care and personal hygiene should prevent skin effects.

Inhalation Irritating to respiratory system.

Ingestion No hazard under normal industrial use. Ingestion may lead to discomfort, nausea, and vomiting.

[

Continuation Sheet - Part II, Section B, Industrial Sites Controlled By Others - Worker Exposure/Environmental Release [Chempak]

2. Worker Exposure/Environmental Release

- (1) -- From the diagram above, provide the letter for each worker activity. Complete 2-8 for each worker activity described.
- (2) -- Estimate the number of workers exposed for all sites combined.
- (4) -- Estimate the typical duration of exposure per worker in (a) hours per day and (b) days per year.
- (6) -- Describe physical form of exposure and % new chemical substance (if in mixture), and any protective equipment and engineering controls, if any, used to protect workers.
- (7) -- Estimate the percent of the substance as formulated when packaged or used as a final product.
- (9) -- From the process diagram above, enter the number of each release point. Complete 9-13 for each release point identified.
- (10) -- Estimate the amount of the substance released (a) directly to the environment or (b) into control technology to the environment (in kg/day or kg/batch).
- (12) -- Describe media of release i.e. stack air, fugitive air (optional-see PMN Form Instructions Manual), surface water, on-site or off-site land or incineration, POTW, or other (specify) and control technology, if any, that will be used to limit the release of the substance to the environment.
- (14) -- Identify byproducts which may result from the operation.
- (3), (5), (8), (11), (13) and (15) -- Mark (X) this column if any of the proceeding entries are confidential business information (CBI).

Letter of Activity (1)	# of Workers Exposed (2)	CBI (3)	Duration of Exposure		CBI (5)	Protective Equip. / Engineering Controls/ Physical Form and % substance (6)	% in Formulation (7)	CBI (8)	Release Number (9)	Amount of Substance Released		CBI (11)	Media of Release & Control Technology (12)	CBI (13)
			(4a)	(4b)						(10a)	(10b)			
A		X			X	PPE: Disposable dust mask, safety glasses, gloves, steel-toe shoes Physical form: Liquid % Substance: 100%		X						
B		X			X	PPE: Disposable dust mask, safety glasses, gloves, steel-toe shoes Physical form: Liquid % Substance: 100%		X				X		X
C					X	PPE: Fully encapsulated suit, supplied air, safety glasses, gloves, steel-toe shoes Physical form: Liquid % Substance: 100%		X						
D					X	PPE: Disposable dust mask, safety glasses, gloves, steel-toe shoes Physical form: Liquid % Substance: 100%		X						
(14) -- Byproducts: none														(15)