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Prevention, Pesticides
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1-Methyl-3,5,7-Triaza-1-Azoniatricyclodecane Chloride (Busan1024)
Summary Document: Final Work Plan Registration Review

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Registration Review
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Approved By:

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Date: 12/14/07

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I. FINAL WORK PLAN

Introduction

The Food Quality Protection Act (FQPA) of 1996 amended the Federal Fungicide Insecticide and Rodenticide Act (FIFRA) to mandate a new program: registration review. All pesticides distributed or sold in the United States generally must be registered by the Environmental Protection Agency (EPA), based on scientific data showing that they will not cause unreasonable risks to human health, workers, or the environment when used as directed on product labeling. The new registration review program is intended to make sure that, as the ability to assess and reduce risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects. Changes in science, public policy, and pesticide use practices will occur over time. Through the new registration review program, the Agency periodically reevaluates pesticides to make sure that as change occurs, products in the marketplace can continue to be used safely. Information on this program is provided at http://www.epa.gov/oppsrrd1/registration_review/.

The Agency has begun to implement the new registration review program pursuant to FIFRA Section 3(g) and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration. The public phase of registration review begins when the initial docket is opened for each case. The docket is the Agency's opportunity to state what it knows about the pesticide and what additional risk analyses and data or information it believes are needed to make a registration review decision. Busan 1024 is an antimicrobial pesticide used in materials preservative applications and to prevent bacterial growth in specific industrial processes and water systems.

The Initial Summary Document and Preliminary Work Plan for Busan 1024, *1-Methyl-3,5,7 Triaza-1-Azoniatricyclodecane Chloride (Busan 1024) Summary Document: Initial Docket*, was signed on June 21, 2007. The Initial Summary Document for Busan 1024 was updated per the public comment period to create the Final Work Plan. On December 14, 2007 this document, *Busan 1024 Summary Document: Final Work Plan*, was signed.

This is the Agency's updated *Summary Document: Final Work Plan* for the registration review of Busan 1024. The *Summary Document: Final Work Plan* for Busan 1024 addresses any errors found in the Initial Summary Document and Preliminary Work Plan such as changes to the registration review timeline and changes to the proposed data needs outlined in the Initial Summary Document. The *Summary Document: Final Work Plan* also addresses public comments received during the public comment period, which are posted and can be viewed in the Busan 1024 registration review docket.

The Summary Document provides information on what the EPA knows about a pesticide undergoing registration review and what additional risk analyses and data or information the Agency believes are needed to make a registration review decision. After

the Initial Summary Document and Preliminary Work Plan for Busan 1024 were posted on the public docket, the technical registrant of Busan 1024, Buckman Laboratories, requested to voluntarily terminate the following uses: laundry starch, petroleum production & recovery, textiles, papermaking chemicals and coatings, and metalworking fluids. The technical registrant also requested to amend the Busan 1024 product label to clarify that the use of detergents is for industrial use only. As a result of these pending voluntary use terminations and use clarifications, the proposed data needs found in the Initial Summary Document and Preliminary Work Plan may be modified along with the proposed work timeline. These anticipated changes and modifications are reflected in this document, the *Summary Document: Final Work Plan* for Busan 1024, and would become effective once the voluntary use terminations are finalized and become effective. In this revised document the Agency did not evaluate those uses that have been proposed for voluntary termination when determining the assessment and data needs for Busan 1024.

However, if the proposed voluntary use terminations do not become effective, the Agency will conduct the human health and ecological risk assessments that are outlined in the Initial Summary Document and Preliminary Work Plan for Busan 1024. The current Final Work Plan for Busan 1024 indicates that there is no need for a dietary risk assessment. However, if the pending use terminations do not take effect a dietary risk assessment will be needed, in addition to those risk assessments outlined in this document. Also, in addition to the data needs outlined within this document, the following data, which are outlined in the Initial Summary Document and Preliminary Work Plan for Busan 1024, will be required if the voluntary use terminations do not become effective.

Human Health Toxicity Data Needs[1]:

- (GLN 850.3150) 90-Day Oral Toxicity- non-rodent
- (GLN 870.4100) Chronic Toxicity- rodent
- (GLN 870.4200) Carcinogenicity- rat
- (GLN 870.4200) Carcinogenicity-mouse
- (GLN 870.3700) Prenatal Developmental Tox- rabbit
- (GLN 870.3800) Reproduction and Fertility Effects

Residential Post-Application Exposure Data Needs:

- (GLN 875.3000) Non-dietary Ingestion Exposure

Ecological Exposure Data Needs:

- (GLN 850.1035) Acute Marine Mysid Shrimp Toxicity
- (GLN 850.1055) Acute Marine Bivalve Embryo Larvae Toxicity
- (GLN 850.1075) Acute Toxicity to Marine Fish

1 These data are not required if the pending use terminations become effective. However, if the pending use terminations do not take effect, these additional data will be needed. The data needs and risk assessment needs in the Initial Summary Document: Preliminary Work Plan for Busan 1024 will be required if the pending use terminations do not take effect.

Risk Assessment Status & Anticipated Risk Assessment and Data Needs

Human Health Risk Assessment Status

No human health, dietary, residential, or occupational risk assessments have been performed for the active ingredient Busan 1024. Based on the registered uses of Busan 1024 as a materials preservative and in industrial processes and water systems, there is potential for residential and occupational exposure and risk. Therefore, the Agency anticipates conducting a complete occupational and residential human health exposure risk assessment for all Busan 1024 uses, excluding those uses pending voluntary termination. For a detailed discussion of the anticipated human health exposure and risk assessment needs please refer to Section III, C. *Human Health Exposure and Risk Assessment.*

Dietary Exposure

Once the proposed voluntary use terminations become effective, the Agency believes that a dietary exposure and risk assessment will not be needed for Busan 1024 for the following reasons. Busan 1024 will have no registered uses that will come in direct contact with food once the voluntary use terminations become effective. In addition, Busan 1024 has no tolerances or exemptions from tolerances in raw agricultural commodities or processed food and feed products.

The registrant will continue to support the adhesive use for Busan 1024. However, the Agency believes that a dietary risk assessment for indirect food contact exposure from adhesives is not needed because Busan 1024 has no Food and Drug Administration (FDA) clearances. Also, the Busan 1024 label contains the following label language, which eliminates the possibility for dietary food contact exposure, "Busan 1024 may not be used for preservation of materials which may contact food."

A dietary risk assessment will be needed, as indicated in the Initial Summary Document and Preliminary Work Plan for Busan 1024, if the proposed voluntary use terminations do not become effective.

In the event that additional data or other information are presented to the Agency that would indicate the need to conduct a dietary assessment for the use of Busan 1024 as a materials preservative in adhesives, the Agency reserves the right to conduct a dietary risk assessment as it may deem warranted in the future.

Drinking Water

It is possible that the Agency may need human drinking water exposure and risk assessments if analysis of initial Tier I screening for environmental fate and effects indicates that the magnitude of exposure to potential drinking water sources could be high.

Anticipated Human Health Data Needs

No human health toxicity endpoints for the active ingredient Busan 1024 have been selected. Consequently, toxicity endpoints need to be established. For further details regarding the anticipated human health toxicity data needs please refer to Section III, C. *Human Health Exposure and Risk Assessment* and Appendix B, *Exposure Guideline Study Justification*.

The Agency anticipates that the following data are needed to conduct a complete human health exposure and risk assessment for all Busan 1024 uses, excluding those uses pending voluntary termination. Please refer to Appendix A for a detailed description of the anticipated toxicity database needs and Appendix B for a detailed description of the anticipated occupational and residential applicator and post-applicator exposure data needs.

Human Health Toxicity Data Needs for the AI:

- (GLN 870.3100) 90-Day Oral Toxicity-rodent
- (GLN 870.3465) 90-Day Inhalation Toxicity-rat

Residential Applicator Exposure Data Needs:

- (GLN 875.1300) Inhalation Outdoor Exposure
- (GLN 875.1400) Inhalation Indoor Exposure
- (GLN 875.1600) Data Reporting and Calculations
- (GLN 875.1700) Product Use Information

Occupational Applicator Exposure Data Needs:

- (GLN 875.1300) Inhalation Outdoor Exposure
- (GLN 875.1400) Inhalation Indoor Exposure
- (GLN 875.1600) Data Reporting and Calculations
- (GLN 875.1700) Product Use Information

Residential Post-Application Exposure Data Needs:

- (GLN 875.2300) Indoor Surface Residue Dissipation[2]
- (GLN 875.2700) Product Use Information
- (GLN 875.2900) Data Reporting and Calculations[2]

Occupational Post-Application Exposure Data Needs:

- (GLN 875.2700) Product Use Information

Anticipated Physical/ Chemical Property Data Needs

2 These studies may not be needed based on the outcome of other studies or 100% residue transfer assumptions in the risk assessment.

Although physical/chemical property data have been provided by the registrant for some chemicals that are used to form the active ingredient, Busan 1024, no data on physical/chemical properties of the active ingredient have been submitted by the registrant. As a result, the Agency anticipates requiring the registrant to provide these data. The Agency also expects to need information on the physical form of the one currently registered end-use product. For a detailed discussion of the anticipated physical chemistry data needs please refer to Section III, D. *Physical/Chemical Properties and Environmental Fate.*

The anticipated physical chemistry data needs include the following:

- (GLN 830.1550) Product Identity and Composition
- (GLN 830.1600) Description of Materials Used to Produce the Product
- (GLN 830.1620) Description of Production Process
- (GLN 830.1670) Discussion of Formation of Impurities
- (GLN 830.1700) Preliminary Analysis
- (GLN 830.1750) Certified Limits
- (GLN 830.6302) Color
- (GLN 830.6303) Physical State
- (GLN 830.6304) Odor
- (GLN 830.3613) Stability to Sunlight, Normal and Elevated Tem. Metals/Metal Ions
- (GLN 830.6314) Oxidation/Reductions: Chemical Incompatibility
- (GLN 830.6315) Flammability
- (GLN 830.6317) Storage Stability
- (GLN 830.6319) Miscibility
- (GLN 830.6320) Corrosion Characteristics
- (GLN 830.6321) Dielectric Breakdown
- (GLN 830.7000) pH of Water Solutions or Suspensions
- (GLN 830.7050) UV/VIS Absorption
- (GLN 830.7200) Melting Point/ Melting Range
- (GLN 830.7220) Boiling Point/ Boiling Range
- (GLN 830.7300) Density/Relative Density/Bulk Density
- (GLN 830.7370) Dissociation Constant in Water
- (GLN 830.7520) Particle Size, Fiber Length and Diameter Distribution
- (GLN 830.7550) Partition Coefficient (n-Octanol)/H_20), Shake Flask Method
- (GLN 830.7560) Partition Coefficient (n-Octanol/ H_20), Generator Column Method
- (GLN 830.7840) Water Solubility: Column Elution Method, Shake Flask Method
- (GLN 830.7860) Water Solubility, Generator Column Method
- (GLN 830.7950) Vapor Pressure

Anticipated Environmental Fate Data Needs

An environmental fate assessment has not been conducted for Busan 1024. The Agency believes that environmental fate data are needed because of potential exposures to waste water treatment plants (WWTPs); and discharges in WWTP effluents (biosolids and/or water) may be high. Data are needed to determine if there is a potential for exposure; and to ascertain if residues that may occur in effluents and environmental compartments (e.g., surface waters) will result in impacts to non-target organisms. Therefore, the Agency anticipates needing the proposed Tier I environmental fate data for the active ingredient and/or any of its major degradation products that are of potential concern for all registered uses of Busan 1024. The following data are needed to conduct an environmental fate assessment:

- (GLN 161-1) Hydrolysis Study
- (GLN 850.6800) Modified Activated Sludge, Respiration Inhibition
- (GLN 835.1110) Activated Sludge Sorption Isotherm
- (GLN 835.3110) Ready Biodegradability

It is possible that under specific conditions the Agency may need additional environmental fate studies. For a detailed discussion of the environmental fate status and anticipated data needs please refer to Section III, D. *Physical/ Chemical Properties and Environmental Fate,* and Appendix C, *Environmental Fate Guideline Study Justification.*

Ecological Exposure Risk Assessment Status

The Agency has not conducted ecological risk assessments for Busan 1024. The potential for Busan 1024 to be released into the environment at exposure levels of concern to ecological organisms is expected to be low for most registered use patterns. Busan 1024 uses that have potential for environmental exposure are industrial process water discharges and materials preservative discharges.

The Agency anticipates conducting a hazard assessment for the active ingredient and/or any of its metabolic and/or hydrolytic degradates identified to be of potential concern. The hazard assessment will be used to meet current labeling needs and to determine hazard endpoints for ecological organisms potentially exposed in the event of a spill or other potential environmental releases of Busan 1024.

Industrial process water discharges, preserved materials, and industrial detergents containing Busan 1024 may contaminate waste water treatment plants (WWTPs) and release into the aquatic environment. The Agency anticipates conducting a waste water treatment plant (WWTP) risk assessment for industrial process water and materials preservative releases. Modeling will predict the amount of antimicrobial that passes through a standard WWTP and concentrations that will enter the aquatic environment. The WWTP model estimates will be used in a deterministic risk assessment. If analysis of initial Tier I screening tests indicate that ecological toxicity and magnitude of exposure

exceed levels of concern for drinking water and ecological effects, the Agency may need additional data to refine the ecological risk assessment for the industrial processes and materials preservative use patterns for Busan 1024.

The planned ecological risk assessment will allow the Agency to determine whether Busan 1024 use has "no effect" or "may affect" federally listed threatened or endangered species (listed species) or their designated critical habitat. If the assessment indicates that Busan 1024 "may affect" a listed species or its designated critical habitat, the assessment will be refined. The refined assessment will allow the Agency to determine whether use of Busan 1024 is "likely to adversely affect" the species or critical habitat or "not likely to adversely affect" the species or critical habitat. When an assessment concludes that a pesticide's use "may affect" a listed species or its designated critical habitat, the Agency will consult with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (Services), as appropriate.

For a detailed discussion of the status of the ecological exposure and risk assessments for Busan 1024 refer to Section III, E. *Ecological Exposure and Risk* and Appendix D, *Ecological Guideline Study Justification*.

Anticipated Ecological Exposure Data Needs

A Tier II green algae study is needed because there is potential for industrial wastewater discharges as a result of the industrial use patterns (e.g., industrial use detergents, fountain wash systems and inks). These data will be used to conduct hazard and risk assessments to evaluate the down-the drain exposure to aquatic ecosystems and endangered species. The following is a summary of the needed ecotoxicity data:

- (GLN 850.5400) Tier II Green Algae using *Selenastrum capricornutum*

For a detailed discussion regarding the anticipated ecological data needs refer to Section III, E. *Ecological Exposure and Risk* and Appendix D, *Ecological Guideline Study Justification*.

Timeline

EPA has created the following estimated timeline for the completion of the Busan 1024 registration review.

Registration Review for Busan 1024- Project Registration Review Timeline	
Activities	**Time**
Phase I: Opening Docket	
Opened Public Comment Period for Busan 1024 Docket	July 2007
Closed public comment	October 2007
Phase II: Case Development	
Final Work Plan (FWP)	December 2007
Issue DCI	October-December 2008
Data Submission	October-December 2010[3]
Open Public Comment Period for Preliminary Risk Assessments	December 2011
Close Public Comment	February 2011
Phase III: Registration Review Decision	
Open Public Comment Period for Proposed Registration Review Decision	April - June 2011
Close Public Comment Period	July – September 2011
Final Registration Reivew Decision & Begin Post-Decision Follow-up	October – December 2011
Total (years)	**5**

Impaired Water Body & Water Quality Data

[3] Time-frames may change depending on the studies needed.

Busan 1024 is not identified as a cause of impairment for any water-bodies listed as impaired under section 303(d) of the Clean Water Act, based on information provided at: http://oaspub.epa.gov/tmdl/waters_list.impairments?p_impid=3. During the public comment period for the Initial Summary Document, the Agency invited submission of water quality data for this chemical. It was requested that, to the extent possible, data conform to the quality standards in Appendix A of the "OPP Standard Operating Procedure: Inclusion of Impaired Water Body and Other Water Quality Data in OPP's Registration Review Risk Assessment and Management Process," (http://www.epa.gov/oppsrrd1/registration_review/water_quality_sop.htm), in order to ensure they can be used quantitatively or qualitatively in pesticide risk assessments. No water quality data were submitted during the public comment period for the Initial Busan 1024 Summary Document.

Trade Barriers

Through the registration review process, the Agency intends to solicit information on trade irritants and, to the extent feasible, take steps toward facilitating irritant resolution. Growers and other stakeholders are asked to comment on any trade irritant issues resulting from lack of Maximum Residue Limits (MRLs) or disparities between U.S. tolerances and MRLs in key export markets, providing as much specificity as possible regarding the nature of the concern. No trade barrier information or data were submitted during the public comment period for the Initial Busan 1024 Summary Document.

Environmental Justice

The EPA seeks to achieve environmental justice, the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies. To help address potential environmental justice issues, the Agency seeks information on any groups or segments of the population who, as a result of their location, cultural practices, or other factors, may have atypical, unusually high exposure to Busan 1024, compared to the general population. During the public comment period for the Initial Busan 1024 Summary Document, no environmental justice information or data were submitted regarding any sub-populations that may have atypical or unusually high exposure to Busan 1024 compared to the general population.

Structure Activity Relationships

The EPA must rely upon information of appropriate quality and reliability for each decision made by the Agency. In the Office of Pesticide Programs (OPP), the evaluation process for a pesticide chemical traditionally begins with the applicant's submission of a set of studies conducted with the specific pesticide chemical of interest. The use of the results of such testing (measured data) is a logical, scientifically rigorous process that identifies the physical, chemical, and environmental fate properties of the

pesticide, as well as the dose and endpoints at which an adverse effect can occur in various animal species.

Today, there is significant interest in alternative techniques, i.e., techniques other than data generation that could significantly inform the Agency's decision-making process. Recently, the OPP has made increasing use of structure activity relationship (SAR) as part of its regulatory decision-making process. In the SAR process, a chemical's molecular structure is compared to that of other chemicals for which data are available. These structural similarities are then used to make predictive judgments about a chemical's physical, chemical, and biological properties. Thus, the chemical's physical, chemical, and biological properties are a function of (or directly related to) the chemical's molecular structure. Quantitative SAR is referred to as QSAR. To develop a QSAR, a selected set of measured data on a single physical, chemical, or biological property is used to derive a model (an equation) to predict the value of that property.

Since SAR assessments and QSAR modeling are another set of tools that are available to Agency scientists, the OPP has begun a process shift that envisions shifting from the current study-by-study approach to an approach in which the use of predicted data, generated using validated models, is considered along with information from open literature and studies specifically generated under Part 158 requirements. All relevant information would be considered as part of a weight-of-the-evidence evaluation.

At this time, the EPA believes that for certain endpoints, especially physical/chemical and fate properties, that SAR and QSAR might be effectively utilized to fulfill these data requirements for many antimicrobial pesticide chemicals. When considering biological properties, at this time, the EPA believes that SAR and QSAR can be most effectively utilized in the evaluation of chemicals that exhibit lower toxicity for human health and/or ecotoxicity parameters. This is appropriate because the risk assessment for lower toxicity chemicals can be stream-lined (e.g., a screening-level assessment procedure rather than multiple tiers of assessments with progressively more data requirements).

During the public comment period for the initial Busan 1024 Summary Document, stakeholders were asked to submit any information that they believe could fulfill one of the data needs for Busan 1024. The Agency did not receive any comments regarding such information during the public comment period.

Summary of Comments Received During Docket Opening

The Busan 1024 registration review docket was open for a 90-day comment period beginning on July 6, 2007. During that time one comment was received. This comment is summarized below. The comment, which is addressed in this document, did not change the work plan or timeline set out in the preliminary work plan. Further this document makes final the work plan for the Busan 1024 registration review processes.

Summary of Comments Regarding Anticipated Risk Assessment and Data Needs:

1. **Comment:** The FIFRA Endangered Species Task Force (FESTF) submitted a comment requesting that any technical registrant for Busan 1024 who is not a member of the FESTF (or a company having met its data compensation obligations) be asked to provide a formal offer-to-pay to FESTF for reliance on their data. In their comment, FESTF also noted that Buckman Laboratories is the only technical registrant for Busan 1024, and that Buckman Laboratories is not an FESTF member. Therefore, the technical registrant must offer to pay FESTF to rely on FESTF submitted data or develop substantial similar data on their own.

   Response: The Agency thanks FESTF for its comment and will consider this information as it conducts the registration review and makes its registration review decisions.

Next Steps

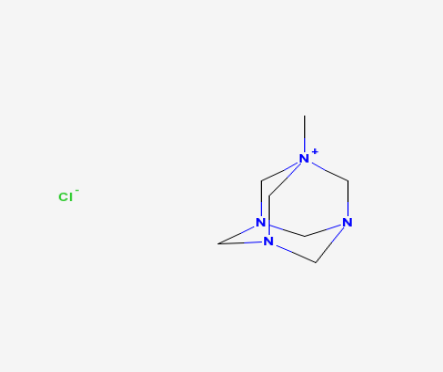
As detailed in the *Risk Assessment Status & Anticipated Risk Assessment and Data Needs* section above, the Agency will prepare to issue a Data Call In (DCI), which will identify the data needed to conducted both human health and ecological risk assessments for Busan 1024. Complete human health and ecological risk assessments, including an endangered species assessment, for all uses will be conducted by the Agency. Also, as previously mentioned, if the voluntary use cancellations do not become effective the Agency will conduct those human health and ecological assessments as outlined in the Initial Summary Document and Preliminary Work Plan for Busan 1024; and, the registrant will be responsible for all data needs listed in the Initial Summary Document and Preliminary Work Plan for Busan 1024.

II. FACT SHEET

Background Information

- Busan1024 registration review case number: 5026
- Busan 1024 PC Code: 128889
- Busan 1024 CAS#: 76902-90-4
- Technical registrant: Buckman Laboratories
- First approved for use in a registered product: August 7, 1987
- Not subject to reregistration (no Reregistration Eligibility Decision [RED])
- Antimicrobials Division Chemical Review Manager (CRM): K. Avivah Jakob, jakob.kathryn@epa.gov
- Antimicrobials Division Product Manager (PM): Marshall Swindell, swindell.marshall@epa.gov

Chemical Structure of Busan 1024



Use & Usage Information

For additional usage information and details, please refer to Section III, Table 1 *Application Information for 1-methyl-3,5,7-Triaza-azoniatrycclodecane chloride (PC Code 12889)*.

- The following uses are found on the current Busan 1024 product label (product registration number 1448-92): Busan 1024 is a bacteriostat and microbiocide/microbistat that is used as a materials preservative (non-food use only) in emulsion paints, latex emulsions, adhesives, detergents, construction materials, inks, polishes and waxes, laundry starch, textiles, papermaking chemicals and coatings, and metalworking fluids. Busan 1024 is also used in industrial processes and waste water systems to treat fountain wash systems and for petroleum production and recovery.
- The following uses, which are currently listed on product registration 1448-92, are pending voluntary use termination: laundry starch, textiles, papermaking chemicals and coatings, petroleum production and recovery, and metalworking

fluids. The technical registrant has requested to amend the label to clarify that the use of detergents is for industrial use only.

- The Busan 1024 label contains the following label language, which eliminates the possibility for dietary food contact exposure, "Busan 1024 may not be used for preservation of materials which may contact food."
- There is one registered product containing Busan 1024 as an active ingredient, formulated as a ready-to-use solution.
- Pests controlled include deterioration/spoilage bacteria and fungi.
- Application rates range from 0.02% to 0.75% Busan 1024 by weight of the formulation (200 ppm to 7500 ppm). The preservative can be added in the let-down or to any of the aqueous raw materials incorporated in the paint.

Recent Regulatory Actions

- On March 18, 2004 the use of Busan 1024 for latex emulsion preservation (materials preservative incorporation) was granted by the Agency.
- The following uses are pending voluntary use termination: laundry starch, petroleum production & recovery, textiles, papermaking chemicals and coatings, metalworking fluids.

Ecological Risk Assessment Status

Ecological risk assessments have not been conducted for Busan 1024 and the existing data are not adequate for assessing the risk associated with Busan 1024 use. The potential for Busan 1024 to be released into the environment at exposure levels of concern to ecological organisms is expected to be low for most registered uses; however, the Agency anticipates conducting risk assessments for industrial waste water discharges and material preservatives that potentially pass through waste water treatment plants (WWTPs) in terrestrial and aquatic environments. The final Busan 1024 registration review decision will include an endangered species effect determination. Please refer to Section III, *Status of Human Health and Ecological Risk Assessment for Busan 1024*, for a detailed discussion of the anticipated ecological risk assessment and data needs.

Human Health Risk Assessment Status

A human health risk assessment has not been conducted for Busan 1024. At this time, the Agency is unable to evaluate potential human health risks for Busan 1024 because of limited data and the lack of risk assessments currently available. For a detailed discussion of the anticipated risk assessment and data needs for human health please refer to Section III, *Status of Human Health and Ecological Risk Assessment for Busan 1024.*

Tolerances

- There are no tolerances listed under 40 CFR 180.448 for Busan 1024.

Data Call-In Status

- A data call-in has not been issued for Busan 1024 because it was registered in 1987 and, therefore, not subject to reregistration.

Labels

There is one registered product for the active ingredient 1-methyl-3,5,7-triaza-1-azoniatricyclodecane chloride (Busan 1024). Due to the limited amount of products associated with this active ingredient, the one product label has been included within the Busan 1024 docket. For future reference, during registration review a list of product registration numbers will be included in the docket. Product registration labels may be obtained from the Pesticide Product Label System (PPLS) website at: http://oaspub.epa.gov/pestlabl/ppls.home.

III. STATUS OF HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT FOR BUSAN 1024 (1-methyl-3,5,7-triaza-1-azoniatricyclodecane chloride) (PC Code 128889; CAS# 769-90-4) (Active Ingredient of Busan 1024–Registration Review Case Number 5026)

A. INTRODUCTION

The active ingredient, 1-methyl-3,5,7-triaza-1-azoniatricyclodecane chloride, present in the registered product, Busan 1024, is an antimicrobial pesticide used in materials preservative applications and to prevent bacterial growth in specific industrial processes and water systems. This active ingredient will be undergoing registration review to determine potential human and ecological exposures and risks from these uses. The Antimicrobial Division's Busan 1024 Registration Review Team has evaluated the human health and ecological assessments to determine the scope of work necessary to support the registration review. During registration review the AD team will examine potential human and ecological toxicity, physical/chemical properties, environmental fate, exposures, and risks as a result of registered uses. Data needs are determined largely by the potential human and ecological toxicity and exposures associated with these types of uses. Information on the use profile of Busan 1024 is presented in Section B of this status report. The status of human exposure and risk assessment is presented in Section C. The status of data on physical/chemical properties and environmental fate is presented in Section D of this report. Ecological exposure and risk assessment status for Busan 1024 is presented in Section E of this report. The purpose of reviewing the status of this registration review case is to determine whether sufficient data are available, whether new human health and ecological risk assessments are needed to support registration review, and to report why the Agency feels it may be necessary to either require new guideline studies and/or to conduct new risk assessments under the registration review process.

Data Requirements and Data Waivers

The Agency employs a step-wise process to assist the registrant in determining the data needed to support its particular product. The actual data and studies needed may be modified on an individual basis to fully characterize the use and properties of specific pesticide products under review. While the EPA will assist the registrant in outlining data needs, it is important to emphasize that it is the registrant's obligation under FIFRA to demonstrate that an individual product meets the standard under FIFRA and/or FFDCA. Accordingly, registrants are encouraged to consult with the Agency on the appropriate data requirements, as outlined here, as related to their specific product during this registration review process.

Since there is much variety in pesticide chemistry, exposure, and hazard the Agency tries to be flexible. The Agency also recognizes, however, that due to the particular nature and risk of some pesticides, registrants may seek to obtain data waivers or may suggest alternative approaches to satisfying data needs. Some products may have unusual physical, chemical, or biological properties or atypical use patterns which would make particular data requirements inappropriate, either because it would not be possible

to generate the required data or because the data would not be useful in the Agency's evaluation of the risks or benefits of the product. The Agency will waive data needs it finds are inappropriate, but will ensure that sufficient data are available to make the determinations required by the applicable statutory standards.

Considering the above, registrants may request to use surrogate data or alternative methods to meet data needs or request a waiver of data based upon chemistry, exposure, or hazard rationales that support their position. Registrants are encouraged to discuss the request with the Agency before developing and submitting supporting data, information, or other materials. All waiver requests must be submitted to the Agency in writing. The request must clearly identify the data need(s) for which a waiver is sought along with an explanation and supporting rationale why the registrant believes the data requirement should be waived. In addition, the applicant must describe any unsuccessful attempts to generate the required data, furnish any other information that the registrant(s) believes would support the request, and when appropriate, suggest alternative means of obtaining data to address the concern that underlies the data requirement. The Agency will review each waiver request and subsequently inform the applicant in writing of its decision.

B. USE PROFILE

The uses of antimicrobial pesticide chemicals regulated under FIFRA are highly variable and complex and have been organized into twelve categories of use patterns based on similarity of use, pesticide function, method of incorporation into end-use products, method of application of end-use products, types of establishments in which products are used, environmental media to which antimicrobials are expected to be released, and types of receptors expected to come into contact with antimicrobial pesticides. The twelve general use patterns for antimicrobial pesticides include:

(1) Agricultural premises and equipment;
(2) Food handling/storage establishments, premises, and equipment;
(3) Commercial, institutional and industrial premises and equipment;
(4) Residential and public access premises;
(5) Medical premises and equipment;
(6) Human drinking water systems;
(7) Materials preservatives;
(8) Industrial processes and water systems;
(9) Antifoulants and ballast water;
(10) Wood preservatives;
(11) Swimming pools; and
(12) Aquatic areas.

Busan 1024, EPA Registration number 1448-92, is the only registered product for this active ingredient undergoing registration review. Of these 12 general use patterns for antimicrobial pesticides, two are applicable to Busan 1024: materials preservatives and industrial processes and water systems. Specific uses, general use patterns, and potential for long-term exposure determine data needs for terrestrial and aquatic non-target

organisms, environmental fate, human toxicity, and occupational and residential exposure for the active ingredient of Busan 1024.

After the Initial Summary Document and Preliminary Work Plan for Busan 1024 was posted on the public docket, the technical registrant of Busan 1024, Buckman Laboratories, requested to voluntarily terminate the following uses: laundry starch, petroleum production & recovery, textiles, papermaking chemicals and coatings, and metalworking fluids. The technical registrant has also requested to amend the Busan 1024 product label to clarify that the use of detergents is for industrial use only. As a result of these pending voluntary use terminations and use clarifications, the proposed data needs found in the Initial Summary Document and Preliminary Work Plan may be modified along with the proposed work timeline. These anticipated changes and modifications are reflected in this document, the *Summary Document: Final Work Plan* for Busan 1024, and would become effective once the voluntary use terminations are finalized and become effective. In this revised document the Agency did not evaluate those uses that have been proposed for voluntary termination when determining the assessment and data needs for Busan 1024. However, if the proposed voluntary use terminations do not become effective, the Agency will conduct those human health and ecological assessments that are outlined in the Initial Summary Document and Preliminary Work Plan for Busan 1024; and, the registrant will be responsible for all data needs listed in the Initial Summary Document and Preliminary Work Plan for Busan 1024.

Table 1 presents information on each of the specific use sites for the general use patterns that are applicable to Busan 1024. This information includes the method of application, application rate, and range of percent by weight of active ingredient to be added to each use site. Table 1 reflects the label language and all uses that are currently listed on the Busan 1024 label, even those uses that are pending termination.

TABLE 1

Table 1. Application Information for 1-methyl-3,5,7-Triaza-1-azoniatricyclodecane chloride (PC code 128889)				
Use Site	**Formulation**	**Method of Application**	**Application Rate/ No. of applications**	**Use Limitations**
Materials preservatives				
Emulsion paints	Ready-to-use: 1448-92	In-can preservative	Add 0.05 – 0.5% product by weight of formulation (500-5000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Latex emulsions	Ready-to-use: 1448-92	Open and closed loading	Add 0.05 – 0.5% product by weight of formulation (500-5000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Adhesives	Ready-to-use: 1448-92	Open and closed loading	Add 0.1 – 0.5% product by weight of formulation (1000 to 5000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.

Table 1. Application Information for 1-methyl-3,5,7-Triaza-1-azoniatricyclodecane chloride (PC code 128889)				
Use Site	**Formulation**	**Method of Application**	**Application Rate/ No. of applications**	**Use Limitations**
Detergents [4]	Ready-to-use: 1448-92	Open and closed loading	Add 0.1 to 0.3% product by weight of formulation (1000 – 3000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Construction Materials (caulks, grout, spackling compounds, cement)	Ready-to-use: 1448-92	Open and closed loading	Add 0.05% to 0.15% product by weight of formulation (500-1500 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Inks	Ready-to-use: 1448-92	Open and closed loading	Add 0.02 – 0.1% product by weight of formulation (200 – 1000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Polishes and waxes	Ready-to-use: 1448-92	Open and closed loading	Add 0.3 – 0.75% product by weight of formulation (3000 – 7500 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Papermaking chemicals and coatings [5]	Ready-to-use: 1448-92	Open and closed loading	Add 0.3 – 0.5 % product by weight.	Busan 1024 may not be used for preservation of materials which may contact food.

4 The technical registrant has clarified that detergents are for industrial use only. The label will be updated to clarify that Busan 1024 is to be used for industrial use detergents only. These anticipated changes are reflected in this document, the *Summary Document: Final Work Plan* for Busan 1024, and would become effective once the voluntary use terminations and label amendments are finalized and become effective.

5 The following uses are pending voluntary termination: laundry starch, petroleum production & recovery, textiles, papermaking chemicals and coatings, and metalworking fluids. As a result of these proposed voluntary use terminations and use clarifications, the proposed data needs and work timeline found in the Initial Summary Document and Preliminary Work Plan may be modified. These anticipated changes and modifications are reflected in this document, the *Summary Document: Final Work Plan* for Busan 1024, and would become effective once the voluntary use terminations are finalized and become effective. If the voluntary use terminations do not occur the following data, in addition to the data needs outlined in this document, would be required: (GLN 850.3150) 90 Day Oral Toxicity-non-rodent; (GLN 870.4100) Chronic Toxicity-rodent; (GLN 870.4200) Carcinogenicity-rat; (GLN 870.4200) Carcinogenicity-mouse; (GLN 870.3700) Prenatal Developmental Toxicity-rabbit; (GLN 870.3800) Reproduction and Fertility Effects; (GLN 875.3000) Non-dietary Ingestion Exposure; (GLN 850.1035) Acute Marine Mysid Shrimp Toxicity; (GLN 850.1055) Acute Marine Bivalve Embryo Larvae Toxicity; (GLN 850.1075) Acute Toxicity to Marine Fish. A dietary risk assessment will also be needed, in addition to the human health and ecological risk assessment needs outlined in this document, if the voluntary use terminations do not become effective.

Table 1. Application Information for 1-methyl-3,5,7-Triaza-1-azoniatricyclodecane chloride (PC code 128889)				
Use Site	**Formulation**	**Method of Application**	**Application Rate/ No. of applications**	**Use Limitations**
Metalworking fluids [5]	Ready-to-use: 1448-92	Open and closed loading	In soluble oils and semi-synthetic fluids: Add sufficient product to provide a concentration of 0.3 – 0.5%. Synthetic metal working fluids: Add sufficient product to provide a concentration of 0.1 -0.5%	Busan 1024 may not be used for preservation of materials which may contact food.
Laundry starch[5]	Ready-to-use: 1448-92	Open and closed loading	Add 0.1 to 0.3% product by weight of formulation (1000 to 3000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Textiles	Ready-to-use: 1448-92	Open and closed loading	Add 0.8 – 1% product by weight (8000-10000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.
Industrial processes and water systems				
Fountain wash systems	Ready-to-use: 1448-92	Open and closed loading	Add 0.15 to 0.3% product by weight of formulation (1500 – 3000 ppm)	May not be used for preservation of materials which may contact food.
Petroleum production and recovery [5]	Ready-to-use: 1448-92	Open and closed loading	Add 0.2% - 0.3% product by weight (2000-3000 ppm)	Busan 1024 may not be used for preservation of materials which may contact food.

C. HUMAN HEALTH EXPOSURE AND RISK ASSESSMENT

No human health dietary, occupational, or residential risk assessments have been performed for the active ingredient Busan 1024. The current label states, "Busan 1024 may not be used for preservation of materials which may contact food."

Toxicity

The registrant has submitted both a 90-day dermal toxicity study in rats (MRID 413071-01) and 21/28-day toxicity study (MRID 258510). The 90-day study has been

reviewed by the Agency as acceptable. In this study, there were no dermal and systemic effects identified at the limit dose of 1000 mg/kg/day. The 21/28-day study is no longer acceptable with current guidelines (GDLN 870.3200). Since Busan 1024 is classified as Toxicity Category IV for skin irritation, not a sensitizer, and the 90-day dermal toxicity study indicates no dermal and systemic effects, a quantitative short- and intermediate-term dermal exposure assessment will not be needed.

The registrant has also submitted a prenatal developmental toxicity study in rats (MRIDs 150730 and 263286) that is guideline acceptable. However, based on a limited database that includes toxicity data gaps for a number of data needs, the Agency was not able to select oral and inhalation toxicological endpoints. A more complete toxicity database will be needed to quantify risk for the dietary and inhalation exposure scenarios. No toxicity endpoint values for the active ingredient of Busan 1024 have been selected. Consequently, toxicity endpoints will need to be established. In general, the Agency requires a basic toxicity dataset to characterize the hazard and risks through all exposure routes (oral, inhalation, and dermal). At this time the Agency can only characterize the dermal exposure route.

Refer to Appendix A for specific justifications on toxicity guideline studies. This appendix identifies, for example, why certain Busan 1024 use patterns may trigger specific toxicity data based on length of exposure and why the Agency needs studies to examine species sensitivity. It should be noted that although Busan 1024 has adequate acute data, the Agency cannot use LD_{50} (lethal dose – a single dose that kills half [50%] of the animals tested) from acute oral studies for hazard characterization and toxicity endpoints selection for risk assessment, as toxicity observed in a repeated exposure setting is much different and higher than toxicity observed in an one-time acute exposure setting.

Dietary Risk Assessment

Once the proposed voluntary use terminations become effective, the Agency believes that a dietary exposure and risk assessment will not be needed for Busan 1024 for the following reasons. Busan 1024 will have no registered uses that will come in direct contact with food once the voluntary use terminations become effective. In addition, Busan 1024 has no tolerances or exemptions from tolerances in raw agricultural commodities or processed food and feed products.

The registrant will continue to support the adhesive use for Busan 1024. However, the Agency believes that a dietary risk assessment for indirect food contact exposure from adhesives is not needed because Busan 1024 has no Food and Drug Administration (FDA) clearances. Also, the Busan 1024 label contains the following label language, which eliminates the possibility for dietary food contact exposure, “Busan 1024 may not be used for preservation of materials which may contact food.”

A dietary risk assessment will be needed, as indicated in the Initial Summary Document and Preliminary Work Plan for Busan 1024, if the proposed voluntary use terminations do not become effective.

In the event that additional data or other information are presented to the Agency that would indicate the need to conduct a dietary assessment for the use of Busan 1024 as a materials preservative in adhesives, the Agency reserves the right to conduct a dietary risk assessment as it may deem warranted in the future.

Drinking Water

It is possible that the Agency may need human drinking water exposure and risk assessments if analysis of initial Tier I screening for environmental fate and microbial effects indicate that the magnitude of exposure to potential drinking water sources could be high rather than negligible or low.

Occupational and Residential Risk Assessment

Based on the registered uses of Busan 1024 as materials preservatives and in industrial processes and water systems, there is potential for residential and occupational exposure and risk. No residential or occupational exposure and risk assessment has been performed for Busan 1024. Consequently, the Agency will need to perform an assessment of residential and occupational exposure and risk. Mixer/loader and applicator exposure scenarios include open and closed loading of Busan 1024 in industrial settings, such as the manufacturing process for paints, adhesives, latex emulsions, construction materials, industrial detergents, inks, polishes & waxes, and fountain wash systems. In addition, there is the potential for applicator exposure during painting (residential and professional painters). Potential post-applicator exposures are believed to be minimal.

For both the occupational and residential assessments, a 90-day inhalation study will be needed to set toxicity endpoints for this route of exposure. Since Busan 1024 is classified as Toxicity Category IV for skin irritation, not a sensitizer, and the 90-day dermal toxicity study indicates no dermal and systemic effects, a quantitative short- and intermediate-term dermal exposure assessment will not be needed. If the Agency receives acceptable oral toxicity data, an oral endpoint value with a 100% absorption factor could potentially be used in lieu of inhalation data.

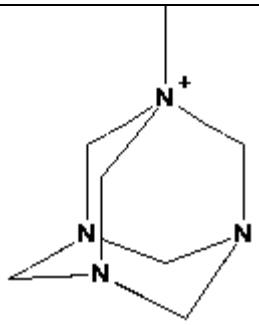
Inhalation occupational assessments will be needed during registration review for use in manufacturing settings (e.g. material preservatives) and commercial painters. Based on most of the currently supported uses, short-and intermediate-term inhalation scenarios will be needed for registration review. Residential assessments will be needed for short-term inhalation (e.g. painting). The Agency will likely use task force submitted data for applicator exposure to conduct these occupational or residential assessments. Refer to Appendix B for more specific details on the exposure data needs and why this information is necessary.

D. PHYSICAL/CHEMICAL PROPERTIES AND ENVIRONMENTAL FATE[6]

Submission of physical/chemical property data is needed for registration of Busan 1024. The registrant has submitted no data on physical/chemical properties of the active ingredient. As a result, the Agency anticipates requiring the registrant to provide these data. The Agency also expects to need information on the physical form of the manufacturing and end-use products. The chemical structure of Busan 1024 is provided in table 2.

Physical/chemistry data help the Agency in evaluating hazard and exposure including acute toxicity (inhalation), workers' exposure (vapor pressure), and bioaccumulation (environmental fate). These studies also help in determining the disposal policy (ecological effects). Storage stability helps the Agency in determining if the product would remain stable in a formulation etc.

Table 2. Chemical Structure

Chemical Name	1-Methyl-3,5,7-Triaza-1-Azoniatricyclodecane Chloride
Common/Trade Names	Busan 1024
CAS Number	76902-90-4
Structure	 Cl-

Additionally, the Agency is planning to determine (1) the potential of antimicrobial pesticides and/or their major transformation products to directly adversely affect biological treatment processes present in a wastewater treatment plant (WWTP); (2) the amount of an antimicrobial pesticide and/or its major transformation products present in influents to a WWTP and in effluents (water or bio-solids) that a WWTP releases to the environment; and (3) whether antimicrobial pesticides found in WWTP effluents or environmental compartments, such as surface water, exceed the Agency's Levels of Concern (LOCs) for nontarget organisms. One source of antimicrobials in

6 Including potential effects on wastewater treatment plants (WWTPs).

surface water is disposal of products such industrial detergents into wastewater. Also, if the EPA determines that other use categories result in discharges to WWTPs, the Agency will conduct other assessments normally performed for these other use categories.

The environmental fate data expected to be needed for the technical grade of the active ingredient and/or any of its major transformation products that are identified to be of potential concern are: (1) hydrolysis study (OPP guideline number 161-1); (2) modified activated sludge respiration inhibition test (OPPTS guideline number 850.6800); (3) activated sludge sorption isotherm test (OPPTS guideline number 835.1110); and (4) ready biodegradability study (OPPTS guideline number 835.3110). Data from the hydrolysis study will enable the Agency to determine if the antimicrobial pesticide hydrolyzes in water discharged to WWTPs, in aquatic effluents WWTPs discharge to surface waters, or in surface waters. The modified activated sludge respiration inhibition test will allow the Agency to identify antimicrobial pesticides which could harm microorganisms found in biological wastewater treatment systems and would also indicate suitable concentrations for use in the ready biodegradability study. The activated sludge adsorption isotherm test will allow the EPA to assess the distribution of antimicrobials among the aqueous, solid, and vapor phases of WWTPs. In addition, this study will identify those chemicals that are likely to adsorb to sludge. Examination of the sludge compartment is necessary since humans and nontarget organisms may potentially be exposed to antimicrobials that adsorb strongly to sludge that are applied to land as a soil amendment. Finally, the activated sludge adsorption isotherm test results will help determine which ready biodegradability test method is most appropriate. The ready biodegradability study will enable the Agency to determine the likelihood that an antimicrobial will biodegrade during the wastewater treatment process. It is possible that under specific conditions the Agency may need additional environmental fate tests. Further description of the environmental fate guideline studies needed by the EPA is presented in Appendix C.

E. ECOLOGICAL EXPOSURE AND RISK ASSESSMENT

For most registered uses of Busan 1024, the potential for exposure to ecological organisms is expected to be low. Although the Agency has not performed label hazard or ecological risk assessments, the Agency expects to need ecological toxicity studies for the active ingredient and/or any of its metabolic and/or hydrolytic transformation products identified to be of potential concern. As a result, the Agency will likely need the following base set of ecological toxicity studies:

- (GLN 850.5400) Algal Toxicity (Tier II)-using freshwater green alga, *Selenastrum capricornutum* using TGAI

The Agency has no ecological risk assessment for Busan 1024 to date. All uses were previously considered “indoor” having no potential for environmental exposure. In response to concerns over persistent compounds in surface waters and disruptions to sewage treatment processes, the Agency has reevaluated the definition of “indoor” in regard to environmental exposure. In order to perform wastewater treatment plant

(WWTP) and ecological risk assessments, the Agency must evaluate the toxicity of busan 1024 to nontarget and endangered or threatened terrestrial and aquatic animals and plants. Busan 1024 uses having potential for environmental exposure are industrial process water discharges and materials preservative discharges on land and in marine areas.

The justifications for guideline studies for ecological non-target organisms and plants are presented in Appendix D. As mentioned in Appendix D, these guideline studies will provide the Agency with endpoints to be used in wastewater treatment plant surface water exposures. It is possible that after further review and under specific conditions the Agency may need additional ecological toxicity tests.

The planned ecological risk assessment will allow the Agency to determine whether Busan 1024 use has "no effect" or "may affect" federally listed threatened or endangered species (listed species) or their designated critical habitat. If the assessment indicates that Busan 1024 "may affect" a listed species or its designated critical habitat, the assessment will be refined. The refined assessment will allow the Agency to determine whether use of Busan 1024 is “likely to adversely affect” the species or critical habitat or "not likely to adversely affect" the species or critical habitat. When an assessment concludes that a pesticide's use "may affect" a listed species or its designated critical habitat, the Agency will consult with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (Services), as appropriate.

IV. GLOSSARY of TERMS & ABBREVIATIONS

ai	Active Ingredient
AR	Anticipated Residue
ASTM	American Society for Testing and Materials
AWPA	American Wood Preserver's Association
CFR	Code of Federal Regulations
cPAD	Chronic Population Adjusted Dose
CSF	Confidential Statement of Formula
CSFII	USDA Continuing Surveys for Food Intake by Individuals
DCI	Data Call-In
DEEM	Dietary Exposure Evaluation Model
DFR	Dislodgeable Foliar Residue
DNT	Developmental Neurotoxicity
DWLOC	Drinking Water Level of Comparison
EC	Emulsifiable Concentrate Formulation
EDWC	Estimated Drinking Water Concentration
EEC	Estimated Environmental Concentration
EPA	Environmental Protection Agency
EUP	End-Use Product
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FFDCA	Federal Food, Drug, and Cosmetic Act
FQPA	Food Quality Protection Act
FOB	Functional Observation Battery
GENEEC	Tier I Surface Water Computer Model
IR	Index Reservoir
LC_{50}	Median Lethal Concentration. A statistically derived concentration of a substance that can be expected to cause death in 50% of test animals. It is usually expressed as the weight of substance per weight or volume of water, air or feed, e.g., mg/l, mg/kg or ppm.
LD_{50}	Median Lethal Dose. A statistically derived single dose that can be expected to cause death in 50% of the test animals when administered by the route indicated (oral, dermal, inhalation). It is expressed as a weight of substance per unit weight of animal, e.g., mg/kg.
LOC	Level of Concern
LOAEL	Lowest Observed Adverse Effect Level
µg/g	Micrograms Per Gram
µg/L	Micrograms Per Liter
mg/kg/day	Milligram Per Kilogram Per Day
mg/L	Milligrams Per Liter
MOE	Margin of Exposure
MRID	Master Record Identification (number). EPA's system of recording and tracking submitted studies.
MUP	Manufacturing-Use Product
NA	Not Applicable
NAWQA	USGS National Ambient Water Quality Assessment
NPDES	National Pollutant Discharge Elimination System
NR	Not Required
NOAEL	No Observed Adverse Effect Level
OPP	EPA Office of Pesticide Programs
OPPTS	EPA Office of Prevention, Pesticides and Toxic Substances
PAD	Population Adjusted Dose
PAIRA	Pure Active Ingredient Radiolabelled
PCA	Percent Crop Area

PDP	USDA Pesticide Data Program
PHED	Pesticide Handler's Exposure Data
PHI	Preharvest Interval
ppb	Parts Per Billion
PPE	Personal Protective Equipment
ppm	Parts Per Million
PRZM/EXAMS	Tier II Surface Water Computer Model
Q_1*	The Carcinogenic Potential of a Compound, Quantified by the EPA's Cancer Risk Model
RAC	Raw Agriculture Commodity
RED	Reregistration Eligibility Decision
REI	Restricted Entry Interval
RfD	Reference Dose
RQ	Risk Quotient
SCI-GROW	Tier I Ground Water Computer Model
SAP	Science Advisory Panel
SF	Safety Factor
SLN	Special Local Need (Registrations Under Section 24©) of FIFRA)
TGAI	Technical Grade Active Ingredient
TEP	Typical End-Use Product
USDA	United States Department of Agriculture
UF	Uncertainty Factor
WPS	Worker Protection Standard

V. APPENDICES

Appendix A. Toxicity Guideline Study Justifications		
Guideline	Study Title	Practical Utility of the Data
870.3100	90-Day Oral Toxicity Study (Rodent)	**1) What is the value of the study?** The Agency does not have a full picture of the potential effects which could occur as a result of exposure via the oral route. The needed study should provide insight into concerns regarding toxicity via the oral route. It may also provide a toxicity endpoint applicable to risk assessment. **2) How would the data be used?** The study would form the foundation for hazard characterization and toxicity endpoints selection for risk assessment through all exposure routes (oral, inhalation, and dermal). The data should allow the Agency to conclude more definitively whether or not there would be any concerns for oral toxicity in the rat. This should help provide a more complete hazard characterization of Busan 1024 in regards to the potential risks to the U.S. general population including infants and children as needed by the FQPA. **3) How could the data affect the risk assessment?** The study would form the foundation for hazard characterization and toxicity endpoints selection for risk assessment through all exposure routes (oral, inhalation, and dermal). It is possible that the database uncertainty factor be reduced or removed, resulting in different magnitude of the value of the endpoint used for regulation. **4) What is triggering the need for this data?** The difficulty of predicting real world human oral exposure (as well as inhalation and/or dermal) with limited data and no repeated-dose toxicity data or other alternative information, such as SAR (structure-activity-relationship), surrogate data, and/or weight-of-evidence to the Agency **triggered** the need for a 90-day (guideline) oral toxicity study, in order to adequately evaluate real world human exposure to Busan 1024 based on how it is used.

Appendix A. Toxicity Guideline Study Justifications		
Guideline	Study Title	Practical Utility of the Data
870.3465	90-Day Inhalation Toxicity Study (Rat)	**1) What is the value of the study?** The Agency does not have a full picture of the potential effects which could occur as a result of exposure via the inhalation route. The needed study should provide insight into concerns regarding toxicity via the inhalation route. It may also provide a toxicity endpoint applicable to risk assessment. **2) How would the data be used?** The study may result in a change in how risks are quantified. The data should allow the Agency to conclude more definitively whether or not there would be any concerns for inhalation toxicity in the rat. This should help provide a more complete hazard characterization of Busan 1024 in regards to the potential risks to the U.S. general population. **3) How could the data affect the risk assessment?** The study may result in a change in how risks are quantified. It is possible that the database uncertainty factor be reduced or removed, resulting in different magnitude of the value of the endpoint used for regulation. **4) What is triggering the need for this data?** The difficulty of predicting real world human inhalation exposure with limited data and no inhalation data or other alternative information, such as SAR (structure-activity-relationship), surrogate data, and/or weight-of-evidence to the Agency **triggered** the need for a 90-day (guideline) Inhalation toxicity study, in order to adequately evaluate real world human exposure to Busan 1024 particles based on how it is used (The OPPTS Guidelines require an MMAD of 1-3 μm in inhalation toxicity studies of aerosols so that a portion of the test article will reach the lungs).

Appendix B: Exposure Guideline Study Justifications

Guideline	Study Title	Practical Utility of the Data
875.1300 and 875.1400 (Applicator)	Inhalation Outdoor Exposure and Inhalation Indoor Exposure	*Note: Inhalation exposure data are needed for both residential and occupational uses. The selection of an outdoor versus an indoor site is based on the high end exposure scenario (for inhalation the selection is typically indoors). In almost all cases, repeating an exposure study for the same scenario outdoors and indoors is not necessary.* **1) What is the value of the study?** The inhalation exposure route is very important for exposure scenarios such as paint rollers and airless sprayers where aerosols would be generated. In addition, inhalation exposures from liquid pouring are evident in exposure studies in the Pesticide Handlers Exposure Database (PHED). The significance of these exposures is directly affected by the severity of the inhalation toxicological endpoint of concern. At this point in time, no toxicological data are available to assess the inhalation risk. The existing Chemical Manufacturer Association (CMA) data base and PHED for these scenarios are limited in scope for QA/QC and number of monitoring units. EPA presented the need for additional handler exposure data to the January 2007 Science Advisory Panel (SAP) as well as to the April 2007 Human Studies Review Board (HSRB) and both groups agreed that additional data are warranted. **2) How would the data be used?** The inhalation exposure data would be used to assess the residential short-term duration of painting with a paint brush/roller and an airless sprayer. For occupational uses, the inhalation exposure data would be used to assess the short- and intermediate-term commercial painters (brush/roller and airless sprayer), as well as pouring Busan 1024 (e.g., poured into paint as a preservative in manufacturing settings). **3) How could the data affect the risk assessment?** The inhalation exposure data would be used to determine the accuracy of the inhalation risks to both residence and occupational workers. If risks warrant mitigation, the inhalation exposure data would provide the types of mitigation necessary such as respiratory protection from respirators or closed systems for commercial uses to potential removal of uses from the label. **4) What is triggering the need for this data?**

Appendix B: Exposure Guideline Study Justifications

Guideline	Study Title	Practical Utility of the Data
		The criteria for the inhalation exposure data are based on the potential for respiratory exposure from the labeled uses (e.g., airless sprayers) and evidence of toxicity. If no toxicological endpoints of concern were identified, then the inhalation exposure data would not be needed.
875.1600 (Applicator)	Data Reporting and Calculations	**1) What is the value of the study?** For all exposure studies these data are needed to facilitate the review of the data. **2) How would the data be used?** The study report and all raw data/calculations would be reviewed for the adequacy of the data. **3) How could the data affect the risk assessment?** The data are needed to interpret the inhalation exposure data collected. **4) What is triggering the need for this data?** This data need is triggered if an exposure study is conducted.
875.1700 (Applicator)	Product Use Information	**1) What is the value of the study?** Product use information is a description of how the product is actually applied; it is not a field study. A description of how this product is used would provide for a comprehensive realistic assessment of its potential applications. **2) How would the data be used?** The description of the application techniques would be used to define the exposure scenarios to be assessed in the risk assessment. **3) How could the data affect the risk assessment?** A complete description of product use would ensure that the risk assessment is inclusive of the types of exposures occurring during residential and occupational use. **4) What is triggering the need for this data?**

Appendix B: Exposure Guideline Study Justifications		
Guideline	Study Title	Practical Utility of the Data
		The need for a risk assessment as needed under Registration Review would require that the risk assessor understands how the product is applied.
875.2700 (Post Application)	Product Use Information	**1) What is the value of the study?** Product use information for the post application data need is a description of what types of consumer products are treated; it is not a field study. A description of what types of consumer products are treated, specifically what types of paints, polishes, waxes, etc. would provide for a comprehensive realistic assessment that the potential for post application exposures is minimal. **2) How would the data be used?** The listing of the end use consumer products would be used to define the exposure scenarios. **3) How could the data affect the risk assessment?** A complete description of consumer products treated would ensure that the risk assessment is inclusive of the types of exposures occurring during residential use. **4) What is triggering the need for this data?** The need for a risk assessment under Registration Review would require that the risk assessor understands how the product is applied.
875.2900 (Post Application)	Data Reporting and Calculations	**1) What is the value of the study?** For all exposure studies these data are needed to facilitate the review of the data. **2) How would the data be used?** The study report and all raw data/calculations would be reviewed for the adequacy of the data. **3) How could the data affect the risk assessment?** The data are needed to interpret the residue data collected. **4) What is triggering the need for this data?**

Appendix B: Exposure Guideline Study Justifications		
Guideline	Study Title	Practical Utility of the Data
		The data reporting need is triggered if a residue study is conducted.

Appendix C. Environmental Fate Guideline Study Justifications

Guideline	Study Title	Practical Utility of the Data
OPP 161-1	Hydrolysis	**1) What is the value of the study?** Results from the hydrolysis study should indicate the stability and persistence of Busan 1024, indicating the potential for this chemical to contaminate water discharged to WWTPs. In aquatic effluents, WWTPs may discharge directly to surface waters. The Agency will address the risks of concern. **2) How would the data be used?** Data should show/help in establishing chemical hydrolysis as a route for degradation of a pesticide and to identify, if possible, the hydrolytic products formed which may adversely affect non-target organisms and may contaminate water and food source of aquatic organisms. **3) How could the data affect the risk assessment?** The results of hydrolysis data should indicate if Busan 1024 is persistent or it degrades into degradation products which may adversely affect nontarget organisms and may contaminate their food and water and possibly soil. **4) What is triggering the need for this data?** Hydrolysis data are needed to conduct the fate assessment to support indoor uses for Busan 1024.
850.6800	Modified Activated Sludge, Respiration Inhibition	**1) What is the value of the study?** The modified activated sludge, respiration inhibition test should allow EPA to identify antimicrobial pesticides which could harm microorganisms found in biological wastewater treatment systems and should also help establish correct concentrations for use in the ready biodegradability test. **2) How would the data be used?** The data would be used to determine the potential of Busan 1024 to directly harm the nontarget organisms and/or to microbial treatment processes present in a WWTP and to determine suitable noninhibitory concentrations of Busan 1024 to be used in biodegradability tests. **3) How could the data affect the risk assessment?** If the data show that Busan 1024 is toxic to nontarget organisms and/or to microbial process found in WWTPs

Appendix C. Environmental Fate Guideline Study Justifications		
Guideline	Study Title	Practical Utility of the Data
		then, the Agency may need Tier II environmental fate data to evaluate potential adverse effects on WWTPs. **4) What is triggering the need for this data?** Studies are needed to conduct environmental fate assessment and to determine the potential exposure of Busan 1024 to waste water treatment plants (WWTPs) (via effects on WWTP microbes).
835.1110	Activated Sludge Sorption Isotherm	**1) What is the value of the study?** The results from activated sludge sorption study should allow EPA to assess the distribution of the antimicrobial among the solid, aqueous, and vapor phases of WWTPs. Specifically, this study identifies those chemicals which sorb to sludge biomass. **2) How would the data be used?** The data would be used to determine the sorption potential of Busan 1024 to activated sludge biomass and in biological wastewater treatment systems. **3) How could the data affect the risk assessment?** If Busan 1024 is not sorbed or biodegraded then, it would pass through a biological treatment system unaffected and it would contaminate surface and drinking waters and also have potential adverse effects to nontarget organisms. **4) What is triggering the need for this data?** Studies are needed to conduct environmental fate assessment and to determine the sorption potential of activated sludge for the removal of specific chemical compounds in biological wastewater treatment systems.
835.3110	Ready Biodegradability	**1) What is the value of the study?** The ready biodegradability study should enable the Agency to determine the likelihood that the antimicrobial pesticide of biodegrading in aquatic environments under aerobic conditions. **2) How would the data be used?** The results from the data should be used to determine the rate and extent of aerobic biodegradation of Busan

Appendix C. Environmental Fate Guideline Study Justifications		
Guideline	Study Title	Practical Utility of the Data
		1024 when it is released into aquatic environments and would help establish if Busan 1024 is stable or not stable under real environmental conditions. **3) How could the data affect the risk assessment?** If the results show low biodegradability then, Busan 1024 would occur in significant quantities in WWTP effluents (water and biosolids) and in environmental compartments (e.g., surface waters) such that potential adverse effects to nontarget organisms, found in such environmental compartments, may occur. **4) What is triggering the need for this data?** Data are needed to conduct an environmental fate assessment and to determine the ready biodegradability of Busan 1024.

Appendix D: Ecological Guideline Study Justifications

Guideline	Study Title	Practical Utility of the Data:
850.5400	Tier II green algae using *Selenastrum capricornutum*	**1) What is the value of the study?** As part of a Tier I risk assessment, one indicator plant species is tested for phytotoxicity. This study should assist the Agency in categorizing busan 1024 as toxic or non-toxic to plants. If toxic, additional higher tier plant tests would be needed. An endangered species assessment for endangered or threatened plants is not possible without this study. **2) How would the data be used?** This study would be used to evaluate the toxicity of busan 1024 to non-target plants in terrestrial and aquatic ecosystems. **3) How could the data affect the risk assessment?** Adverse effects to non-target plants in terrestrial and aquatic ecosystems may result in mitigation to protect species at risk. Mitigation might include reduced label dosages, neutralization of effluents prior to discharge into water, restrictions on use in sensitive ecosystems or where endangered species are present, or other mitigation measures. **4) What is triggering the need for this data?** Increased concern from state regulators and the public to evaluate impacts on WWTP operations, endangered species, and persistence in the environment, since initial registration, have triggered the need for this study. Green algae are critical to ecosystem health and productivity.