

A PROTOCOL FOR DOCUMENTING AND INVESTIGATING SYMPTOMS REPORTED NEAR BIOSOLIDS LAND APPLICATION SITES

Version: September 2, 2008

This Research was funded by the Water Environment Research Foundation (WERF). Neither WERF, members of WERF, the organization(s) named below, nor any person acting on their behalf: (a) makes any warranty, express or implied, with respect to the use of any information, apparatus, method, or process disclosed in this report or that such use may not infringe on privately owned rights; or (b) assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this report.

Contact Information

Steve Wing, Ph.D.
Department of Epidemiology
School of Public Health, CB#7435
University of North Carolina
Chapel Hill, NC 27599-7435
919-966-7416 (voice)
919-966-2089 (fax)
steve_wing@unc.edu

A PROTOCOL FOR DOCUMENTING AND INVESTIGATING SYMPTOMS REPORTED NEAR BIOSOLIDS LAND APPLICATION SITES

Introduction and Overview

In the U.S., treated sewage sludges, also known as biosolids, are routinely applied to agricultural lands as soil amendments. The National Academy of Sciences (2002) defined sewage sludge as “the solid, semi-solid, or liquid residue generated during treatment of domestic sewage,” and biosolids as “sewage sludge that has been treated to meet the land-application standards in [US EPA] Part 503 rule or any other equivalent land application standards.” The NAS recommended several types of studies to investigate potential adverse health effects of these practices. In addition to exposure studies and epidemiologic studies, the report called for “response studies,” for example, investigations of symptoms of illness reported by nearby residents following land application of biosolids.

Sometimes people who live near areas where biosolids are applied to land report symptoms and health problems to government agencies. This Investigation Protocol is intended for public officials to use when responding to such concerns. The starting point for the investigation is contact by a member of the public or clinician with a patient who has experienced symptoms that the patient and/or clinician believe could be connected to land application of biosolids.

The Investigation Protocol provides a standardized procedure for documenting (1) reported symptoms; (2) recent land application of biosolids in the vicinity; (3) the sources, amounts and characteristics of biosolids; (4) factors that could affect off-site migration of pollutants from land application sites; and (5) other exposures that could be related to reported symptoms of illness. In addition to providing a protocol for responding to reports of symptoms from specific areas, records of investigations should be entered into an electronic database that could be used to examine spatial patterns of reported concerns, temporal changes in the frequency or types of concerns, and relationships between reported concerns and the sources or characteristics of biosolids applied to land.

The Investigation Protocol involves five steps:

- Step 1** Health Questionnaire for Assessing Symptoms Potentially Related to Land Application of Biosolids
- Step 2** Site Identification and Source Report
- Step 3** Biosolids Generator Questionnaire
- Step 4** Biosolids Applier Questionnaire
- Step 5** Site Follow-Up Report

Figure 1 shows the stages of an investigation in response to one or more reports of health concerns. When a call or other contact (i.e. email, letter, etc.) is received, an initial decision must be made about whether the concern potentially relates to changes in the health of residents located near land application sites after biosolids (or an unknown soil amendment that might be biosolids) have been applied. If the concerns have to do exclusively with issues unrelated to recent changes in health or symptoms of illness (for example, the potential for future health effects from local application of biosolids, consumption of food grown on biosolids applied fields, or potential for future contamination of well water), the resident should be referred to appropriate educational materials and personnel, but this investigation protocol should not be administered.

If the concern relates to symptoms experienced following land application of biosolids or an unknown soil amendment that might be biosolids, the investigation should proceed. The first step in the Investigation Protocol is to complete the Health Questionnaire for Assessing Symptoms Potentially Related to Land Application of Biosolids. This questionnaire is designed to be administered as a telephone interview. If the responses to the Health Questionnaire indicate that the resident recently experienced or is currently experiencing symptoms, and if the responses suggest the possibility of recent nearby land application of biosolids, the investigation should proceed to Step 2 as described below. If the resident reports severe symptoms and ongoing or recent land application of biosolids or an unknown soil amendment that might be biosolids close to the resident's home, Step 5 should be initiated as quickly as possible and concurrently with Steps 2-4. The interviewer may be able to assist the concerned resident in contacting the appropriate parties to request that the land application be stopped, if desired.

Step 2 involves completion of the Site Identification & Source Report, in which the investigator records information about the locations of permitted biosolids land application site(s) within a mile of the resident's property and the holders of the permits. If there are permitted land application sites in the area, the investigation should proceed to Steps 3 and 4. If there are no permitted sites, the investigation should proceed to Step 5 to determine whether there has been local application of biosolids at sites that were not identified in the permit records.

Step 3 includes a Biosolids Generator Questionnaire. The Generator Questionnaire is used to record information about the sources of wastewater and sludge, biosolids preparation, generation, treatment, quality testing, storage, and management. It is designed to be administered as a telephone interview and to obtain information about treatment processes that could affect the presence of toxicants, pathogens, and odorant chemicals in biosolids applied to land.

Step 4 is the Biosolids Applier Questionnaire. The Applier Questionnaire is used to record information about hauling, land application methods, land application amounts, land application rates, and weather conditions during land application. Like the Generator Questionnaire, it is designed to be administered as a telephone interview, although some data may be collected from records. Depending on the state regulatory program, tracking biosolids application may be relatively easy or difficult. Some states require thorough record keeping, and some do not.

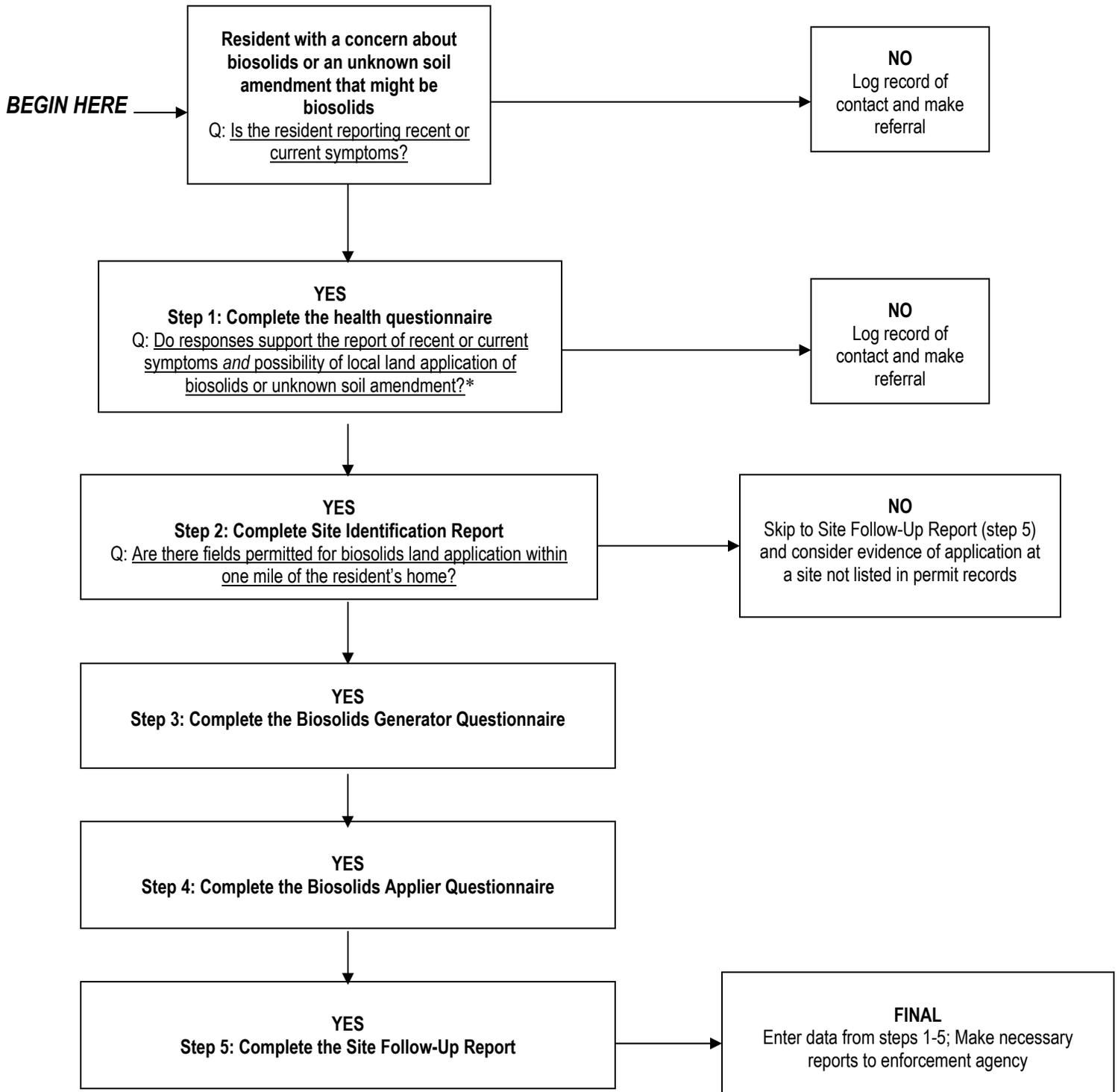
Step 5 is the Site Follow-Up Report. The Site Follow-Up Report is to be used for field evaluation of neighboring land uses, factors that could affect off-site migration of materials from land application sites (e.g. distances to residences, surface waters, vegetative buffers), vectors (e.g. insects, birds, pets), and potential for human exposure to other soil amendments (e.g. animal

manures). The Site Follow-Up Report is designed to be completed during a site visit to the area of residence of the person(s) with health concerns.

When an investigation is complete the resulting information is entered into a database. If there is interest from members of the public, clinicians, environmental officials, or operators of wastewater treatment plants, a summary of results may be prepared for distribution. Investigators and agencies are encouraged to provide results of the investigation to individuals who reported symptoms.

The steps of the Investigation Protocol should be completed as quickly as feasible. The Protocol is intended to facilitate collection of common data for cases in which members of the public believe their health has been affected by biosolids. However, it is not intended to discourage investigators from obtaining additional information when it is needed for a public health response.

Investigation Protocol Decision Tree



* If the resident reports severe symptoms and ongoing or recent land application, Step 5 should be initiated as quickly as possible and concurrently with Steps 2-4. The interviewer may be able to assist the resident in contacting the appropriate parties to request that the land application be stopped, if desired.

Step 1. Health Questionnaire for Assessing Symptoms Potentially Related to Land Application of Biosolids

Introduction to the Questionnaire

What is the purpose of this questionnaire?

This health questionnaire is a tool to be used as part of an investigation of symptoms of illness reported by residents near sites where biosolids are applied to land. It is designed as a telephone questionnaire to collect standard health-related information. It may also be conducted face-to-face. If the soil amendment of concern is biosolids, other investigation tools will be used to gather information specific to generation, treatment, storage and land application of biosolids. If, after completing the health questionnaire, it appears that a resident's concern is related to a soil amendment other than biosolids, the resident should be referred to the appropriate person, department, or agency. Please note that this survey is intended for individuals who report symptoms. The survey could also be completed by an adult on behalf of a child or someone who could not answer the questions themselves.

Who will administer this questionnaire?

This questionnaire should be administered by professionals in the health or environmental agencies that assume responsibility for investigating symptoms reported by residents near biosolids land application sites.

What is the structure of the questionnaire?

This questionnaire is designed to collect information about residents' symptoms, possible causes, household and environmental factors, and other information pertinent to their health. Respondents are also asked for demographic information.

The questionnaire guides the interviewer through the following sections:

- I. Introduction
- II. Personal Contact Information
- III. Description of Concern(s)
- IV. Symptoms Information
- V. Evidence of Land Application(s)
- VI. Household Information
- VII. Personal Health Information
- VIII. Demographic Information
- IX. Closing

How was this questionnaire designed?

The following questionnaires were consulted in developing this instrument:

- 1) Standard Foodborne Disease Outbreak Questionnaire (Centers for Disease Control and Prevention)
(http://www.cdc.gov/foodborneoutbreaks/standard_ques.htm)
- 2) Hepatitis A Outbreak Questionnaire (North Carolina Institute for Public Health)
- 3) PA DOH Biosolids Health Complaint Questionnaire (PA Department of Health)
- 4) Bureau of Labor Statistics, Current Population Survey 2007

Instructions to the Interviewer

- ◆ Read through the questionnaire prior to administration to familiarize yourself with the questions, instructions, and skip patterns
- ◆ Ask the questions exactly as they are worded in the questionnaire
- ◆ Read each question slowly
- ◆ Ask the questions in the order in which they are presented in the questionnaire
- ◆ Ask every question specified in the questionnaire
- ◆ Do not assume answers
- ◆ Repeat the question(s) as needed
- ◆ Have a calendar handy for helping the interviewee answer questions about dates

Interviewer instructions are given in all capital letters and parentheses, for example, “(READ OUT).” Explanations of some of the instructions that appear in the questionnaire are as follows:

- ◆ **WRITE RESPONSE:** Write out what the respondent says.
- ◆ **CHECK ALL THAT APPLY:** Check all answer choices that the respondent names.
Do not read the answer choices unless there are instructions to do so.
- ◆ **CHECK ONE:** Check only one answer choice. If respondent gives more than one, ask them to please choose one.
- ◆ **IF UNKNOWN, ASK FOR THEIR BEST ESTIMATE:** These are for questions where the respondent may not know, but try to obtain their best guess.
- ◆ **READ OUT:** Read out the answer choices for the respondent to choose from. **If a question does not have the “READ OUT” instruction, then do not read out the answer choices.**
- ◆ **PROMPT:** Give the respondent an opportunity to respond to the question, before reading what is written in the prompt.

HEALTH QUESTIONNAIRE
FOR ASSESSING SYMPTOMS POTENTIALLY RELATED
TO LAND APPLICATION OF BIOSOLIDS

INTERVIEWER NAME _____ AGENCY _____ DATE (MM/DD/YY): ____/____/____

I. INTRODUCTION

VERSION 1 (If concerned citizen contacts interviewer directly):

INTERVIEWER: Thank you for your call. In order to document your concern and determine the appropriate next steps, I would like to ask you for some additional information. You may refuse to respond to any questions that you are not comfortable answering. If you prefer, the information that you provide can be kept confidential so that none of it will be linked to your name or other information that could identify you, except to contact you and locate the site of concern if it is determined that a follow-up site investigation is necessary. Would you like your name and information to be kept confidential?

- 1 No
2 Yes

The questions should take about 20-25 minutes to complete. May I proceed with the questions?

VERSION 2 (If interviewer returns the call of a concerned citizen):

INTERVIEWER: Hello, my name is _____ (name of interviewer) from the _____ (name of agency). I am calling to follow-up on a concern that you reported to _____ (name and agency of first responder) on _____ (date of report). In order to document your concern and determine the appropriate next steps, I would like to ask you for some additional information. You may refuse to respond to any questions that you are not comfortable answering. If you prefer, the information that you provide can be kept confidential so that none of it will be linked to your name or other information that could identify you, except to contact you and locate the site of concern if it is determined that a follow-up site investigation is necessary. Would you like your name and information to be kept confidential?

- 1 No
2 Yes

The questions will take about 20-25 minutes to complete. May I proceed with the questions?

(If No) Is there a convenient time when I can call you back? (IF RESPONDENT DOES NOT HAVE A PERSONAL HOME PHONE NUMBER, OFFER TO CONDUCT THE INTERVIEW IN PERSON AT A PLACE OF HIS OR HER PREFERENCE.)

Name _____
Date (MM/DD/YY): ____/____/____
Time __:__ am pm
Phone Number: (____) _____ - _____

II. PERSONAL CONTACT INFORMATION

To begin, I need your personal contact information so that we can follow up with you as necessary regarding your concern. What is your...?

1. **First Name:** _____ **Last Name:** _____
2. **Phone Number (or number where you can be reached):** (_____) _____ - _____
3. **Physical Home Address:** _____
City: _____ **State:** _____
Zip: _____ **County:** _____
4. **Mailing Address (if different from home address):** _____
City: _____ **State:** _____
Zip: _____ **County:** _____

III. DESCRIPTION OF CONCERN

The next questions are about the nature of your concern.

5. **Is your concern related to symptoms you have had recently and/or are currently experiencing?**

1 Yes (Skip to 7)

2 No



6. **(If No) What is your concern? (WRITE RESPONSE. REFER RESIDENT TO A SPECIALIST WHO CAN RESPOND TO THEIR CONCERN AND END THE CALL.)**

IV. SYMPTOMS INFORMATION

7. **What are your symptoms? (WRITE RESPONSE)** _____

8. **What do you believe is the cause of your symptoms? (WRITE RESPONSE)**

9. **For the next question, I will read you a list of symptoms. Please respond “yes” or “no” if you have had any of the following symptoms associated with the health concern that you are reporting? (READ EVERY SYMPTOM AND RECORD PERTINENT INFORMATION FOR EACH SYMPTOM)**

Symptom	No	Yes	(If Yes) What day did you first experience this symptom? (IF UNKNOWN ASK FOR THEIR BEST ESTIMATE)
a. Excessive cough	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
b. Runny nose, congestion	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
c. Sore throat	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
d. Difficulty breathing	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
e. Loss of appetite	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
f. Nausea	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
g. Vomiting	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
h. Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
i. Trouble urinating	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
j. General ill feeling	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
k. Fever or chills	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
l. Headache	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
m. Lightheaded or dizzy	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
n. Ringing in ears	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
o. Burning, tearing or irritated eyes	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
p. Burning or irritated nose	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
q. Burning or scratchy throat	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
r. Skin irritation or redness	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
s. Ulcer or boils on skin	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
t. Round patches or scaly areas on skin	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
u. Rash with spots or bumps	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
v. Itching	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
w. Other, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____
x. Other, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>	(MM/DD/YY): ____/____/____

10. **Did you visit a medical provider, e.g., a doctor or nurse, for any of your symptoms?** (CHECK ONE)

- 1 No
2 Yes

11. **Does anyone other than you presently live in your household?** (CHECK ONE)

- 1 No (Skip to 13)
2 Yes



12. **(If Yes) Has anyone else in your household had similar symptoms?** (CHECK ONE)

- 1 No
2 Yes (IF YES, ASK RESPONDENT IF YOU MAY ASK THE SAME QUESTIONS OF THE OTHER HOUSEHOLD MEMBER(S) WHEN YOU HAVE COMPLETED THE QUESTIONNAIRE. IF HOUSEHOLD MEMBER IS UNDER 18, ASK IF RESPONDENT IS WILLING TO ANSWER THE QUESTIONS FOR THE INDIVIDUAL.)

13. **Do you know of anyone else in your neighborhood that has had similar symptoms?** (CHECK ONE)

- 1 No
2 Yes

V. EVIDENCE OF LAND APPLICATION

As you may know, a variety of soil amendments are sometimes applied—meaning spread, sprayed, or injected—to agricultural land. These soil amendments may include treated sewage sludge, also known as biosolids; manure; food residuals produced from food preparation and consumption at establishments, such as, restaurants, hotels, and cafeterias; septage, meaning waste content found in a septic tank; compost or decomposed organic material; and others. These next questions ask about possible evidence of the land application of biosolids or other soil amendments on farmland near your home. For these questions please think about the 1 month prior to when you started having your first symptoms.

14. **Did you notice any indications that land application would be occurring near your home, for example, signs or flags in the road?**

- 1 No (Skip to 16)
2 Yes



15. **(If Yes) Please describe:** _____

16. **Did you notice material being hauled, stockpiled or applied—meaning spread, sprayed, or injected—to fields near your home?**

- 1 No (Skip to 23)
2 Yes



17. **(If Yes) If known, please identify the material that was being applied: (CHECK ALL THAT APPLY)**

- 1 Biosolids or treated sewage sludge
- 2 Manure
- 3 Food residuals
- 4 Septic tank waste
- 5 Compost
- 6 Liquid fertilizer for spraying
- 7 Agricultural lime
- 8 Other _____
- 9 Don't know

18. **If known, how was the material being applied: (READ OUT. CHECK ALL THAT APPLY)**

- 1 Stockpiled
- 2 Spread
- 3 Sprayed
- 4 Injected
- 5 Other _____
- 6 Don't know

19. **On what day or days did you notice that material was being applied? (IF UNKNOWN, ASK FOR THEIR BEST ESTIMATE)**

(MM/DD/YY): ____/____/____ (MM/DD/YY): ____/____/____ (MM/DD/YY): ____/____/____

(MM/DD/YY): ____/____/____ (MM/DD/YY): ____/____/____ (MM/DD/YY): ____/____/____

(MM/DD/YY): ____/____/____ (MM/DD/YY): ____/____/____ (MM/DD/YY): ____/____/____

20. **How many days total did you notice that material was being applied? (CHECK ONE. IF APPLICATION WAS INTERMITTENT, RECORD THE TOTAL # OF DAYS)**

- 1 1-2
- 2 3-5
- 3 6-7
- 4 8-14
- 5 15-21
- 6 21+

21. **If known, where was the application occurring in relation to your property? Please provide descriptive information that could help somebody locate the site of application for investigation purposes, for example, a road or landmark. (WRITE RESPONSE)**

22. If known, what was the weather like during application? (CHECK ALL THAT APPLY)

- 1 Sunny/clear
 2 Rainy
 3 Windy
 4 Snowy
 5 Other _____
 6 Don't remember/Don't know

23. Did you notice any land application material near your home or on the roads near your home? (CHECK ONE)

- 1 No
 2 Yes

24. Did you notice more insects, rodents, or birds on or near your property than usual? (CHECK ONE)

- 1 No (Skip to 26)
 2 Don't know/Don't remember
 3 Yes



25. (If Yes) Please describe: _____

26. Did you detect any odors associated with the land application material? (CHECK ONE)

- 1 No (Skip to 38)
 2 Yes



27. (If Yes) Please describe the odor: (WRITE RESPONSE) _____

28. What was the level of odor? (READ OUT. CHECK ONE)

- 1 Faint
 2 Moderate
 3 Strong

29. What day did you first notice the odor? (IF UNKNOWN, ASK FOR BEST ESTIMATE.)

(MM/DD/YY): ____ / ____ / ____

30. How many days total did you notice the odor, including days when the odor came back after going away? (CHECK ONE)

- 1 Less than 1 day
 2 1-2 days
 3 3-4 days
 4 5-6 days
 5 1 week
 6 More than 1 week

31. **Is the odor still present?** (CHECK ONE)

- 1 No
2 Yes

32. **Did you choose not to open windows because of the presence of outside odors?** (CHECK ONE)

- 1 No
2 Yes

33. **Did you choose not to go outside or alter your outdoor activities because of the presence of outside odors?** (CHECK ONE)

- 1 No
2 Yes

34. **Is there anything that you wanted to do at or near your home but chose not to because of the presence of outside odors?** (CHECK ONE)

- 1 No (Skip to 36)
2 Yes



35. **(If Yes) Please describe:** (WRITE RESPONSE) _____

36. **Is there anything that you did differently or with difficulty because of the presence of outside odors?** (CHECK ONE)

- 1 No (Skip to 38)
2 Yes



37. **(If Yes) Please describe:** (WRITE RESPONSE) _____

38. **Did you notice any dust?** (CHECK ONE)

- 1 No (Skip to 40)
2 Yes



39. **Where did you see the dust?** (WRITE RESPONSE) _____

VI. HOUSEHOLD INFORMATION

The next questions are related to your household.

40. How long have you lived at your current residence? (CHECK ONE)

- 1 Under 1 year
- 2 1-2 years
- 3 3-5 years
- 4 6-10 years
- 5 11-20 years
- 6 More than 20 years
- 7 Don't know/can't remember

41. What is the source of your drinking water at home? (READ OUT. CHECK ONE)

- 1 Public water supply, e.g., city, county, town, village
- 2 Private household well
- 3 Private community water supply
- 4 Other
- 5 Don't know

42. During the seven days prior to your symptoms, did you notice any change in the color, taste, or smell of your water?

- 1 No
- 2 Yes

43. Do you have a septic system on your property? (CHECK ONE)

- 1 No
- 2 Yes

44. Do you have pets? (CHECK ONE)

- 1 No (Skip to 46)
- 2 Yes



45. (If Yes) Do they have access to fields where land application occurs?

- 1 No
- 2 Yes
- 3 Don't know

46. Do you have farm animals? (CHECK ONE)

- 1 No (Skip to 48)
- 2 Yes



47. (If Yes) Do they have access to fields where land application occurs?

- 1 No
 2 Yes
 3 Don't know

VII. PERSONAL HEALTH INFORMATION

Next, I will ask you about your health and certain health behaviors.

48. I will read you a list of conditions. Please respond "yes" or "no" if you have any of the following conditions? (READ EVERY CONDITION AND RECORD PERTINENT INFORMATION FOR EACH CONDITION.)

CONDITION	No	Yes		No	Yes
a. Hay fever/Pollen/Allergies	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>	→ (If Yes) Has the condition worsened since your health concern began?	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>
b. Asthma	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>	→ (If Yes) Has the condition worsened since your health concern began?	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>
c. Chronic Bronchitis	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>	→ (If Yes) Has the condition worsened since your health concern began?	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>
d. Skin Allergies	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>	→ (If Yes) Has the condition worsened since your health concern began?	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>
e. Food Allergies	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>	→ (If Yes) Has the condition worsened since your health concern began?	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>
f. Other Allergies	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>	→ (If Yes) Has the condition worsened since your health concern began?	No 1 <input type="checkbox"/>	Yes 2 <input type="checkbox"/>

49. Do you smoke cigarettes? (CHECK ONE)

- 1 No
 2 Yes

50. During the seven days prior to your symptoms, did you swim in a body of water (other than a swimming pool) near fields where soil amendments were applied? (CHECK ONE)

- 1 No (Skip to 52)
 2 Yes



51. (If Yes) Please describe: (PROBE: HOW FAR IS THE BODY OF WATER FROM THE LAND APPLICATION FIELDS? WRITE RESPONSE) _____

VIII. DEMOGRAPHIC INFORMATION

Next, I will ask a few questions about your age, race, and occupation.

52. **In what age group do you belong?** (READ OUT. CHECK ONE)

- 1 <18 (WRITE AGE) _____
- 2 18-24
- 3 25-34
- 4 35-44
- 5 45-54
- 6 55-64
- 7 65+

53. **Do you consider your race to be . . . ?** (READ OUT. CHECK ALL THAT APPLY)

- 1 White or Caucasian
- 2 Black or African American
- 3 American Indian or Alaska Native
- 4 Asian
- 5 Native Hawaiian or other Pacific Islander
- 6 Mixed
- 7 Other: (WRITE RESPONSE) _____
- 8 Don't know/refused (DO NOT READ)

54. **Are you of Hispanic, Latino, Latina or Spanish origin?** (CHECK ONE)

- 1 No
- 2 Yes
- 3 Don't know/refused (DO NOT READ)

55. **What is the highest level of education that you completed?** (CHECK ONE)

- 1 Less than high-school diploma
- 2 High-school graduate
- 3 Some college, no degree
- 4 Associate degree
- 5 Bachelor's degree
- 6 Master's degree
- 7 Professional degree
- 8 Doctoral degree

56. **What is your gender?** (ONLY ASK IF THERE IS UNCERTAINTY ABOUT THE RESIDENT'S GENDER. OTHERWISE SILENTLY RECORD. CHECK ONE.)

- 1 Male
- 2 Female
- 3 Don't know/refused (DO NOT READ)

IX. CLOSING

If it would help the investigation, would it be okay if an investigator visited your property to further inspect possible evidence of land application and compliance with application standards? (IF RESIDENT IS CONCERNED ABOUT CONFIDENTIALITY, REMIND THEM THAT THEIR ADDRESS WILL ONLY BE USED DURING THE INVESTIGATION TO LOCATE THEIR PROPERTY, BUT WILL NOT BE LINKED TO THEIR NAME OR OTHER INFORMATION THAT COULD IDENTIFY THEM.)

- 1 No
2 Yes

Thank you very much for reporting your concern(s) and answering these questions that will help us better understand what you and others like you may be experiencing. We would like to remind you that if you requested confidentiality before we began the questionnaire, the information that you provide will not be linked to your name or other information that could identify you, except to contact you and locate the site of concern if it is determined that a follow-up site investigation is necessary. Please feel free to call back with questions, comments or concerns as needed. Note to Interviewer: If resident agreed to allow you to speak with other members of the household, please ask to do so now.

Step 2. Site Identification and Source Report

Introduction to the Questionnaire

The Site Identification & Source Report provides a structured format to record information about permit holders, biosolids-generating facilities and the location of permitted biosolids land application sites within 1000, 1500 or 2000 feet of the resident's home. Distance should reflect local conditions. In the investigation reports and questionnaires, the distance is specified at 2000 feet. The investigator may adjust this distance to less than 2000 feet according to local conditions. If there are no application sites within 2000 feet, the investigation may be expanded if there is a perceived possibility of exposure. If there are permitted land application sites in the area, the investigation should proceed to Step 3 (Biosolids Preparer and Applier Questionnaire). If there are no permitted sites, the investigation should proceed to Step 4 (Site Follow-Up Report) to determine whether there has been land application of biosolids at sites that were not identified in the permit records. If there is more than one resident in a neighborhood that has reported a concern, this form may need to be copied and completed for each resident to be sure all possible land application sites and biosolids generating sources are accounted for.

SITE IDENTIFICATION AND SOURCE REPORT

INVESTIGATOR NAME _____	AGENCY _____
DATE (MM/DD/YY): ____/____/____	PHONE NUMBER: (____) ____ - ____
ID# OF CORRESPONDING HEALTH QUESTIONNAIRE: _____	
DATE OF CORRESPONDING HEALTH QUESTIONNAIRE (MM/DD/YY): ____/____/____	
DATE OF ONSET OF SYMPTOMS (HEALTH QUESTIONNAIRE # 9) (MM/DD/YY): ____/____/____	

Note to Investigator: In order to complete this report, please refer to land application permit records and a map that identifies the approximate location of the resident's home and surrounding area within 1000, 1500 or 2000 feet of the resident's home. Distance should reflect local conditions. In the investigation reports and questionnaires, the distance is specified at 2000 feet. The investigator may adjust this distance to less than 2000 feet according to local conditions. If there are no application sites within 2000 feet, the investigation may be expanded if there is a perceived possibility of exposure. Please note that permitting and record keeping systems and entities to which land application permits are issued, e.g., state, county, generator, hauler, or land applier, vary by state. It is the responsibility of the investigator to obtain the land application permits that provide the information below.

1. Are there permitted biosolids land application fields within 2000 feet? (Check one)

No (If No, proceed to the Site Follow-Up Report and examine possible evidence of unreported land application.)

Yes



2. Please complete the following information for the biosolids land application fields within 2000 feet that were permitted around the time of the resident's onset of symptoms. (If there are multiple permits that include land application fields within 2000 feet, please make copies of the form below and complete and attach the information for each permit.)

LAND APPLICATION PERMIT #: _____

LAND APPLICATION PERMITTEE: _____

FIELD/SITE ID#S AND LOCATION(S): (List all field or site ID#s within 2000 feet of the resident's home. Describe location(s) and attach copies of maps of fields listed below if available in the permit. If more space is needed, please continue on the back of this report.)

Field/Site ID#: _____	Location: _____

APPROVED BIOSOLIDS-GENERATING FACILITIES FOR LAND
APPLICATION PERMIT # LISTED ABOVE: *(If more space is needed, please use
the remaining space on this page.)*

Facility Name: _____	Phone number: _____
Facility Name: _____	Phone number: _____
Facility Name: _____	Phone number: _____
Facility Name: _____	Phone number: _____

Step 3. Biosolids Generator Questionnaire

Introduction to the Questionnaire

The Biosolids Generator Questionnaire is designed to acquire information about the dates of recent biosolids application events, the sources of biosolids, characteristics of the wastewater and sludge, methods of biosolids preparation, generation, treatment, quality testing, storage, and management. The questionnaire should be administered as a telephone questionnaire to personnel at biosolids-generating facilities, such as municipal wastewater treatment plants (WWTPs) and publicly owned treatment works (POTWs).

A separate Biosolids Generator Questionnaire should be filled out for each biosolids-generating facility that is approved to apply biosolids to fields within 1000, 1500 or 2000 feet of a concerned resident's home. In the investigation reports and questionnaires, the distance is specified at 2000 feet. The investigator may adjust this distance to less than 2000 feet according to local conditions. If no generating facilities are found to have land applied biosolids within 2000 feet, the investigation may be expanded if there is a perceived possibility of exposure. The investigator should refer to the Site Identification and Source Report for certain information that will be requested in the questionnaire. Some states and localities permit biosolids land application sites per field whereas others permit biosolids land application sites per farm. The investigator should refer to the Site Identification and Source Report and cross-reference what sites are permitted as a field versus those that are permitted as a farm with multiple fields.

This questionnaire is based on Title 40 of the Code of Federal Regulations [CFR] Part 503, *The Standards for the Use or Disposal of Sewage Sludge* which was published in the Federal Register (58 FR 9248 to 9404) on February 19, 1993 and became effective on March 22, 1993. Any mention of the regulation in this document will be referred to as "the Part 503 rule."

BIOSOLIDS GENERATOR QUESTIONNAIRE

INVESTIGATOR NAME _____	AGENCY _____
DATE (MM/DD/YY): ____/____/____	PHONE NUMBER: (____) ____ - ____
ID# OF CORRESPONDING HEALTH QUESTIONNAIRE: _____	
DATE OF CORRESPONDING HEALTH QUESTIONNAIRE (MM/DD/YY): ____/____/____	
DATE OF ONSET OF SYMPTOMS (HEALTH QUESTIONNAIRE # 9) (MM/DD/YY): ____/____/____	

BIOSOLIDS GENERATOR CONTACT INFORMATION

1. FACILITY NAME: *(Copy from Site Identification Report)* _____
2. FACILITY PHONE NUMBER: *(Copy from Site Identification Report)* (____) ____ - ____
3. FACILITY CONTACT FIRST NAME: _____ LAST NAME: _____
4. FACILITY CONTACT'S EMAIL: _____

DATES OF LAND APPLICATION

5. WERE BIOSOLIDS LAND APPLIED TO THE FOLLOWING FIELDS? *(Name all field numbers listed in association with this facility in the Site Identification and Source Report. If facility contact is not familiar with field numbers, ask about the general vicinity within 2000 feet of the residence, without naming residents or the location of the residence. Please adapt the questionnaire if there are multiple residences calling in a complaint.)*

1 No *(If No, skip to Site Follow-Up Report and consider possible evidence of unreported land application.)*

2 Yes



6. (IF YES) PLEASE LIST THE FIELD/SITE ID# AND DATES OF LAND APPLICATION WITHIN THE LAST 30 DAYS PRIOR TO DATE OF ONSET OF THE RESIDENT'S SYMPTOMS—(SEE HEALTH QUESTIONNAIRE) FOR EACH FIELD/SITE ID#: *(If facility contact is not familiar with field numbers ask about the dates of application in the general vicinity within 2000 feet of the residence, without naming the resident(s) or the location of residence.)*

Land Application Permit #: *(Copy from Site Identification and Source Report)* _____

Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field ID#: _____	Date(s) of Application (mm/dd/yy): _____

SLUDGE/BIOSOLIDS SOURCE INFORMATION

7. WHAT IS THE SOURCE OF THE WASTEWATER? *(check all that apply)*

- 1 Domestic wastewater only
- 2 Primarily domestic wastewater
- 3 Mixture of domestic and industrial wastewater
- 4 Primarily industrial wastewater
- 5 Industrial wastewater
- 6 Other _____

8. (IF THERE IS AN INDUSTRIAL WASTEWATER CONTRIBUTION) WHAT ARE THE MAJOR INDUSTRIES? *(please specify)*

9. WHAT IS THE SOURCE OF THE BIOSOLIDS? *(check all that apply)*

- 1 Primary sludge
- 2 Secondary sludge
- 3 Septage (as a separate stream only, excludes septage blended with raw wastewater)
- 4 Other _____

SLUDGE/BIOSOLIDS TREATMENT INFORMATION

10. WHERE IS THE LOCATION OF YOUR SLUDGE TREATMENT PROCESS?

- 1 At the source wastewater treatment plant only
- 2 Off-site only
- 3 At the source wastewater treatment plant, then further treatment off-site
- 4 Other _____

11. WHAT PROCESS(ES) DO YOU USE TO TREAT SEWAGE SLUDGE? *(check all that apply)*

- 1 Thickening
- 2 Centrifugal dewatering
- 3 Filter presses and other non-centrifugal dewatering
- 4 Chemical treatment:
 - 5 pH adjustment (other than with lime)
 - 6 coagulation with organic polymer(s)
 - 7 coagulation with ferric chloride
 - 8 coagulation with alum
 - 9 blending with lime, but not for alkaline stabilization
- 10 Alkaline stabilization:
 - 11 With lime
 - 12 With cement-kiln dust
 - 13 With other similar material *(please specify)*
- 14 Anaerobic digestion:
 - 15 Mesophilic
 - 16 Thermophilic
- 17 Aerobic digestion
 - 18 Mesophilic
 - 19 Thermophilic
- 20 Composting

- 21 Thermal treatment:
 - 22 Wet-air oxidation
 - 23 Pasteurization
 - 24 Drying
- 25 Other _____

12. WHAT TYPE OF POLYMER(S) (IF ANY) DO YOU USE TO TREAT THE BIOSOLIDS?

13. HOW ARE VECTOR CONTROL REQUIREMENTS SATISFIED?

14. PLEASE DESCRIBE THE TYPE OF BIOSOLIDS THAT YOU GENERATE TO BE LAND APPLIED: *(check all that apply)*

- 1 Exceptional quality (EQ) biosolids
- 2 Cumulative pollutant loading rate (CPLR) biosolids
- 3 Pollutant concentration (PC) biosolids
- 4 Class A biosolids
- 5 Class B biosolids
- 6 Other _____

BIOSOLIDS STORAGE INFORMATION

15. DO YOU STORE BIOSOLIDS?

- 1 No (Skip to 20)
- 2 Yes



16. IN THE 6 MONTHS PRIOR TO (MM/DD/YY): / / HOW WERE YOU STORING BIOSOLIDS? *(PROMPT: Fill in the date of first onset of symptoms as recorded in the health questionnaire. Check all that apply)*

- 1 In a container *(please specify type):* _____
- 2 Surface impoundment *(please specify where):* _____
- 3 Other: _____

17. IN THE 6 MONTHS PRIOR TO (MM/DD/YY): / / WHERE WERE YOU STORING BIOSOLIDS? *(PROMPT: Fill in the date of first onset of symptoms as recorded in the health questionnaire. Check all that apply)? (check all that apply)*

- 1 Onsite
- 2 Off-site *(please specify where):* _____
- 3 Biosolids land application site *(please specify where):* _____
- 4 Other _____

18. IN THE 6 MONTHS PRIOR TO (MM/DD/YY): / / HOW LONG WERE THE BIOSOLIDS STORED? (PROMPT: Fill in the date of first onset of symptoms as recorded in the health questionnaire. Check all that apply)

- 1 1 day or less
- 2 2 to 3 days
- 3 4 to 5 days
- 4 6 to 7 days
- 5 More than 1 week but less than 1 month
- 6 1 month or more but less than 6 months
- 7 6 months or more but less than 1 year
- 8 1 year or more but less than 2 years
- 9 2 or more years
- 10 Other _____
- 11 Don't know

19. WHAT IS THE MAXIMUM STORAGE TIME OF BIOSOLIDS IN DAYS?

_____ days

BIOSOLIDS ODOR INFORMATION

20. IN THE 6 MONTHS PRIOR TO (MM/DD/YY): / / DID THE BIOSOLIDS YOU GENERATED PRODUCE ANY OF THE FOLLOWING STRONG ODORS? (PROMPT: Fill in the date of onset of first symptoms as recorded in the Health Questionnaire. Place a check mark next to any that the respondent answers "Yes" to. Specify dates of strong odors using the MM/DD/YY format.)

- 1 Rotten, rotting fish (If yes please specify dates) _____
- 2 Rotten eggs/rotten cabbage (If yes please specify dates) _____
- 3 Rancid or pungent meat (If yes please specify dates) _____
- 4 Solvents (If yes please specify dates) _____
- 5 Fecal matter (If yes please specify dates) _____
- 6 Other (Please specify) _____

BIOSOLIDS MONITORING INFORMATION

21. ARE THE BIOSOLIDS MONITORING RECORDS AVAILABLE FOR INSPECTION?

- 1 No (Skip to 23)
- 2 Yes



22. (IF YES) HOW WOULD WE ATTAIN ACCESS TO THESE RECORDS? (please specify)

23. ARE THE BIOSOLIDS MONITORED FOR ANY OF THE FOLLOWING? (check all that apply)

- 1 Specific pathogenic microorganisms (e.g., enteric viruses, *Salmonella* spp., helminthes, *Cryptosporidium*)
- 2 Indicator organisms, such as total coliforms, fecal coliforms, *E. coli* or coliphages
- 3 Metals (If Yes, please specify) _____
- 4 Organic compounds (If Yes, please specify) _____
- 5 pH
- 6 Temperature
- 7 Total ammonia-nitrogen
- 8 Odor
- 9 Sulfur compounds (e.g., hydrogen sulfide and/or organosulfur compounds)
- 10 Vector attraction reduction
- 11 Other (specify)

24. HOW FREQUENTLY ARE THE BIOSOLIDS MONITORED FOR ANY OF THE POLLUTANTS, PATHOGEN DENSITIES AND VECTOR ATTRACTION REDUCTION? (check all that apply)

- 1 Once per year
- 2 Once per quarter (4 times per year)
- 3 Once per 60 days (6 times per year)
- 4 Once per month (12 times per year)
- 5 Other (please specify) _____
- 6 Don't know

25. WHAT IS THE NITROGEN CONTENT OF THE BIOSOLIDS (e.g., TOTAL OR AVAILABLE NITROGEN, TKN, ORGANIC N, NH4)?

BIOSOLIDS LAND APPLICATION INFORMATION

26. AS THE GENERATOR (e.g., WWTP, POTW) DOES YOUR FACILITY LAND-APPLY BIOSOLIDS?

- 1 No (Skip to 28)
- 2 Yes



27. WHAT CONTRACTOR(S) DO YOU USE TO LAND APPLY BIOSOLIDS? (please specify)

CHANGES TO BIOSOLIDS MANAGEMENT PROCESSES

28. HAVE ANY OF THE FOLLOWING MANAGEMENT PROCESSES CHANGED IN THE 6 MONTHS PRIOR TO (MM/DD/YY): / / ? (PROMPT: Fill in the date of onset of symptoms as recorded in the health questionnaire. Place a check mark next to any that apply.)

- 1 Source of the wastewater (If yes please specify how) _____
- 2 Biosolids treatment method(s) (If yes please specify how) _____
- 3 Biosolids storage method(s) (If yes please specify how) _____
- 4 Biosolids land application method(s) (If yes please specify how) _____
- 5 Biosolids monitoring method(s) (If yes please specify how) _____
- 6 Other (Please specify) _____

29. FOR EACH MANAGEMENT PROCESS THAT WAS CHANGED WHEN WAS THE PROCESS CHANGED? (PROMPT: For each management process that was checked in the list above record the date it was changed)

Management process: _____
Date changed (MM/DD/YY): / /

Step 4. Biosolids Applier Questionnaire

Introduction to the Questionnaire

The Biosolids Applier Questionnaire is designed to acquire information about the dates of biosolids land application events 30 days prior to the first onset of symptoms as reported on the Health Questionnaire and the date of the most recent biosolids application event prior to the first onset of symptoms as reported on the Health Questionnaire. The questions cover the dates of biosolids land application, management process, hauling, land application methods, land application amounts, land application rates, and weather conditions during land application. The questionnaire should be administered as a telephone questionnaire to personnel at biosolids-generating facilities, such as municipal wastewater treatment plants (WWTPs) and publicly owned treatment works (POTWs), as well as private biosolids contractors that prepare, generate, haul, and/or land apply biosolids.

A separate Biosolids Applier Questionnaire should be filled out for each biosolids-generating facility that is approved to apply biosolids to fields/sites within 1000, 1500 or 2000 feet of a concerned resident's home. Distance should reflect local conditions. In the investigation reports and questionnaires, the distance is specified at 2000 feet. The investigator may adjust this distance to less than 2000 feet according to local conditions. If there are no application sites within 2000 feet, the investigation may be expanded if there is a perceived possibility of exposure. The investigator should refer to the Site Identification and Source Report for certain information that will be requested in the questionnaire.

This questionnaire is based on Title 40 of the Code of Federal Regulations [CFR] Part 503, *The Standards for the Use or Disposal of Sewage Sludge* which was published in the Federal Register (58 FR 9248 to 9404) on February 19, 1993 and became effective on March 22, 1993. Any mention of the regulation in this document will be referred to as "the Part 503 rule."

BIOSOLIDS APPLIER QUESTIONNAIRE

INVESTIGATOR NAME _____ AGENCY _____
 DATE (MM/DD/YY): ____/____/____ PHONE NUMBER: (____) ____ - ____
 ID# OF CORRESPONDING HEALTH QUESTIONNAIRE: _____
 DATE OF CORRESPONDING HEALTH QUESTIONNAIRE (MM/DD/YY): ____/____/____
 DATE OF ONSET OF SYMPTOMS (HEALTH QUESTIONNAIRE # 9) (MM/DD/YY): ____/____/____

BIOSOLIDS APPLIER CONTACT INFORMATION

1. APPLIER NAME: *(Copy from Site Identification Report)* _____
2. APPLIER PHONE NUMBER: *(Copy from Site Identification Report)* (____) ____ - ____
3. APPLIER CONTACT FIRST NAME: _____ LAST NAME: _____
4. APPLIER CONTACT'S EMAIL: _____

DATES OF LAND APPLICATION

5. IN THE 30 DAYS PRIOR TO *(Date of onset of symptoms)* (MM/DD/YY): ____ / ____ / ____ WERE BIOSOLIDS LAND-APPLIED TO THE FOLLOWING FIELDS/SITES AT ANY TIME? *(INSTRUCTION: Fill in the date of first onset of symptoms as recorded in the health questionnaire. Name all field/site numbers listed in association with this facility in the Site Identification and Source Report. If facility contact is not familiar with field/site numbers, ask about the general vicinity within 2000 feet of the residence(s), without naming resident(s) or the location of residence(s).)*

- 1 No *(Skip to 7)*
 2 Yes
- ↓

6. (IF YES) PLEASE LIST THE FIELD/SITE ID #S AND DATES OF LAND APPLICATION WITHIN THE LAST YEAR FOR EACH FIELD/SITE: *(If facility contact is not familiar with field/site numbers ask about the dates of application in the general vicinity within n km of the residence(s), without naming the resident(s) or the location of residence(s).)*

Land Application Permit #: *(Copy from Site Identification and Source Report)* _____

Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____
Field/Site ID#: _____	Date(s) of Application (mm/dd/yy): _____

7. IN THE 30 DAYS PRIOR TO (*Date of onset of symptoms*) (MM/DD/YY): / / WERE BIOSOLIDS FIELD STORED AT THE FOLLOWING FIELDS/SITES AT ANY TIME? (*INSTRUCTION: Fill in the date of first onset of symptoms as recorded in the health questionnaire. Name all field/site numbers listed in association with this facility in the Site Identification and Source Report. If facility contact is not familiar with field/site numbers, ask about the general vicinity within 2000 feet of the residence(s), without naming resident(s) or the location of residence(s).*)

1 No (*Skip to Site Follow-Up Report and consider possible evidence of unreported land application and field storage.*)

2 Yes



8. (IF YES) PLEASE LIST THE FIELD/SITE ID #S AND DURATION OF FIELD STORAGE: (*If facility contact is not familiar with field/site numbers ask about the dates of application in the general vicinity within n km of the residence(s), without naming the resident(s) or the location of residence(s).*)

Land Application Permit #: (*Copy from Site Identification and Source Report*) _____

Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days
Field/Site ID#:	_____	Duration of Field Storage:	_____	days

PERMITTED BIOSOLIDS LAND APPLICATION FIELD INFORMATION

Note to investigator: Please make copies of the form below and complete and attach the information for each field/site ID number.

Field # _____

THE FOLLOWING QUESTIONS REFER TO THE PERIOD 30 DAYS PRIOR TO (MM/DD/YY): / / *(INSTRUCTIONS: Fill in the date of first onset of symptoms as recorded in the health questionnaire.)*

9. HOW MANY BIOSOLIDS LAND APPLICATION EVENTS OCCURRED AT THE PERMITTED FIELD?

10. WHAT AMOUNT OF BIOSOLIDS WAS LAND-APPLIED AT THE PERMITTED FIELD/SITE? *(PROMPT: Please specify amount and units, e.g., dry English tons per acre, dry metric tons per acre, total liquid gallons, or number of truck loads)*

Amount land applied: _____

11. WHAT WAS/WERE THE SOURCE(S) OF THE BIOSOLIDS? *(PROMPT: Please list all generator sources from which material was obtained for land application.)*

THE FOLLOWING QUESTIONS REFER TO THE MOST RECENT LAND APPLICATION EVENT PRIOR TO (MM/DD/YY): / / *(INSTRUCTIONS: Fill in the date of first onset of symptoms as recorded in the health questionnaire.)*

12. FOR THE MOST RECENT APPLICATION EVENT WHAT AMOUNT OF BIOSOLIDS WAS LAND-APPLIED TO THE PERMITTED FIELD/SITE? *(PROMPT: Please specify amount and units, e.g., dry English tons per acre, dry metric tons per acre, total liquid gallons, number of truck loads)*

Amount land-applied: _____

13. FOR THE MOST RECENT APPLICATION EVENT WHAT WAS THE BIOSOLIDS LAND-APPLICATION RATE AT THE PERMITTED FIELD/SITE? *(PROMPT: Please specify amount, time period and units: e.g., dry English tons per acre, dry metric tons per acre, total liquid gallons, number of truck loads AND per hour, day, week)*

14. FOR THE MOST RECENT APPLICATION EVENT WHAT WAS THE CONSISTENCY OF THE LAND-APPLIED BIOSOLIDS AT THE PERMITTED FIELD/SITE?

- 1 Liquid
- 2 Wet cake
- 3 Dry solid
- 4 Other _____

15. FOR THE MOST RECENT APPLICATION EVENT WHAT METHOD WAS USED TO LAND APPLY BIOSOLIDS AT THE PERMITTED FIELD/SITE? (*check all that apply*)

- 1 Slinger, e.g., side slinging
- 2 Spreader, e.g., cake spreading
- 3 Sub-surface injection
- 4 Surface incorporation, e.g., tilling (If yes, is the soil subsequently tilled? And if is tilled, what is the waiting period?) _____
- 5 Sprayer, e.g., liquid irrigation
- 6 Other _____

IF TILLING OR SURFACE INCORPORATION OF LAND-APPLIED BIOSOLIDS WAS PERFORMED PLEASE ANSWER QUESTIONS 16 & 17.

16. WHAT WAS THE WAITING PERIOD BEFORE TILLING? (*PROMPT: Please specify time period.*)

17. HOW QUICKLY WAS THE LAND-APPLIED BIOSOLIDS INCORPORATED INTO THE SOIL AFTER LAND-APPLICATION? (*PROMPT: Please specify time period.*) _____

WEATHER, BUFFER ZONE AND MISCELLANEOUS INFORMATION

THE FOLLOWING QUESTIONS REFER TO THE MOST RECENT LAND APPLICATION EVENT PRIOR TO (MM/DD/YY): / / (*PROMPT: Fill in the date of first onset of symptoms as recorded in the health questionnaire.*)

18. FOR THIS MOST RECENT APPLICATION EVENT WHAT WERE THE WEATHER CONDITIONS AT THE PERMITTED LAND APPLICATION FIELD/SITE? (*PROMPT: Please note if there was a sudden rain event, strong prevailing winds, high humidity, etc.*)

19. FOR THIS MOST RECENT APPLICATION EVENT WERE BIOSOLIDS LAND-APPLIED IN ANY BUFFER ZONES NEAR THE BIOSOLIDS LAND APPLICATION PERMITTED FIELD/SITE?

1 Yes (*if yes please specify*) _____

2 No

20. WERE ANY OF THE FOLLOWING WITHIN 500 FEET OF THE BUFFER ZONE? (*Check all that apply*)

- 1 Streams or brooks
- 2 Public or private water supply wells
- 3 Recreational facilities, such as playgrounds, ball fields, etc

21. DO YOU KNOW OF ANYTHING UNUSUAL THAT OCCURRED DURING THE MOST RECENT BIOSOLIDS LAND APPLICATION EVENT AT THE PERMITTED BIOSOLIDS LAND APPLICATION FIELD/SITE?

1 Yes (*if yes please specify*) _____

2 No

Step 5. Site Follow-Up Report

Introduction to the Report

The Site Follow-Up Report is used for evaluating the potential for off-site migration of materials from biosolids application sites. The report covers site features (e.g., distances to residences, surface waters, vegetative buffers), vectors (e.g., insects, pets), other exposures that could lead to health concerns (e.g., animal manures, pesticides, septic tanks), and visual inspection pertaining to migration of materials off-site (e.g., biosolids on the road ways, deposition of biosolids material from run-off following a heavy rain event). These questions should be answered during a site visit to the biosolids land application site and the resident's property. The questionnaire should be adapted (make multiple copies of the questionnaire and fill one out for each resident's property and each neighboring biosolids land application field) to be used in a situation where there are multiple residences near multiple permitted biosolids land application fields.

The person completing the site follow-up report should visit the biosolids land application field(s) within 1000, 1500 or 2000 feet of the residence(s) to gather information about the biosolids land application process and other possible exposure sources. Distance should reflect local conditions. In the investigation reports and questionnaires, the distance is specified at 2000 feet. The investigator may adjust this distance to less than 2000 feet according to local conditions. If there are no application sites within 2000 feet, the investigation may be expanded if there is a perceived possibility of exposure.

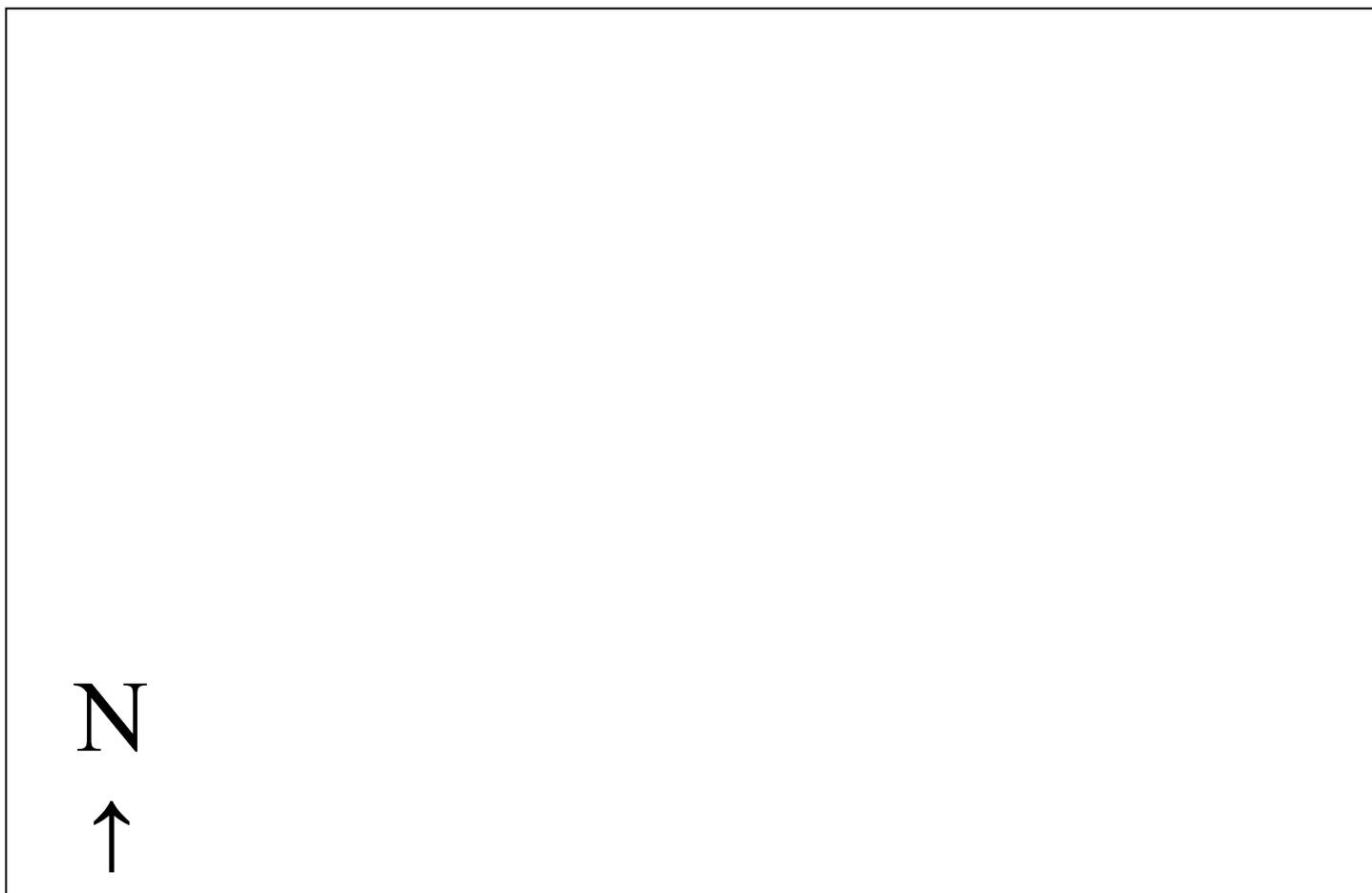
BIOSOLIDS LAND APPLICATION FIELD SITE MAP

INVESTIGATOR NAME _____	AGENCY _____
DATE (MM/DD/YY): ____/____/____	PHONE NUMBER: (____) ____ - ____
ID# OF CORRESPONDING HEALTH QUESTIONNAIRE: _____	
DATE OF CORRESPONDING HEALTH QUESTIONNAIRE (MM/DD/YY):	____/____/____
DATE OF ONSET OF SYMPTOMS (HEALTH QUESTIONNAIRE #9) (MM/DD/YY):	____/____/____

Note to the Investigator:

If the Site Identification and Source Report (Step 2) identified multiple permitted fields within 2000 feet of where a neighbor has reported a health concern, the investigator should adapt (repeat) this questionnaire for each permitted field in that area. If the Site Identification and Source Report (Step 2) identified multiple neighbors who reported a health concern 2000 feet of biosolids land application sites, the investigator should adapt (repeat) this questionnaire for each neighboring residence that reported a health complaint in that area.

1. PLEASE DRAW A MAP OF THE LOCATION OF THE PERMITTED BIOSOLIDS LAND APPLICATION FIELD/SITE WITHIN 2000 FEET OF THE RESIDENT'S PROPERTY. PLEASE DRAW THE LOCATION OF ANY WELLS, SEPTIC SYSTEMS, SEPTIC DRAINAGE FIELDS, ANIMAL CONFINEMENT AREAS (e.g., confined animal feeding operations, livestock grazing fields), AGRICULTURAL LAND USES (e.g., spreading of animal manure), AND ANY OTHER LANDSCAPE FEATURES (e.g., ponds, lakes, creeks, rivers, streams, wetlands, vegetative buffers, hills, mountains, buildings). *(Should be as close to scale as possible. Include legend. If there are multiple residences make sure that the site map reflects distances from each of the residences.)*



BIOSOLIDS LAND APPLICATION FIELD LOCATION INFORMATION

2. WHAT IS THE TOTAL ACREAGE OF THE PERMITTED BIOSOLIDS LAND APPLICATION FIELD?

3. IS THERE A BODY OF WATER (e.g., pond, lake, creek, drainage ditch, stream, river, wetlands, other) WITHIN 2000 FEET OF THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No (Skip to 5)
- 2 Yes



4. (IF YES) HOW FAR AWAY IS THE NEAREST BODY OF WATER FROM THE BIOSOLIDS LAND APPLICATION FIELD (e.g., pond, lake, creek, drainage ditch, stream, river, other)? (PROMPT: The person conducting the site survey should record the type of body of water and the distance. Body of water may include any of the following: pond, lake, creek, drainage ditch, stream, river, other).

Distance to nearest body of water (specify in feet or miles): _____

5. ARE THERE STEEP DECLINES OR INCLINES ON THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 Unable to determine
- 2 No (Skip to 7)
- 3 Yes



6. (IF YES) WHAT IS THE MAXIMUM SLOPE (DERIVED FROM TOPOGRAPHICAL MAPS)?

- 1 0-2%
- 2 3-6%
- 3 7-12%
- 4 Greater than 12%

7. IS THE RESIDENT'S PROPERTY WITHIN 2000 FEET OF THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No (Skip to 9)
- 2 Yes



8. (IF YES) WHAT IS THE DISTANCE BETWEEN THE RESIDENT'S PROPERTY AND THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 Less than 100 feet
- 2 100-249 feet
- 3 250-499 feet
- 4 500-999 feet
- 5 1000-1999 feet
- 6 2000 feet or greater

9. IS THERE A BUFFER BETWEEN THE BIOSOLIDS LAND APPLICATION FIELD AND THE RESIDENT'S PROPERTY?

- 1 No (Skip to 13)
- 2 Yes



10. (IF YES) WHAT TYPE OF BUFFER IS IT? *(Check all that apply)*

- 1 Grass
- 2 Crop *(please specify)* _____
- 3 Shrubs
- 4 Trees
- 5 Other _____

11. (IF YES) DOES IT APPEAR THAT BIOSOLIDS WERE LAND-APPLIED IN THE VEGETATIVE BUFFER ZONE SURROUNDING THE PERMITTED BIOSOLIDS LAND APPLICATION FIELD WITHIN 2000 FEET OF THE RESIDENT'S PROPERTY? *(Check one)*

- 1 No
- 2 Yes

12. (IF YES) DOES IT APPEAR THAT OTHER AGRICULTURAL SOIL AMENDMENTS *(e.g., animal manure or other non biosolids fertilizer)* WERE LAND-APPLIED IN THE VEGETATIVE BUFFER ZONE SURROUNDING THE PERMITTED BIOSOLIDS LAND APPLICATION FIELD WITHIN 2000 FEET OF THE RESIDENT'S PROPERTY? *(Check one)*

- 1 No
- 2 Yes

13. ARE THERE AREAS OF HUMAN ACTIVITY, E.G., A PLAYGROUND OR PICNIC SITE, NEAR THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No (Skip to 15)
- 2 Yes



14. (IF YES) WHAT IS THE DISTANCE BETWEEN THE BIOSOLIDS LAND APPLICATION FIELD AND THE AREA OF HUMAN ACTIVITY?

- 1 Less than 100 feet
- 2 100-249 feet
- 3 250-499 feet
- 4 500-999 feet
- 5 1000-1999 feet
- 6 2000 feet or greater

15. IS THERE A GARDEN (e.g., household vegetable, fruit, or herb garden designed for human consumption) NEAR THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No (Skip to 17)
- 2 Yes



16. (IF YES) WHAT IS THE DISTANCE BETWEEN THE BIOSOLIDS LAND APPLICATION FIELD AND THE GARDEN?

- 1 Less than 100 feet
- 2 100-249 feet
- 3 250-499 feet
- 4 500-999 feet
- 5 1000-1999 feet
- 6 2000 feet or greater

HOUSEHOLD CHARACTERISTICS

17. DOES THE RESIDENT'S PROPERTY HAVE A DOMESTIC WELL?

- 1 No (Skip to 26)
- 2 Yes



18. (IF YES) WHEN WAS THE WELL FIRST CONSTRUCTED (e.g., dug or drilled)?

DATE (MM/DD/YY): ____/____/____

19. WHAT TYPE OF WELL IS IT? (check one)

- 1 Dug well
- 2 Drilled well
- 3 Cistern well
- 4 Shallow well
- 5 Sandpoint well
- 6 Buried slab well
- 9 Other _____
- 10 Don't know

20. WHAT TYPE OF CASING/LINING DOES THE WELL HAVE? (check one)

- 1 Bricks/rocks/stones
- 2 Concrete or clay tile
- 3 Plastic
- 4 Steel
- 5 Wood
- 9 Other _____
- 10 Don't know

21. WHAT IS THE DEPTH OF THE CASING? (Please specify depth in feet) _____

22. WHAT IS THE DEPTH TO WATER? (Please specify depth in feet) _____

23. IS THE WELL EQUIPPED WITH A PUMP? (check one)

- 1 No
- 2 Yes

24. WHAT IS THE DISTANCE BETWEEN THE RESIDENT'S WELL AND THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 Less than 100 feet
- 2 100-249 feet
- 3 250-499 feet
- 4 500-999 feet
- 5 1000-1999 feet
- 6 2000 feet or greater

25. IS THE WELL DOWNHILL OF THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No
- 2 Yes

26. DOES THE RESIDENT HAVE A SEPTIC SYSTEM AND DRAINAGE FIELD?

- 1 No (Skip to 29)
- 2 Yes



27. (IF YES) WHAT IS THE DISTANCE BETWEEN THE RESIDENT'S WELL (*If the resident has a well*) AND THE RESIDENT'S SEPTIC SYSTEM AND DRAINAGE FIELD?

- 1 0-49 feet
- 2 50-99 feet.
- 3 100-199 feet
- 4 200-299 feet
- 5 300-399 feet
- 6 400-499 feet
- 7 500 feet or greater

28. (IF YES) IS THE SEPTIC SYSTEM OR DRAINAGE FIELD UPHILL FROM THE RESIDENT'S WELL?

- 1 No
- 2 Yes

VECTOR ATTRACTION INFORMATION

29. AT THE TIME OF YOUR VISIT, DO THERE APPEAR TO BE ANY UNUSUAL AMOUNTS OF VECTOR INSECTS OR ANIMAL(S) (*e.g. swarms of flies or birds*) ON THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No (Skip to 31)
- 2 Yes



30. (IF YES) WHAT TYPE(S) OF VECTOR INSECT(S) OR ANIMAL(S) (*e.g. swarms of flies or birds*) ARE PRESENT ON THE BIOSOLIDS LAND APPLICATION FIELD? (*check all that apply*)

- 1 Flies
- 2 Bird(s) (*please specify: e.g., raven, seagull*) _____
- 3 Other _____

USE OF OTHER AGRICULTURAL SOIL AMENDMENTS

31. ARE THERE **AGRICULTURAL FIELD(S)** WITHIN 2000 FEET OF THE RESIDENT'S PROPERTY WHERE OTHER AGRICULTURAL SOIL AMENDMENTS WERE LAND APPLIED AROUND THE SAME TIME AS BIOSOLIDS LAND APPLCATION EVENT(S)? (e.g., animal manure or other non biosolids fertilizer)?

- 1 No (Skip to 34)
- 2 Yes



32. (IF YES) WHAT TYPE(S) OF OTHER AGRICULTURAL SOIL AMENDMENT(S) (e.g., animal manure or other non biosolids fertilizer) WERE APPLIED ON **AGRICULTURAL FIELD(S)** WITHIN 500 FEET OF THE RESIDENT'S PROPERTY AROUND THE SAME TIME AS BIOSOLIDS LAND APPLCATION EVENT(S)? (check all that apply)

- 1 Cow manure
- 2 Chicken manure
- 3 Horse manure
- 4 Swine manure
- 5 Commercial fertilizer
- 6 Pesticides
- 7 Herbicides
- 8 Lime
- 9 Other (please specify) _____
- 10 Unknown

33. WAS THIS OTHER SOIL AMMENDMENT APPLIED TO:

- 1 a field where biosolids were applied
- 2 a field other than the field where biosolids were applied
- 3 a field where biosolids were applied *and* a field other than the field where biosolids were applied

BIOSOLIDS ODOR INFORMATION

34. DID YOU DETECT ANY UNUSUAL OUTSIDE ODORS NEAR THE RESIDENT'S PROPERTY? (CHECK ONE)

- 1 No (Skip to 36)
- 2 Yes



35. (IF YES) PLEASE DESCRIBE THE ODOR(S): (Please specify: e.g., fishy, rotten fish, rotten eggs, rotten cabbage, rancid or pungent meat, solvents, fecal matter)

36. (IF YES) WHAT IS THE LEVEL OF ODOR? (CHECK ONE)

- 1 Faint
- 2 Moderate
- 3 Strong

VISIBLE BIOSOLIDS OFF-SITE

37. IS THERE VISIBLE BIOSOLIDS MATERIAL DEPOSITED ON OR ALONG-SIDE THE ROAD(S) LEADING TO THE BIOSOLIDS LAND APPLICATION FIELD?

- 1 No
- 2 Yes

38. IS THERE CLEARLY VISIBLE BIOSOLIDS MATERIAL DEPOSITED ON THE BIOSOLIDS LAND APPLICATION FIELD?

1 No

2 Yes

39. PLEASE NOTE THE PRESENCE OF ANY OTHER BIOSOLIDS MATERIALS THAT APPEAR TO HAVE MIGRATED OFF-SITE IN AREAS WITHIN 2000 FEET OF THE BIOSOILDS LAND APPLICATION FIELD. (e.g., in buffer zones, on vegetation or fences, on the residential property of the resident, on cars)

(INSTRUCTIONS: The investigator should consult weather records to learn about weather conditions since the application event, if it seems important to the investigation. Use the space below to record findings from weather records)

40. PLEASE NOTE THE RESULTS OF SEARCHING WEATHER RECORDS SINCE THE APPLICATION EVENT RECORDED IN THE HEALTH QUESTIONNAIRE (MM/DD/YY): / / _____

-- End of Questionnaire --