A Protocol for the Surveillance and Investigation of the Concerns Reported by Neighbors of Land Application (Biosolids and Other Soil Amendments)

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This is a Public Partnering project. WERF initiated Public Partnering to involve both traditional and nontraditional stakeholders in projects that generate substantial public interest and where the outcome may contribute data and knowledge needed by decision makers. A team of experts in public participation, conflict resolution, and consensus-building helped WERF develop processes for involving non-traditional, diverse stakeholders in its research.

The Project Subcommittee (PSC) members were nominated by their peers and selected by consensus to represent diverse interests, expertise and perspectives on the subject of biosolids land application. Their role was to develop the request for proposals, review work products submitted by the research team, and offer constructive feedback for refining and improving the accuracy and usefulness of the final report for WERF subscribers and the public. As such, the PSC for this project played a more significant role in the development of this project than is the case for other WERF projects. This project (Phase 2) was the pilot testing phase which led to revisions of the draft protocol developed in Phase 1 (Stock No. 06HHE5PP) to reflect the reality of testing actual incident complaints before dissemination. The tool developed in this report is a rapid response surveillance and investigation protocol that is practical, easy to use, efficient, and effective on complaints of health symptoms or concerns from the land application of biosolids and/or other soil amendments that researchers have field tested and validated.

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TABLE OF CONTENTS

Acknowledgements ........................................................................................................................................ iii
1.0 Background and Purpose of the Protocol .......................................................................................1-1
2.0 How the Protocol Was Developed .................................................................................................2-1
3.0 Instructions for Using the Protocol ...............................................................................................3-1
4.0 Instructions for Interviewers .........................................................................................................4-1
5.0 Inter-Agency Coordination of Rapid Response Investigations .....................................................5-1
6.0 The Protocol (Questionnaires and Reports) ..................................................................................6-1
   Public Health Questionnaire ..............................................................................................................6-2
   Biosolids Applier Questionnaire .....................................................................................................6-17
   Biosolids Generator Questionnaire ..................................................................................................6-22
   Site Identification Report ...............................................................................................................6-31
   Site Follow-Up Report ................................................................................................ ....................6-32

LIST OF FIGURES

5-1 Coordination of End-User Agency Workflow to Implement Five-Step Protocol ........5-2
BACKGROUND AND PURPOSE OF THE PROTOCOL

This protocol is the culmination of direction given in 2002 by the National Research Council (NRC) and funded by the U.S. Environmental Protection Agency (U.S. EPA), as part of an 18-month study entitled *Biosolids Applied to Land: Advancing Standards and Practices*. The study made an overarching recommendation to “establish a framework for an approach to implement human health investigations” (NRC, 2002). As a response to that recommendation, the Water Environment Research Foundation (WERF) funded two projects, the first of which began in 2006, and is called Phase I.

Phase I developed a draft five-step rapid response investigation protocol to collect data on reports of health effects from neighbors of land application sites (WERF, 2007). This project (Phase II) field tested and refined the Phase I protocol. The final protocol includes a public health questionnaire to collect data on complaints of alleged health symptoms, nuisance odors, or quality of life effects from neighbors of sites where biosolids, manure, and other materials are land applied. The protocol also includes a generator questionnaire to characterize biosolids that were land applied and an appliers’ questionnaire to document methods of application. Additionally, two site investigation reports that can be used to locate, describe, and characterize the land application sites of concern are included. The purpose of this protocol is to:

- Function as a surveillance and rapid response investigation tool that is simple and easy to use with confidence by a broad base of end users who may not have public health or epidemiology backgrounds.
- Provide a valid, practical, feasible, and efficient and effective use of time for both the complainants and investigators.
- Accurately document reports of health symptoms or concerns, and identify one specific and defined land application of concern (the referent land application) related both temporally (the most recent) and spatially (the closest) to the complainant if there are multiple land applications of concern.
- Guide complainants to accurately describe the characteristics of this same referent land application.
- Guide the public health agency interviewer and the respondent to use this referent land application for every question in the health questionnaire and to guide the biosolids regulatory agency to use this referent land application for the remaining steps in the protocol.
- Use data collected from the use of the protocol to identify patterns and trends between land application of biosolids and health symptoms and concerns that could lead to the development of hypotheses for future etiologic studies of the potential relationship between environmental conditions, the land application of biosolids, and symptoms of illness.
CHAPTER 2.0

HOW THE PROTOCOL WAS DEVELOPED

Before the researchers field tested the protocol, an expert review panel (ERP) comprised of the principal investigators (PIs), a social scientist from Strategic Research Group (SRG), and three biosolids coordinators from the OEPA, completed a desktop review of the five steps of the Phase I draft protocol and generated the first revisions. From May 2009 to mid-November 2010, the research team used cognitive interview scripts and probes to evaluate 24 (73%) of the 33 interviews directly afterwards, to determine if any biases existed, either within the structure of this questionnaire or within the methods of administration by the interviewer. The researchers performed cognitive evaluations on 91% of version V1 interviews, 67% of V2 interviews, and 61.5% on V3 interviews. The investigative team refined questions using conventional evaluation methods such as interviewer debriefings, pre-testing, and cognitive interviews from three critical sections of the draft health questionnaire: 1) the open-ended questions in the “Description of Concern”, 2) the “Evidence of Land Application” questions, and 3) the closed-ended list of symptoms questions. Results of the questionnaire and a transcript of the cognitive interviews were entered into databases. The PI wrote a mission statement to help readjust the construct, or elements of information (Groves, et al., 2004) of the Phase I draft health questionnaire after field-testing. The research team used cognitive interview results, listened to the recordings of interviews, personally administered the health questionnaire, and solicited WERF Project Subcommittee (PSC) input throughout the process to analyze and refine the protocol, until researchers delivered the final protocol.

The PI contracted with the OEPA biosolids coordinator staff members who field-tested the applier and generator questionnaires on three of the four Ohio biosolids related complaints. Those staff had also completed the site investigation reports. Researchers engaged a ten member focus group of appliers, generators, and regulatory representatives at an April 2010 scheduled meeting of the OWEA Residuals Workgroup. They used a facilitated think-a-loud discussion technique to review each question, while researchers audio recorded the session (Groves et al., 2004; Willis, 1999) to re-evaluate the questionnaires.

In August 2010, researchers facilitated an interviewer debriefing session with the OEPA biosolids coordinator staff members who field-tested the questionnaires and site reports. They sought to identify any difficulties with the wording or the administration of the questions from the perspective of the interviewers and the respondents. In September 2010, the expert review panel created additional refinements to the applier and generator questionnaires and the two site investigation reports. The PSC thoroughly reviewed those in October 2010.
CHAPTER 3.0

INSTRUCTIONS FOR USING THE PROTOCOL

Future researchers should use the protocol (also included as Appendix L in Final Report, Stock No. 08HHE5PP) under a mutual agreement or a contractual partnership between a local or state public health agency and a state biosolids regulatory agency. As described in the Final Report under Section 3.6, Suggestions for Future Research, this is to ensure that all five steps are implemented in a coordinated method. The protocol contains these five steps:

- Public health questionnaire
- Generator questionnaire
- Applier questionnaire
- Site identification report
- Site follow-up report

Researchers designed the public health questionnaire for use by local or state public health agency staff that may or may not have an epidemiology background. State biosolids regulators should administer the four other steps. For cost effectiveness, the Phase I and Phase II research teams designed the applier, generator and public health questionnaires for use as a telephone interview using a paper survey form. This method could be enhanced to computer assisted telephone interviewing (Groves et al., 2004) if future researchers design and implement a web survey interface as suggested in Section 3.6, Suggestions for Future Research. Using that method, the interviewer could enter survey data directly onto a web-based survey form while interviewing. Or the interviewer could record data onto the paper form and enter it into the web-based survey later. The interviews can be administered face-to-face using a paper survey form.

Regulatory authority staff need to complete the site follow-up reports at the location of the land application site of concern. However, regulators could complete the site identification report using a file review. The regulator and the public health agency must be confident that the answers to the questions on the two site reports and the generator and applier questionnaires apply to the same site and the same land application of concern, as specified by the complainant in question A1 in the public health questionnaire, which will necessitate inter-agency coordination.
CHAPTER 4.0

INSTRUCTIONS FOR INTERVIEWERS

The applier, generator, and public health questionnaires contain “instructions for the interviewer,” which must be followed:

- Read through the questionnaire prior to administration to familiarize yourself with the instructions, definitions, questions, and skip patterns
- Ask every question specified in the questionnaire
- 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
- Go to next question unless a specific response tells you to skip to another question
- Do not assume answers
- Repeat the question as needed
- Have a calendar handy for helping the interviewee answer questions about dates
- Have a notepad and pencil available for taking notes during the interview
- Enter one response per question unless otherwise stated
- Do not read capitalized directions or responses

The interviewer will find instructions at every question in all capital letters and parentheses. Explanations of some of the instructions that appear in the questionnaire are as follows:

- OPEN-ENDED AND SPECIFY: Write out what the respondent says verbatim
- ONE CHOICE PER QUESTION unless otherwise indicated
- CHECK ALL THAT APPLY: Check all answer choices that the respondent names
- IF UNKNOWN, ASK FOR THEIR BEST ESTIMATE: These are for questions where the respondent may not know, but try to obtain their best guess
- RESPONSES IN CAPITALS: If the responses are capitalized, then do not read out the answer choices
- PROMPT: Are italicized. Give the respondent an opportunity to respond to the question, before reading what it is in the prompt

The interviewer will find inclusion/exclusion criteria and definitions for the purpose of the interview in the public health questionnaire that will assist in data collection.

4.1 Definitions for the Purpose of This Interview

- A “land application” includes the time period of the first date of delivery of biosolids or other soil amendments to one permitted farm field or land application site, to the date the applier left the same site and no additional land application event(s) took place.
♦ A **land application event** includes the process of delivering biosolids or other soil amendments to the site, stockpiling, and land applying, **all** of the delivered materials by various methods and equipment. One land application of concern could have multiple land application events, and could span over days or weeks of time.

♦ To **land apply** or **land applying** is the process of injecting into the ground, slinging, splashing, spreading or spraying onto the surface of the ground with or without incorporation, **all or portions** of the delivered materials by various methods and equipment.

♦ A **health concern** is a concern expressed with symptoms of an illness.

♦ An **environmental concern** is a concern about surface water or ground water that may be contaminated and affect public health or the health of ecosystems.

♦ If a subject expresses getting sick (vomiting, cramps, diarrhea) from drinking well water, that is a **“health concern”**.

### 4.2 Inclusion/Exclusion Instructions

♦ The public health questionnaire does not apply to odors from manure lagoons.

♦ The public health questionnaire should be administered within three days of complaint.

♦ If the land application of concern is manure or soil amendments other than biosolids, the applier and generator questionnaire, the site identification report, and the site follow-up report do not apply.

Researchers included instructions on how to probe for historical land applications of concern and how to determine the one, most recent and/or closest land application of concern if the complainant is concerned about multiple land applications from different time periods and locations:

1. Concern (e.g., odor, health, quality of life, environmental, food chain)
   a. If health concern, get as much detail concerning health issue as possible.

2. Historical context: **is this the first time there is a concern?** If **more than one** land applications of concern is involved (e.g., land applications in previous years and land applications this year on **same** site), or if there are multiple land applications in one year on the same site (e.g., quarterly, monthly), or if land applications of concern involve multiple sites in one year, or if sites change from year to year. Get as much detail as possible about how many, locations, and time period of land applications.

3. Identify the **one, most recent** and/or closest land application of concern for the purpose of the interview. **Record below:** 1) the first date of delivery of biosolids or other soil amendments to one permitted farm field or land application site, to the date the applier left the **same site** and no additional land application event(s) took place, 2) distance from home in feet, 3) direction, and 4) size of site (e.g., <100’, just west of home, 250 acres). Get best guess of **exact** month/day/year and best guess of distance in feet. (1 mile = 5280 feet, ¼ mile = 3690 feet, ½ mile = 2640 feet, ¼ mile = 1320 feet, 1/8 mile = 660 feet, 1/10 mile = 528 feet)
   a. If there are more than one land application of concern during the same time period in different locations (e.g., first week in March of this year on field A (1000’ away), and
first week in March of this year on field B (4000’ away)), choose the closest site to the caller’s home, field A.

b. If there are more than one land application of concern during different time periods and different locations (e.g., first week in March of this year on field C (1000’ away), and second week in March of this year on field D (2000’ away)), choose the most recent land application, field D.

c. If there are more than one land application of concern during different time periods and the same distance from the caller’s home (e.g., first week in March of this year on field A (1000’ away), and second week in March of this year on field C (1000’ away)), choose the most recent land application, field C.

Distance: ____________
Direction: (CIRCLE ALL THAT APPLY: N /S /E /W)
Size of site: ______
First day of delivery of biosolids (MM/DD/YY) (INTERVIEWER MUST GET BEST GUESS – ENTER 99/99/99 IF DON'T KNOW) ____/_____/_____
Day applier left the site (MM/DD/YY) (INTERVIEWER MUST GET BEST GUESS – ENTER 99/99/99 IF DON'T KNOW) _____/_____/

The Interviewer should not use the protocol without training on survey methods and interviewing techniques as described in Section 3.6, Suggestions for Future Research, or the quality of the data collected will be diminished and data entry, data management, and evaluation will be more difficult for project managers.

4.3 Inclusion/Exclusion Criteria

The researchers established inclusion criteria based upon the results from field-testing the public health questionnaire and discussions with the PSC. The research team and the PSC believed that although data on historical or ongoing complaints was important to capture, and will be captured by question A1 on the public health questionnaire, the complete protocol should only be used on recent complaints. Therefore researchers chose an inclusion period of less than or equal to 30 days. Other criteria follow:

♦ The protocol can be used on complaints of health effects, odor, quality of life concerns, concerns about the food chain, and environmental concerns such as contamination of drinking water or streams and rivers.
♦ The public health questionnaire was designed to be used on soil amendment complaints other than biosolids, such as manure from agriculture.
♦ The public health questionnaire does not apply to odors from manure lagoons, unless there is a land application of the manure and the odors or health effects are from the land application, not the lagoon.
♦ If the land application of concern is manure or soil amendments other than biosolids, complete the public health questionnaire only. **The remaining four steps of protocol (the site identification report, the site follow-up report, the applier and generator**
questionnaires) do not apply. Refer the complaint to the appropriate regulatory authority.

- If the last day of land application (see date from QA1) for the one, most recent and/or closest land application of concern is equal to or less than 30 days from the date of interview, or if the land application has not ended at the time of the interview, complete the interview, assign case identification number and refer to environmental regulatory agency partner to complete remaining four steps of protocol. Skip to section B.

- If the last day of land application (see date from QA1) for the one, most recent and/or closest land application of concern is greater than 30 days from the date of interview, inform complainant that the case will be referred to the appropriate regulatory agency for a compliance follow-up. Do not complete the remaining interview.
CHAPTER 5.0

INTER-AGENCY COORDINATION OF RAPID RESPONSE INVESTIGATIONS

The Phase I and Phase II research teams designed the protocol for future researchers to use all five steps on a biosolids complaint for each investigation. The success of the use of the protocol to meet or exceed the NRC recommendations will depend on the formation of a partnership and coordination between a local or state public health agencies and a state biosolids regulator. The figure on page 5-1 illustrates the end-user coordination of workflow necessary to implement the protocol. Future researchers should execute the individual steps of the protocol within the following timeframes to meet the rapid response objective:

♦ If a complaint is received by an agency or stakeholder other than the public health agency it should be referred to the public health agency the next business day
♦ The public health questionnaire should be administered within three days of the public health agency receiving the complaint
♦ The biosolids regulatory agency should investigate the complaint within three to five working days from when the complaint was registered

The accurate and efficient transfer of complaint contact information between coordinating partners will be key to the success of a rapid response investigation protocol. [ ] indicates a stage of coordination if a complaint is registered by a citizen into the public health agency, a stakeholder agency, or the biosolids regulatory agency:

♦ If complaint is registered to a biosolids regulatory agency, refer contact information to public health agency within one business day.
♦ If complaint is registered to a stakeholder agency, refer contact information to the biosolids regulatory agency or the public health agency within one business day.
♦ If complaint is registered to a public health agency, refer contact information to the biosolids regulatory agency within one business day.

The stage of coordination noted by [ ] will ensure that investigation using the five-step protocol proceeds only if site is permitted, that both agencies are targeting the same specific land application of concern, and that the same case ID is used for all steps of the protocol. During the stage noted by [ ], public health and regulatory agencies will be completing the five steps of the protocol and entering their data into the web-based survey form.
Investigation using 5-step protocol for biosolids land application BEGINS

Public health agency receives complaint

Stakeholder refers complaint to public health agency

Generator, applicator, or other stakeholder receives complaint

Stakeholder refers complaint to biosolids regulatory agency

Biosolids regulatory agency receives complaint

Public health agency assigns Case ID for tracking purposes

Public health agency administers public health questionnaire within three days of receiving complaint

Investigation using 5-step protocol for biosolids land application ENDS

Date of interview is > 30 days from last day of the land application of concern

Date of interview is < or = 30 days from last day of the land application of concern

Public health and biosolids regulatory agencies coordinate investigation to ensure that investigation using the five-step protocol proceeds only if site is permitted, that both agencies are targeting the same specific land application of concern, and that the same case ID is used for all steps of the protocol

Yes

Identified specific land application of concern is a permitted site

No

Biosolids regulatory agency assigns Case ID to four remaining steps of the protocol for tracking purposes

Biosolids regulatory agency completes four remaining steps of the protocol: site identification and source report and site follow up report within three to five working days of complaint, and interviews generator and applicator by phone or face-to-face and/or collects data from files

Public health agency completes public health questionnaire

Public health agency and biosolids regulatory agency enter data collected into web survey portal

Figure 5-1. Coordination of End-User Agency Workflow to Implement Five-Step Protocol.
CHAPTER 6.0

THE PROTOCOL

(Questionnaires and Reports)
PUBLIC HEALTH QUESTIONNAIRE TO INVESTIGATE CONCERNS FROM THE LAND APPLICATION OF BIOSOLIDS OR OTHER SOIL AMENDMENTS

DATE OF COMPLAINT (MM/DD/YY): _____/_____/_____

COMPLAINANT NAME ________________________________________________________________

COMPLAINANT PHONE NUMBERS: LAND LINE ______________________CELL __________________

COMPLAINANT ADDRESS: STREET___________________________________________________

CITY______________ BOROUGH ______________ TOWN(SHIP) _______________STATE_______

CASE IDENTIFICATION NUMBER _________________ ZIP_______________

DATE OF INTERVIEW (MM/DD/YY): _____/_____/_____

INTERVIEWER NAME ______________________________________________________________

TIME OF INTERVIEW ____:____ AM       PM

Instructions to the Interviewer

The interviewer will please:

- Read through the questionnaire prior to administration to familiarize yourself with the instructions, definitions, questions, and skip patterns
- Ask every question specified in the questionnaire
- 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
- Go to next question unless a specific response tells you to skip to another question
- Do not assume answers
- Repeat the question as needed
- Have a calendar handy for helping the interviewee answer questions about dates
- Enter one response per question unless otherwise stated
- Do not read capitalized directions or responses

Interviewer instructions are given at every question in all capital letters and parentheses.

Explanations of some of the instructions that appear in the questionnaire are as follows:

- OPEN-ENDED AND SPECIFY: Write out what the respondent says verbatim
- ONE CHOICE PER QUESTION unless otherwise indicated
- CHECK ALL THAT APPLY: Check all answer choices that the respondent names
- IF UNKNOWN, ASK FOR THEIR BEST ESTIMATE: These are for questions where the respondent may not know, but try to obtain their best guess
- RESPONSES IN CAPITALS: If the responses are capitalized, then do not read out the answer choices
- PROMPT: Are italicized. Give the respondent an opportunity to respond to the question, before reading what it is in the prompt
Definitions for the purpose of this interview:

- A “land application” includes the time period of the first date of delivery of biosolids or other soil amendments to one permitted farm field or land application site, to the date the applier left the same site and no additional land application event(s) took place.

- A “land application event” includes the process of delivering biosolids or other soil amendments to the site, stockpiling, and land applying, all of the delivered materials by various methods and equipment. One land application of concern could have multiple land application events, and could span over days or weeks of time.

- To “land apply” or “land applying” is the process of injecting into the ground, slinging, splashing, spreading or spraying onto the surface of the ground with or without incorporation, all or portions of the delivered materials by various methods and equipment.

- A “health concern” is a concern expressed with symptoms of an illness.

- An “environmental concern” is a concern about surface water or ground water that may be contaminated and affect public health or the health of ecosystems.

- If a subject expresses getting sick (vomiting, cramps, diarrhea) from drinking well water, that is a “health concern”.

Inclusion/exclusion instructions:

- The public health questionnaire does not apply to odors from manure lagoons.

- The public health questionnaire should be administered within 3 days of complaint.

- If the land application of concern is manure or soil amendments other than biosolids, the applier and generator questionnaire, the site identification report, and the site follow-up report do not apply.
A. DESCRIPTION OF CONCERN

A1. The first few questions are about the nature of your concern. Could you tell me the reason for your concern? (WRITE RESPONSE VERBATUM BELOW)

PROBE FOR:
1. CONCERN (ODOR, HEALTH, QUALITY OF LIFE, ENVIRONMENTAL, FOOD CHAIN)
   a. IF HEALTH CONCERN, GET AS MUCH DETAIL CONCERNING HEALTH ISSUE AS POSSIBLE.

2. HISTORICAL CONTEXT: IS THIS THE FIRST TIME THERE IS A CONCERN? IF MORE THAN ONE
   LAND APPLICATIONS OF CONCERN IS INVOLVED (E.G., LAND APPLICATIONS IN PREVIOUS
   YEARS AND LAND APPLICATIONS THIS YEAR ON SAME SITE), OR IF THERE ARE MULTIPLE
   LAND APPLICATIONS IN ONE YEAR ON THE SAME SITE (E.G., QUARTERLY, MONTHLY), OR IF
   LAND APPLICATIONS OF CONCERN INVOLVE MULTIPLE SITES IN ONE YEAR, OR IF SITES
   CHANGE FROM YEAR TO YEAR. GET AS MUCH DETAIL AS POSSIBLE ABOUT HOW MANY,
   LOCATIONS, AND TIME PERIOD OF LAND APPLICATIONS.

3. IDENTIFY THE ONE, MOST RECENT AND/OR CLOSEST LAND APPLICATION OF CONCERN
   FOR THE PURPOSE OF THE INTERVIEW. RECORD BELOW: 1) THE FIRST DATE OF
   DELIVERY OF BIOSOLIDS OR OTHER SOIL AMENDMENTS TO ONE PERMITTED FARM FIELD
   OR LAND APPLICATION SITE, TO THE DATE THE APPLIER LEFT THE SAME SITE AND NO
   ADDITIONAL LAND APPLICATION EVENT(S) TOOK PLACE, 2) DISTANCE FROM HOME IN
   FEET, 3) DIRECTION, AND 4) SIZE OF SITE (E.G., <100’, JUST WEST OF HOME, 250 ACRES),
   GET BEST GUESS OF EXACT MONTH/DAY/YEAR AND BEST GUESS OF DISTANCE IN FEET. (1
   MILE = 5280 FEET, ¾ MILE = 3690 FEET, ½ MILE = 2640 FEET, ¼ MILE = 1320 FEET, 1/8 MILE =
   660 FEET, 1/10 MILE = 528 FEET)
   a. IF THERE ARE MORE THAN ONE LAND APPLICATION OF CONCERN DURING THE
      SAME TIME PERIOD IN DIFFERENT LOCATIONS (E.G., FIRST WEEK IN MARCH OF
      THIS YEAR ON FIELD A (1000’ AWAY), AND FIRST WEEK IN MARCH OF THIS YEAR
      ON FIELD B (4000’ AWAY)), CHOOSE THE CLOSEST SITE TO THE CALLER’S
      HOME, FIELD A.
   b. IF THERE ARE MORE THAN ONE LAND APPLICATION OF CONCERN DURING
      DIFFERENT TIME PERIODS AND DIFFERENT LOCATIONS (E.G., FIRST WEEK IN
      MARCH OF THIS YEAR ON FIELD C (1000’ AWAY), AND SECOND WEEK IN MARCH
      OF THIS YEAR ON FIELD D (2000’ AWAY)), CHOOSE THE MOST RECENT LAND
      APPLICATION, FIELD D.
   c. IF THERE ARE MORE THAN ONE LAND APPLICATION OF CONCERN DURING
      DIFFERENT TIME PERIODS AND THE SAME DISTANCE FROM THE CALLER’S
      HOME (E.G., FIRST WEEK IN MARCH OF THIS YEAR ON FIELD A (1000’ AWAY),
      AND SECOND WEEK IN MARCH OF THIS YEAR ON FIELD C (1000’ AWAY)),
      CHOOSE THE MOST RECENT LAND APPLICATION, FIELD C.
A1. (CONTINUED)

DISTANCE: ___________

DIRECTION: (CIRCLE ALL THAT APPLY: N /S /E /W)

SIZE OF SITE: ______

FIRST DAY OF DELIVERY OF BIOSOLIDS (MM/DD/YY) (INTERVIEWER--MUST GET BEST GUESS. ENTER 99/99/99 IF DON'T KNOW)

_____ /_____ /_____

DAY APPLIER LEFT THE SITE (MM/DD/YY) (INTERVIEWER--MUST GET BEST GUESS. ENTER 99/99/99 IF DON'T KNOW)

_____ /_____ /_____ 

A1a. (INTERVIEWER--CHECK ALL THAT APPLY)

○ 1 HEALTH CONCERN

○ 2 ODOR CONCERN

○ 3 ENVIRONMENTAL CONCERN
  (e.g., drinking water, well water, and stream/ surface water pollution)

○ 4 QUALITY OF LIFE CONCERN

○ 5 GETTING INTO FOOD CHAIN FROM GRAIN OR LIVESTOCK

○ 8 OTHER_____________________

A2. Did you report your concerns to anyone?

○ 1 NO (SKIP TO SECTION B)

○ 2 YES

A2a. To whom? (WRITE RESPONSE)

_____________________________________________________________________

INSTRUCTIONS TO INTERVIEWER:

1. IF THE LAST DAY OF LAND APPLICATION (SEE DATE FROM A1) FOR THE ONE, MOST RECENT AND/OR CLOSEST LAND APPLICATION OF CONCERN IS EQUAL TO OR LESS THAN 30 DAYS FROM THE DATE OF INTERVIEW, OR IF THE LAND APPLICATION HAS NOT ENDED AT THE TIME OF THE INTERVIEW, COMPLETE THE INTERVIEW, ASSIGN CASE IDENTIFICATION NUMBER AND REFER TO ENVIRONMENTAL REGULATORY AGENCY PARTNER TO COMPLETE REMAINING 4 STEPS OF PROTOCOL. SKIP TO SECTION B.

2. IF THE LAST DAY OF LAND APPLICATION (SEE DATE FROM A1) FOR THE ONE, MOST RECENT AND/OR CLOSEST LAND APPLICATION OF CONCERN IS GREATER THAN 30 DAYS FROM THE DATE OF INTERVIEW, INFORM COMPLAINANT THAT THE CASE WILL BE REFERRED TO THE APPROPRIATE REGULATORY AGENCY FOR A COMPLIANCE FOLLOW-UP. DO NOT COMPLETE THE REMAINING INTERVIEW.
B. EVIDENCE OF LAND APPLICATION

Now, I want to ask you a few questions about the land application of concern. (IF NEEDED, REPEAT DESCRIPTION/LOCATION OF SITE FROM 1A)

Before we begin, do you have any questions about which site is the land application of concern that we will discussing in the following questions?

☐ 1 NO ☐ 2 YES (REVIEW DESCRIPTION OF SITE, PROCEED TO B1)

B1. As I read the list, please identify the material that was land applied on the land application of concern? Was it: (CHECK ALL THAT APPLY)

☐ 1 Manure ☐ 5 Compost
☐ 2 Biosolids or treated sewage sludge ☐ 8 OTHER_______________
☐ 3 Food residuals ☐ 9 DON'T KNOW
☐ 4 Septic tank waste

B2. What time of day was the material usually land applied (i.e., injecting into the ground, slinging, splashing, spreading or spraying onto the surface of the ground with or without incorporation) on the land application of concern? Was it: (CHECK ALL THAT APPLY. IF multiple LAND APPLICATION EVENTS, GET BEST GUESS BASED UPON THE TIME OF DAY MOST OF THE MATERIAL WAS LAND APPLIED)

☐ 1 Morning ☐ 4 Evening
☐ 2 Mid-day ☐ 5 Night
☐ 3 Afternoon ☐ 9 DON'T KNOW

B3. For the land application of concern, how many days total was the material being land applied (i.e., injecting into the ground, slinging, splashing, spreading or spraying onto the surface of the ground with or without incorporation)? Was it: (IF THERE WERE MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS OF THE AVERAGE NUMBER OF TOTAL DAYS NECESSARY TO LAND APPLY THE MATERIAL DELIVERED FROM ALL OF THE LAND APPLICATION EVENTS)

☐ 1 1-2 ☐ 5 15-21
☐ 2 3-5 ☐ 6 22-30
☐ 3 6-7 ☐ 7 >30
☐ 4 8-14 ☐ 9 DON'T KNOW
B4. For the land application of concern, how was the (REFER TO TYPE OF MATERIAL IN B1) being land applied? Was it: (CHECK ALL THAT APPLY)

- 1. Applied (spread or sprayed) on surface of ground (not tilled under)
- 2. Injected under the ground during application
- 3. Applied on surface of ground and tilled under at the same time of the application
- 4. Applied on surface of ground and tilled under following the application
- 8. OTHER___________________
- 9. DON'T KNOW

B5. For the land application of concern, was the material land applied the same day it was delivered to the site? (IF THERE WERE MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS BASED UPON WHETHER MOST OF THE INDIVIDUAL DELIVERIES OF MATERIAL WERE LAND APPLIED ON THE SAME DAY)

- 1. NO
- 2. YES (SKIP TO B6)
- 9. DON'T KNOW (SKIP TO B6)

B5a. How many days was a delivery of material piled up or stored (i.e., on the ground, in a bunker, or a bin) at the site before it began to be land applied? Was it: (IF MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS BASED UPON THE AVERAGE TIME A DELIVERY OF MATERIAL IS PILED UP OR STORED BEFORE THAT SAME DELIVERY OF MATERIAL BEGAN TO BE LAND APPLIED)

- 1. 1-2 (i.e., after the initial delivery)
- 2. 3-5
- 3. 6-7
- 4. 8-14
- 5. 15-21
- 6. 22-30
- 7. >30
- 9. DON'T KNOW

B5b. How many days was a delivery of material piled up or stored (i.e., on the ground, in a bunker, or a bin) at the site before it was completely land applied? Was it: (IF MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS BASED UPON THE AVERAGE TIME A DELIVERY OF MATERIAL IS PILED UP OR STORED BEFORE THAT SAME DELIVERY OF MATERIAL IS COMPLETELY LAND APPLIED)

- 1. 1-2 (i.e., after the initial delivery)
- 2. 3-5
- 3. 6-7
- 4. 8-14
- 5. 15-21
- 6. 22-30
- 7. >30
- 9. DON'T KNOW
B6. Please give us a detailed description or directions that could help somebody locate the site of the land application of concern, for example, a nearby road or landmark, behind a fence row, government permit #, GPS location, digital pictures, etc.? (WRITE RESPONSE)

B7. During the land application of concern, what was the weather like most of the time? Was it mostly: (CHECK ALL THAT APPLY. GET AVERAGE TEMPERATURE)

- Sunny/clear
- Cloudy
- Rainy
- Snowy
- Humid
- “Heavy” air
- Windy—From what direction? (CIRCLE ALL THAT APPLY: N /S /E /W)
- Average temperature________
- OTHER__________________________
- DON'T REMEMBER/DON'T KNOW

B8. For the land application of concern, did you notice any land application material near your home, on your property or on the roads near your home?

- NO (SKIP TO B9)
- YES
- DON'T KNOW (SKIP TO B9)

B8a. Where specifically did you notice the material?_________________________

B9. Since the land application of concern, did you notice more insects, rodents, or birds on or near your property than usual?

- NO (SKIP TO B10)
- YES
- DON'T KNOW (SKIP TO B10)

B9a. Please describe what you saw: (WRITE RESPONSE)

B10. For the land application of concern, what was the level of odor in your opinion? Was it: (CHECK ALL THAT APPLY)

- No odor (SKIP TO B11)
- Faint
- Moderate
- Strong
- Sickening
- DON'T KNOW (SKIP TO B11)
B10a. Please describe the odor. Did it smell like: (CHECK ALL THAT APPLY)

- 1 Rotten, rotting fish
- 2 Rotten eggs, rotten cabbage
- 3 Rancid or pungent meat
- 4 Solvents (paint thinner, etc.)
- 5 Animal fecal matter
- 6 Human fecal matter
- 7 Ammonia
- 8 OTHER_____________________

B10b. When did you first notice the odor? Was it: (CHECK ALL THAT APPLY)

- 1 After delivery of material to site but before application
- 2 During land application
- 3 After land application was completed
- 4 OTHER_________________________
- 5 DON'T KNOW

B10c. What day did you first notice the odor? (MUST GET BEST GUESS OF MONTH/DAY/YEAR)

_____ / _____ / _____ (MM/DD/YY) INTERVIEWER ENTER 99/99/99 IF DON'T KNOW

B10d. Is the odor still present today?

- 1 NO
- 2 YES
- 9 DON'T KNOW

B10e. During the land application of concern, did you:

- 1 Keep the windows open
- 2 Keep the windows open because of no AC
- 3 Keep the windows closed
- 4 Keep the windows closed because of AC
- 5 OTHER_________________________

B10f. Did you choose to alter your outdoor activities because of the presence of outside odors from the land application of concern?

- 1 NO (SKIP TO B11)
- 2 YES
- 9 DON'T KNOW (SKIP TO B11)

B10g. What did you change regarding your outside activities:
(WRITE RESPONSE)

_________________________________________________________
_________________________________________________________
**B11. From the land application of concern, did the material being land applied create any dust? (i.e., the dust was generated from the material NOT the soil or other field or farming operations)**

- 1. NO (SKIP TO SECTION C)  
- 2. YES  
- 9. DON'T KNOW (SKIP TO SECTION C)

**B11a. When did you see the dust? Was it: (CHECK ALL THAT APPLY)**

- 1. After delivery of material to site but before application  
- 2. During land application  
- 3. After land application was completed  
- 8. OTHER  
- 9. DON'T KNOW

**B11b. Did you breathe in any of the dust?**

- 1. NO  
- 2. YES  
- 9. DON'T KNOW
C. HOUSEHOLD INFORMATION

The next few questions are related to your household.

C1. How long have you lived at your current residence?

- 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
- 9 DON’T KNOW

C2. Do you feel your home or property value is decreased because of the land application of concern?

- 1 NO
- 2 YES
- 9 DON’T KNOW

C3. What is the source of your water at home? Is it:

- 1 Public water supply (SKIP TO C4)
- 2 Private water supply

C3a. What type of private water supply? (READ OUT. CHECK ONE)

- 1 Drilled well
- 2 Driven well
- 3 Dug well
- 4 Pond
- 5 Cistern
- 6 Hauled water (no cistern)
- 7 Spring
- 8 OTHER_________________________________________________ (SKIP TO C4)
- 9 DON’T KNOW (SKIP TO C4)

C3b. Do you drink your water?

- 1 NO
- 2 YES

C4. What is the source of your sewage treatment at home? Is it:

- 1 Public sewer system (SKIP TO D)
- 2 Private sewage treatment system (e.g., this can include septic tank and leach field, aeration system, septic tank only, sub-surface sand filter, evapo-transportation mound system, Wisconsin mound system, drip mound system, or other type of system on the property to treat and/or dispose of waste from the residence)
- 8 OTHER (SKIP TO D)
- 9 DON’T KNOW (SKIP TO D)
C4a. How old is your private sewage treatment system? Is it:

- ○ 1 Under 1 year
- ○ 2 1-2 years
- ○ 3 3-5 years
- ○ 4 6-10 years
- ○ 5 11-20 years
- ○ 6 21-30 years
- ○ 7 >30 years
- ○ 9 DON’T KNOW
D. PERSONAL HEALTH INFORMATION
ONLY ASK QUESTIONS D1-D4 IF PERSONAL HEALTH SYMPTOMS ARE MENTIONED IN A1

The next few questions are related to your personal health. Are you ready to begin?

D1. Have you experienced any of the following since the first day of delivery of biosolids for the land application of concern (FROM A1). Please answer “yes” or “no” to each symptom, even if you mentioned them earlier.

<table>
<thead>
<tr>
<th>SYMPTOM NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td>Sore, scratchy, burning throat</td>
<td></td>
</tr>
<tr>
<td>Burning nose</td>
<td></td>
</tr>
<tr>
<td>Nasal congestion</td>
<td></td>
</tr>
<tr>
<td>Shortness of breath</td>
<td></td>
</tr>
<tr>
<td>Coughing</td>
<td></td>
</tr>
<tr>
<td>Wheezing</td>
<td></td>
</tr>
<tr>
<td>Asthma attack(s)</td>
<td></td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td></td>
</tr>
<tr>
<td>Abdominal cramping/Diarrhea</td>
<td></td>
</tr>
<tr>
<td>Skin rash or irritation</td>
<td></td>
</tr>
<tr>
<td>Burning, tearing, irritated eyes</td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td></td>
</tr>
<tr>
<td>Other symptoms not mentioned:</td>
<td></td>
</tr>
<tr>
<td>Other symptoms not mentioned:</td>
<td></td>
</tr>
<tr>
<td>Other symptoms not mentioned:</td>
<td></td>
</tr>
</tbody>
</table>

D2. Have you visited a healthcare provider (e.g., doctor, nurse, alternative medicine, acupuncture, etc.) for any of these symptoms?

- [ ] 1 NO (SKIP TO D4)
- [ ] 2 YES

D3. When did you first visit your healthcare provider?
(MUST GET BEST GUESS OF MONTH/DAY/YEAR)

(MM/DD/YY): _____/_____/_____ INTERVIEWER ENTER 999999 IF DON'T KNOW
D4. Has a Doctor or other healthcare provider ever told you that you currently have any of the following illnesses? Please answer “yes” or “no” to each illness.

<table>
<thead>
<tr>
<th>ILLNESS</th>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disorders in the Immune System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardio Vascular Disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic Bronchitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food allergies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pet allergies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hay fever/ pollen allergies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin allergies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
E. DEMOGRAPHIC INFORMATION

Next, I will ask a few questions about you. These questions are only used for statistical purposes and will only be reported as group totals.

E1. In what age group do you belong? Just stop me when I get to the correct range.

   ○ 0  Less than 18 (ENTER AGE)______  ○ 4  45-54
   ○ 1  18-24
   ○ 2  25-34
   ○ 3  35-44  ○ 5  55-64
   ○ 6  65+  ○ 9  REFUSED

E2. Do you consider yourself to be: (CHECK ALL THAT APPLY)

   ○ 1  White or Caucasian  ○ 6  Mixed
   ○ 2  Black or African American  ○ 8  OTHER:_________________
   ○ 3  American Indian or Alaska Native  ○ 9  REFUSED
   ○ 4  Asian
   ○ 5  Native Hawaiian or other Pacific Islander

E3. Are you of Hispanic, Latino, Latina or Spanish origin?

   ○ 1  NO  ○ 2  YES  ○ 9  REFUSED

E4. What is the highest level of education you have completed? 
If currently enrolled, select the previous grade or highest degree received.

   ○ 1  Middle School or below only  ○ 7  Some Graduate work
   ○ 2  Some High School, but did not finish  ○ 8  Masters or Professional Degree
   ○ 3  High School Graduate  ○ 9  Doctorate
   ○ 4  Some College, but did not finish  ○ 99 REFUSED
   ○ 5  College Graduate
   ○ 6  Trade/Technical/Vocational training
E5. What is your income before taxes? Just stop me when I get to the correct range. . .

○ 1 Less than $10,000
○ 2 $10,000 - $19,999
○ 3 $20,000 - $29,999
○ 4 $30,000 - $39,999
○ 5 $40,000 - $49,999
○ 6 $50,000 - $74,999
○ 7 $75,000 - $99,999
○ 8 $100,000 - $124,999
○ 9 $125,000 - $149,999
○ 10 Over $150,000
○ 99 REFUSED

E6. What is your gender? (ONLY ASK IF THERE IS UNCERTAINTY ABOUT THE CALLER’S GENDER. OTHERWISE SILENTLY RECORD)

○ 1 MALE
○ 2 FEMALE
○ 5 DON’T KNOW/REFUSED

F. CLOSING

Thank you very much for reporting your concern and answering these questions that will help us better understand what you and others like you may be experiencing.
BIOSOLIDS APPLIER QUESTIONNAIRE

INVESTIGATOR NAME _________________________ AGENCY __________________________

DATE (MM/DD/YY): ___/___/____ PHONE NUMBER: ( ______ ) ______ - ________

ID# OF CORRESPONDING PUBLIC HEALTH QUESTIONNAIRE: _______________________

SITE ID# OF LAND APPLICATION OF CONCERN: ________________________________

BIOSOLIDS APPLIER CONTACT INFORMATION

1. APPLIER NAME: ___________________________________
2. APPLIER PHONE NUMBER: ( _______ ) _________ - ___________
3. APPLIER CONTACT FIRST NAME: ____________________ LAST NAME: ________________
4. APPLIER CONTACT’S EMAIL: ___________________________________________________

Instructions to the Interviewer

The interviewer will please:

◆ Read through the questionnaire prior to administration to familiarize yourself with the instructions, definitions, questions, and skip patterns
◆ Ask every question specified in the questionnaire
◆ 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
◆ Go to next question unless a specific response tells you to skip to another question
◆ Do not assume answers
◆ Repeat the question as needed
◆ Have a calendar handy for helping the interviewee answer questions about dates
◆ Enter one response per question unless otherwise stated
◆ Do not read capitalized directions or responses

Interviewer instructions are given at every question in all capital letters and parentheses. Explanations of some of the instructions that appear in the questionnaire are as follows:

◆ OPEN-ENDED AND SPECIFY: Write out what the respondent says verbatim
◆ ONE CHOICE PER QUESTION unless otherwise indicated
◆ CHECK ALL THAT APPLY: Check all answer choices that the respondent names
◆ IF UNKNOWN, ASK FOR THEIR BEST ESTIMATE: These are for questions where the respondent may not know, but try to obtain their best guess
◆ RESPONSES IN CAPITALS: If the responses are capitalized, then do not read out the answer choices
◆ PROMPT: Are italicized. Give the respondent an opportunity to respond to the question, before reading what it is in the prompt
Definitions for the purpose of this interview:

♦ A “land application” includes the time period of the first date of delivery of biosolids or other soil amendments to one permitted farm field or land application site, to the date the applier left the same site and no additional land application event(s) took place.

♦ A “land application event” includes the process of delivering biosolids or other soil amendments to the site, stockpiling, and land applying, all of the delivered materials by various methods and equipment. One land application of concern could have multiple land application events, and could span over days or weeks of time.

♦ To “land apply” is the process of injecting into the ground, slinging, splashing, spreading or spraying onto the surface of the ground with or without incorporation, all or portions of the delivered materials by various methods and equipment.

A. DATES OF LAND APPLICATION

INTERVIEWER – MAKE SURE THE ANSWERS TO THESE QUESTIONS APPLY TO THE SAME SITE AND THE SAME LAND APPLICATION OF CONCERN, AS SPECIFIED BY THE COMPLAINTANT IN THE PUBLIC HEALTH QUESTIONNAIRE. THE APPLIER MAY HAVE A MORE ACCURATE BEGINNING AND END DATE THAN THE COMPLAINANT.

A1. What is the beginning and end date of the land application for this field/site (MM/DD/YY)? (SEE DEFINITION OF “LAND APPLICATION”)

FIRST DAY OF DELIVERY OF BIOSOLIDS (MM/DD/YY) (INTERVIEWER–MUST GET BEST GUESS. ENTER 99/99/99 IF DON’T KNOW)

_____ / _____ / _____

DAY APPLIER LEFT THE SITE (MM/DD/YY) (INTERVIEWER–MUST GET BEST GUESS. ENTER 99/99/99 IF DON’T KNOW)

_____ / _____ / _____

A1a. Specify how many days total was the material being land applied (i.e., injecting into the ground, slinging, splashing, spreading, or spraying onto the surface of the ground with or without incorporation)? (IF THERE WERE MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS OF THE AVERAGE NUMBER OF TOTAL DAYS NECESSARY TO LAND APPLY THE MATERIAL DELIVERED FROM ALL OF THE LAND APPLICATION EVENTS)

___________ Days
B. GENERATOR SOURCES, AMOUNT, STORAGE, AND RATES OF LAND APPLICATION

B1. List generator source(s) from which (the applier) obtained material for this land application? (IF MORE THAN ONE GENERATOR SOURCE, REPEAT QUESTIONNAIRE FOR EACH GENERATOR SOURCE)

___________________________________________________________________________

B2. Specify the total amount and unit (from the source in B1) that were land applied at the field/site? (PLEASE SPECIFY AMOUNTS AND UNITS, E.G., DRY ENGLISH TONS, DRY METRIC TONS, TOTAL LIQUID GALLONS, OR NUMBER OF TRUCK LOADS)

____________________________________________________________________________

B3. Specify how many days was a delivery of material (from the source in B1) piled up or stored (i.e., on the ground, in a bunker, or a bin) at the site before it began to be land applied? (IF MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS BASED UPON THE AVERAGE TIME A DELIVERY OF MATERIAL IS PILED UP OR STORED BEFORE THAT SAME DELIVERY OF MATERIAL BEGAN TO BE LAND APPLIED)

___________ Days

B3a. Specify how many days was a delivery of material (from the source in B1) piled up or stored (i.e., on the ground, in a bunker, or a bin) at the site before it was completely land applied? (IF MULTIPLE LAND APPLICATION EVENTS, GET BEST GUESS BASED UPON THE AVERAGE TIME A DELIVERY OF MATERIAL IS PILED UP OR STORED BEFORE THAT SAME DELIVERY OF MATERIAL IS COMPLETELY LAND APPLIED)

___________ Days

B4. Specify how many acres were land applied at the field/site with materials (from the source in B1)?

___________ Acres

B5. Specify the biosolids land application rate at the field/site for materials (from the source in B1)? (PLEASE SPECIFY AMOUNT, UNITS, AND TIME PERIOD, E.G., DRY ENGLISH TONS, DRY METRIC TONS, TOTAL LIQUID GALLONS, NUMBER OF TRUCK LOADS AND PER HOUR, DAY, WEEK)

___________ Amount ___________ Units ___________ Time Period
C. CONSISTENCY AND METHODS OF LAND APPLICATION

C1. Specify the consistency of the land-applied biosolids (from the source in B1) at the field/site from the following list? Was it:

- Liquid
- Cake
- Dry Pellet
- Compost
- OTHER ______________________

C2. Specify what method was used to land apply biosolids (from the source in B1) at the field/site from the following list? (CHECK ALL THAT APPLY)

- Slinger (e.g., slide slinging)
- Spreader (e.g., cake spreading)
- Splasher
- Sub-surface injection (SKIP TO D1)
- Sprayer (e.g., liquid irrigation) (SKIP TO D1)
- OTHER ______________________

C3. Was the material (from the source in B1) left on the surface of the ground or incorporated?

- LEFT ON THE SURFACE (SKIP TO D1)
- INCORPORATED

C4. Specify how quickly (days, hours) was it tilled in or incorporated after the biosolids were placed onto the surface of the ground?

______________ Days ____________ Hours

C5. How deeply was it tilled in or incorporated? (PLEASE SPECIFY IN INCHES)

______________ Inches
D. WEATHER AND MISCELLANEOUS INFORMATION

D1. Were there any significant weather events during this land application? Such as: (CHECK ALL THAT APPLY)

- 1. Heavy rains
- 2. Temperature inversions
- 3. High humidity
- 4. High (very hot) temperatures
- 5. Strong prevailing winds
- 6. Low, freezing temperatures
- 7. Heavy snow, sleet or freezing rain
- 8. Barometric pressure drops
- 88. OTHER ______________________
- 99. DON'T KNOW

D2. Did the biosolids have any odor during the land application?

- 1. NO (SKIP TO D4)
- 2. YES

D3. Please describe the odor. Did it smell like: (CHECK ALL THAT APPLY)

- 1. Rotten, rotting fish
- 2. Rotten eggs, rotten cabbage
- 3. Rancid or pungent meat
- 4. Solvents
- 5. Human fecal matter
- 6. Ammonia
- 8. OTHER ______________________

D4. Do you know of anything unusual that occurred during this biosolids land application at field/site? (e.g., biosolids in contact with pets or people in neighborhood, ponding of water on top of ground, problem with equipment, extreme weather, confrontation by neighbor, biosolids running off site, etc.)

- 1. YES (PLEASE SPECIFY) ________________________________
- 2. NO
BIOSOLIDS GENERATOR QUESTIONNAIRE

INVESTIGATOR NAME __________________________________________________________

AGENCY __________________________________ DATE (MM/DD/YY): ___/___/____

PHONE NUMBER: ( ________ ) ________ - ________

ID# OF CORRESPONDING PUBLIC HEALTH QUESTIONNAIRE: ________________

SITE ID# OF LAND APPLICATION OF CONCERN __________________

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♦ Read each question slowly
♦ Ask the questions in the order in which they are presented in the questionnaire
♦ Go to next question unless a specific response tells you to skip to another question
♦ Do not assume answers
♦ Repeat the question as needed
♦ Have a calendar handy for helping the interviewee answer questions about dates
♦ Enter one response per question unless otherwise stated
♦ Do not read capitalized directions or responses

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♦ CHECK ALL THAT APPLY: Check all answer choices that the respondent names
♦ IF UNKNOWN, ASK FOR THEIR BEST ESTIMATE: These are for questions where the respondent may not know, but try to obtain their best guess
♦ RESPONSES IN CAPITALS: If the responses are capitalized, then do not read out the answer choices
♦ PROMPT: Are italicized. Give the respondent an opportunity to respond to the question, before reading what it is in the prompt
A. BIOSOILDS GENERATOR CONTACT INFORMATION

A1. FACILITY NAME: ________________________________________________

A2. FACILITY PHONE NUMBER:

(______) _______ - ________

A3. FACILITY CONTACT FIRST NAME: ______________________
LAST NAME: ______________________

A4. FACILITY CONTACT’S EMAIL: __________________________

B. SLUDGE/BIOSOLIDS SOURCE INFORMATION

B1. What is the source of the wastewater? Is it:

1. Domestic wastewater only
2. Primarily domestic wastewater
3. Mixture of domestic and industrial/commercial wastewater
4. Primarily industrial/commercial wastewater
5. Industrial wastewater
6. OTHER _____________________

B2. What is the percentage of your industrial flow? _________%

B2a. Do you implement a statutory pre-treatment program?

1. NO
2. YES (SKIP TO B3)

B2b. What are your major industrial contributors?

1. __________________________________________________________
2. __________________________________________________________
3. __________________________________________________________
4. __________________________________________________________
5. __________________________________________________________
6. __________________________________________________________
7. __________________________________________________________
8. __________________________________________________________
B3. Are you a regional facility?

○ 1. NO (SKIP TO SECTION C)

○ 2. YES (CONTINUE WITH B3a)

B3a. In the table below, list the biosolids sources (by jurisdiction) and the type of biosolids from each jurisdiction.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Type of Biosolids</th>
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</table>
C. SLUDGE/BIOSOLIDS TREATMENT INFORMATION

C1. 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
8. OTHER ________________________

C2. What processes did you use to treat sewage sludge that generated the biosolids that were applied to this application site?

1. Thickening (PLEASE SPECIFY) ______________________
2. Dewatering (PLEASE SPECIFY) ______________________
3. Chemical treatment: (CHECK ALL THAT APPLY)
   3a. pH adjustment (other than lime)
   3b. Coagulation with organic polymer
   3c. Coagulation with ferric chloride
   3d. Coagulation with alum
   3e. Blending with lime, but not for alkaline stabilization
   3f. Supplemental carbon
   3g. OTHER ______________________________
4. Alkaline stabilization: (CHECK ALL THAT APPLY)
   4a. With lime
   4b. With cement-kiln dust
   4c. With other similar material (PLEASE SPECIFY) ________________
   4d. OTHER ______________________________
5. Anaerobic digestion (PLEASE SPECIFY) _________________
6. Aerobic digestion (PLEASE SPECIFY) _________________________
7. Composting (PLEASE SPECIFY) _________________________________
8. Thermal treatment
   8a. Wet-air oxidation
   8b. Pasteurization
   8c. Drying
   88. OTHER ______________________________
C3. What polymer(s) (if any) do you use to assist in dewatering the biosolids? (LIST TYPE AND PRODUCT NAME)

Type: ___________________________  Product name: ___________________________

C4. How are pathogen reduction control requirements met?

______________________________________________________________________________
______________________________________________________________________________

C5. How are vector attraction reduction requirements satisfied?

______________________________________________________________________________
______________________________________________________________________________

C6. Please describe the pollutant concentration in your biosolids that you generate to be land applied.

  ○ 1  Meets ceiling concentration limits
  ○ 2  Meets pollutant concentrate (PC) limits
  ○ 8  OTHER ____________________________________________
D. BIOSOLIDS STORAGE INFORMATION

D1. Did you store the biosolids prior to delivery to the application site?
   ○ 1  NO (SKIP TO E1)          ○ 2  YES

D2. Prior to delivery to the application site, how were the biosolids stored? (CHECK ALL THAT APPLY)
   ○ 1  In a container (please specify) __________________________
   ○ 2  Drying beds
   ○ 3  Storage pads
   ○ 4  Storage tanks
   ○ 5  Surface impoundment (please specify where) __________________________
   ○ 8  OTHER __________________________

D3. Where were the biosolids, that were applied, stored prior to delivery to the application site? (CHECK ALL THAT APPLY)
   ○ 1  Onsite (at a treatment plant)          ○ 3  Regional storage facility
   ○ 2  Off-site (specify where) ___________  ○ 8  OTHER _________________

D4. On average, how long were the biosolids that were applied, stored prior to delivery to the application site?
   ○ 1  Less than 1 day
   ○ 2  1 day to 1 week
   ○ 3  1 week or more but less than a month
   ○ 4  1 to 6 months
   ○ 5  6 months or more but less than 1 year
   ○ 6  1 year or more but less than 2 years
   ○ 7  2 or more years
   ○ 9  DON’T KNOW
E. BIOSOLIDS ODOR INFORMATION

E1. Did the biosolids have any odor prior to delivery to the application site?

○ 1 NO (SKIP TO F1) ○ 2 YES

E2. Please describe the odor:

○ 1 Rotten, rotting fish
○ 2 Rotten eggs, rotten cabbage
○ 3 Rancid or pungent meat
○ 4 Solvents
○ 5 Human fecal matter
○ 6 Ammonia
○ 8 OTHER ________________________________
F. BIOSOLIDS MONITORING INFORMATION

F1. Are the biosolids monitored for any of the following at the treatment facility? (CHECK ALL THAT APPLY)

☐ 1 Specific pathogenic microorganisms (e.g. enteric viruses, *Salmonella* spp., helminthes, *Cryptosporidium*)
   How often? ______________

☐ 2 Indicator organisms, such as total coliforms, fecal coliforms, *E. coli* or coliphages
   How often? ______________

☐ 3 Metals (If yes, please specify) __________________________
   How often? ______________

☐ 4 Organic compounds (If yes, please specify) _________________________
   How often? ______________

☐ 5 pH
   How often? ______________

☐ 6 Temperature
   How often? ______________

☐ 7 Total ammonia-nitrogen
   How often? ______________

☐ 8 Odor
   How often? ______________

☐ 9 Sulfur compounds (e.g. hydrogen sulfide and/or organosulfur compounds)
   How often? ______________

☐ 10 Vector attraction reduction
   How often? ______________

☐ 11 Phosphorus
   How often? ______________

☐ 88 OTHER (please specify) _________________________
   How often? ______________

F2. What was the nitrogen content of the biosolids that were applied to the application field (e.g., total or available nitrogen, TKN, organic N, NH₄?)

______________________________.
G. CHANGES TO BIOSOLIDS MANAGEMENT PROCESSES

G1. Have there been any of the following changes recently to the biosolids management process (prior to the delivery of biosolids to the land application site)? (CHECK ALL THAT APPLY)

- Source of the wastewater
  Please describe ________________________________

- Biosolids treatment process
  Please describe ________________________________

- Biosolids storage methods
  Please describe ________________________________

- Biosolids monitoring methods
  Please describe ________________________________

- Source of the Biosolids in question B3
  Please describe ________________________________

- OTHER (please specify) ________________________________

G2. For each 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)

Process: ___________ Date changed (MM/DD/YY): __ / __ / ___

Process: ___________ Date changed (MM/DD/YY): __ / __ / ___

Process: ___________ Date changed (MM/DD/YY): __ / __ / ___

Process: ___________ Date changed (MM/DD/YY): __ / __ / ___
SITE IDENTIFICATION REPORT

INVESTIGATOR NAME _________________________ AGENCY __________________________

DATE (MM/DD/YY): _____ /  / _____ PHONE NUMBER: ( _____) _____ - ________

ID# OF CORRESPONDING PUBLIC HEALTH QUESTIONNAIRE: __________


________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

1. Is the land application of concern a permitted site? (CHECK ONE)
   ○ 1 No (IF NO, PROCEED TO THE SITE FOLLOW-UP REPORT AND EXAMINE POSSIBLE EVIDENCE OF UNREPORTED LAND APPLICATION)
   ○ 2 Yes

2. Please complete the following information for the biosolids land application of concern.

   LAND APPLICATION PERMIT #: __________________________________________

   LAND APPLICATION PERMITTEE: __________________________________________

   FIELD/SITE ID# AND LOCATION: (INSTRUCTIONS: LIST FIELD OR SITE ID# THAT WAS IDENTIFIED AS THE LAND APPLICATION OF CONCERN ON THE PUBLIC HEALTH QUESTIONNAIRE. DESCRIBE LOCATION 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: __________________________________________
SITE FOLLOW-UP REPORT

INVESTIGATOR NAME_________________________AGENCY________________________________

DATE (MM/DD/YY): _____/____/_____ PHONE NUMBER: (______) _______ - _______

ID# OF CORRESPONDING PUBLIC HEALTH QUESTIONNAIRE: __________

SITE ID# (INSTRUCTIONS: MAKE SURE THE ANSWERS TO THESE QUESTIONS APPLY TO THE
SAME SITE AND THE SAME LAND APPLICATION OF CONCERN, AS SPECIFIED BY THE
COMPLAINANT IN THE PUBLIC HEALTH QUESTIONNAIRE A1): ______________________

1. PLEASE DRAW A MAP OF THE LOCATION OF THE PERMITTED BIOSOLIDS
LAND APPLICATION FIELD/SITE OF CONCERN, SHOWING THE LOCATION OF
THE RESIDENT’S PROPERTY. IF VISIBLE, PLEASE DRAW THE LOCATION OF
ANY PRIVATE WELLS, RECREATIONAL FACILITIES (e.g., playgrounds and ball
fields), AND ANY OTHER LANDSCAPE FEATURES (e.g., ponds, lakes, creeks, rivers,
streams, wetlands, vegetative buffers, hills, mountains, buildings). (INSTRUCTIONS:
SHOULD BE AS CLOSE TO SCALE AS POSSIBLE. INCLUDE LEGEND. IF THERE
ARE MULTIPLE RESIDENTS MAKE SURE THAT THE SITE MAP REFLECTS
DISTANCES FROM EACH OF THE RESIDENCES)
BIOSOLIDS LAND APPLICATION FIELD LOCATION INFORMATION

1. Is the resident’s home within 2000 feet of the biosolids land application field of concern? (CHECK ONE)
   ○ 1 No (SKIP TO 4)  ○ 2 Yes

2. What is the distance between the resident’s home and the biosolids land application field of concern?
   ○ 1 Less than 100 feet
   ○ 2 100-250 feet
   ○ 3 250-500 feet
   ○ 4 500-1000 feet
   ○ 5 1000-2000 feet
   ○ 6 Greater than 2000 feet

3. Is there a buffer between the biosolids land application field of concern and the resident’s property line? (CHECK ONE)
   ○ 1 No (SKIP TO 8)  ○ 2 Yes

4. What type of buffer is it? (CHECK ALL THAT APPLY)
   ○ 1 Grass
   ○ 2 Crop (PLEASE SPECIFY) ________________________________
   ○ 3 Shrubs
   ○ 4 Trees
   ○ 8 OTHER ________________________________

5. Does it appear that biosolids were land-applied in accordance with all applicable regulatory buffers? (CHECK ONE)
   ○ 1 No  ○ 2 Yes

6. 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 of concern? (CHECK ONE)
   ○ 1 No  ○ 2 Yes
HOUSEHOLD CHARACTERISTICS

7. Does the resident’s property have a visible domestic well? (CHECK ONE)
   ○ 1 No
   ○ 2 Yes

VECTOR ATTRACTION INFORMATION

8. At the time of your visit, do there appear to be any unusual amounts of vector animal(s) (e.g. swarms of flies or birds) on the biosolids land application field of concern? (CHECK ONE)
   ○ 1 No (SKIP TO 11)
   ○ 2 Yes

9. What type(s) of vector animal(s) (e.g. swarms of flies or birds) are present on the biosolids land application field of concern? (CHECK ALL THAT APPLY)
   ○ 1 Flies
   ○ 2 Bird(s) (PLEASE SPECIFY: e.g., raven, seagull) ________________________________
   ○ 8 OTHER ________________________________

USE OF OTHER AGRICULTURAL SOIL AMENDMENTS

10. Were there agricultural soil amendment(s) (e.g., animal manure or other non-biosolids fertilizer) land applied on the land application of concern within the same time period of concern?
    ○ 1 No (SKIP TO 13)
    ○ 2 Yes
    ○ 9 DON’T KNOW
11. **What type of other agricultural soil amendment(s) (e.g., animal manure or other non-biosolids fertilizer) were applied?** (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
   - 88. OTHER (PLEASE SPECIFY) ______________________________________
   - 99. Unknown

**BIOSOLIDS ODOR INFORMATION**

12. **Did you detect any unusual outside odors near the resident’s property?** (CHECK ONE)
   - 1. No (SKIP TO16)
   - 2. Yes

13. **Please describe the odor. Did it smell like:**
   - 1. Rotten, rotting fish
   - 2. Rotten eggs, rotten cabbage
   - 3. Rancid or pungent meat
   - 4. Solvents
   - 5. Human fecal matter
   - 6. Ammonia
   - 8. OTHER_____________________

14. **What is the level of odor?** (CHECK ONE)
   - 1. Faint
   - 2. Moderate
   - 3. Strong
VISIBLE BIOSOLIDS OFF-SITE

15. Is there visible biosolids material deposited on or along-side the road(s) leading to the biosolids land application field? (CHECK ONE)

   O 1  No
   O 2  Yes

16. Please note the presence of any other biosolids materials that appear to have migrated off-site of the land application of concern (e.g., in buffer zones, on vegetation or fences, on the residential property of the resident, on cars).

____________________________________________________________________________
____________________________________________________________________________
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OTHER ENVIRONMENTAL CHARACTERISTICS

17. Please note any significant weather events during the time period of this land application of concern. (CHECK ALL THAT APPLY)

(INSTRUCTIONS: THE INVESTIGATOR SHOULD CONSULT WEATHER RECORDS TO LEARN ABOUT WEATHER CONDITIONS DURING THE LAND APPLICATION OF CONCERN, IF IT SEEMS IMPORTANT TO THE INVESTIGATION)

   O 1  Heavy rains
   O 2  Temperature inversions
   O 3  High humidity
   O 4  High temperatures
   O 5  Strong prevailing winds
   O 6  Low, freezing temperatures
   O 7  Heavy snow, sleet or freezing rain
   O 8  Barometric pressure drops
   O 8 8 OTHER_______________________
18. **What is the soil type and seasonal high water table at the land application of concern?** (INSTRUCTIONS: THE INVESTIGATOR SHOULD CONSULT THE NATIONAL RESOURCE CONSERVATION SERVICE WEBSITE AT: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx OR THE PUBLISHED SOIL SURVEY FOR YOUR COUNTY TO DETERMINE THESE SOIL CHARACTERISTICS)

SOIL TYPE_______________________________

SEASONAL HIGH WATER TABLE (INCHES/CENTIMETERS) ________________________________
Alabama
Montgomery Water Works & Sanitary Sewer Board

Alaska
Anchorage Water & Wastewater Utility

Arizona
Avondale, City of
Glendale, City of
Mesa, City of
Peoria, City of
Phoenix Water Services Dept.
Pima County Wastewater Reclamation Department
Tempe, City of

Arkansas
Little Rock Wastewater

California
Central Contra Costa Sanitary District
Corona, City of
Crestline Sanitation District
Delta Diablo Sanitation District
Dublin San Ramon Services District
East Bay Dischargers Authority
East Bay Municipal Utility District
Fairfield-Suisun Sewer District
Fresno Department of Public Utilities
Inland Empire Utilities Agency
Irvine Ranch Water District
Las Gallinas Valley Sanitary District
Las Virgenes Municipal Water District
Livermore, City of
Los Angeles, City of
Montecito Sanitation District
Napa Sanitation District
Novato Sanitary District
Orange County Sanitation District
Palo Alto, City of
Riverside, City of
Sacramento Regional County Sanitation District
San Diego, City of
San Francisco Public Utilities, City & County of
San Jose, City of
Sanitation Districts of Los Angeles County
Santa Barbara, City of
Santa Cruz, City of
Santa Rosa, City of
South Bayside System Authority
South Coast Water District
South Orange County Wastewater Authority
Sutter Sanitary District

South Carolina
Charleston, City of
Charleston Sewerage District
Charleston Water System
Mount Pleasant Waterworks & Sewer Commission

South Dakota
Capital City of

Tennessee
Beaumont-Jasper Water & Sewer Authority
Charleston Water System
Mount Pleasant Waterworks & Sewer Commission

Texas
Austin, City of
Dallas Water Utilities
Denton, City of
El Paso Water Utilities
Fort Worth, City of
Houston, City of
San Antonio Water System
Trinity River Authority

Utah
Salt Lake City Department of Public Utilities

Virginia
Charlottesville, City of
Fairfax County Water Authority

Washington
City of

West Virginia
City of

Wisconsin
City of

Wyoming
City of

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Lynchburg Regional Wastewater Treatment Plant
Prince William County Service Authority
Richmond, City of
Rivanna Water & Sewer Authority

Washington
Everett, City of
King County Department of Natural Resources
Seattle Public Utilities
Sunnyside, Port of
Yakima, City of

Wisconsin
Green Bay Metro Sewerage District
Kenosha Water Utility
Madison Metropolitan Sewerage District
Milwaukee Metropolitan Sewerage District
Racine Water & Wastewater Utility
Sheboygan, City of
Wausau Water Works

Water Services Association of Australia
ACTEW Corporation
Barwon Water
Central Highlands Water
City West Water
Coliban Water Corporation
Cradle Mountain Water
Gippsland Water
Gladstone Area Water Board
Gosford City Council
Hunter Water Corporation
Melbourne Water
Power & Water Corporation
Queensland Urban Utilities
South Australia Water Corporation
Sydney Catchment Authority
Sydney Water

Canada
Edmonton Waste Management Centre of Excellence
Lethbridge, City of
Regina, City of, Saskatchewan
Toronto, City of, Ontario
Winnipeg, City of, Manitoba

STORMWATER UTILITY
California
Fresno Metropolitan Flood Control District
Los Angeles, City of, Department of Public Works
Monterey, City of
San Diego County Department of Public Works
San Francisco, City of
Santa Rosa, City of
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Kansas
Lenexa, City of
Overland Park, City of
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Louisville & Jefferson County Metropolitan Sewer District
Maine
Portland Water District
Pennsylvania
Philadelphia, City of
Tennessee
Chattanooga Stormwater Management
Texas
Harris County Flood Control District
Washington
Bellevue Utilities Department
Seattle Public Utilities

STATE
Connecticut Department of Environmental Protection
Kansan Department of Health & Environment
New England Interstate Water Pollution Control Commission (NEIWPC)
Ohio River Valley Sanitation Commission
Urban Drainage & Flood Control District, CO

CORPORATE
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Ecovation
Effluent Systems LLC
EMA Inc.
Environ International Corporation
Environmental Operating Solutions, Inc.
Freese & Nichols, Inc.
Ft. Assoc Inc.
Gannett Fleming Inc.
Garden & Associates, Ltd.
Geosyntec Consultants
GHD Inc.
Global Water Associates
Greeley and Hansen LLC
Haen & Sawyer, P.C.
HDR Engineering, Inc.
HNTB Corporation
Holmes and McGrath Inc.
Homer and McGrath Inc.

INDUSTRY
American Electric Power
American Water
Anglian Water Services, Ltd.
Chevron Energy Technology
Dow Chemical Company
DuPont Company
Eastman Chemical Company
Elly Lilly & Company
InsinkErator
Johnson & Johnson
Merck & Company Inc.
Procter & Gamble Company
Suez Environment
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Veolia Water North America

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