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(54) SYSTEMS AND RELATED METHODS FOR MANAGING DATA CORRESPONDING TO ENVIRONMENTAL INSPECTIONS, AND FOR DYNAMICALLY GENERATING AN INSPECTION REPORT

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(52) **U.S. Cl.** **702/83**; 210/85; 422/119

(57) **ABSTRACT**

A system is provided for easily and efficiently managing a compliance monitoring process and for dynamically generating an inspection report. The system includes a database that contains data that identifies specific information about a device, system or environmental element that is located and to be inspected at a particular site. The database also contains data that identifies specific information to be obtained during an inspection of the specific devices, systems or environmental elements at a particular site. Furthermore, the database can be easily updated to correspond with changes in the laws and/or regulations applicable to a particular site, or to correspond with changes to the devices, systems or environmental elements located at a particular site. The inspection report includes the data from the database, and is dynamically generated soon before an inspector inspects a device, system or environmental element at a particular site. By generating an inspection report soon before an inspection is to occur, and using data from a database that is updated, the inspection report can provide just specific, current data required for the specific inspection to be performed.

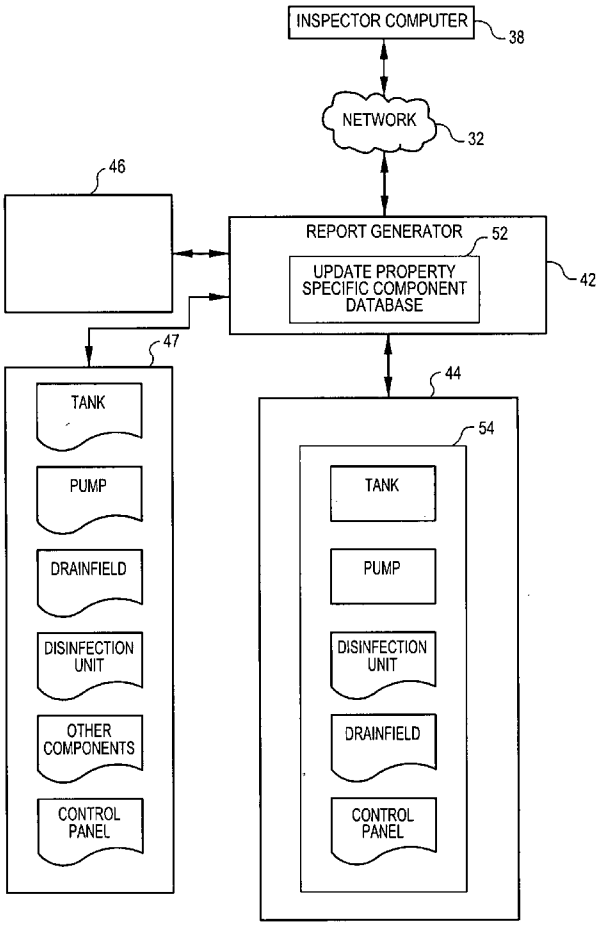
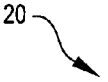


FIG. 1A
(PRIOR ART)



Facility

Owner

Facility Street Address

City/Town Zip Code

Mailing address of owner, if different:

Street Address

City/Town State Zip Code

( ) - ext
Telephone Number

Authorized Provider

O&M Firm

Facility Street Address

City/Town State Zip Code

( ) - ext
Telephone Number

Inspector Name ☐ PE ☐ RS

Facility/System Information

DEP Transmittal Number GW Greywater Project ID Number

Installation Date Start of Operation

Date of Inspection Previous Inspection Date

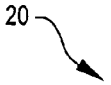
System is: ☐ Remedial

System facility is occupied? ☐ Yes ☐ No

Seasonal Residence: used less than 6 mo./year: ☐ Yes ☐ No

Pumping Recommended ☐ Yes ☐ No

FIG. 1B
(PRIOR ART)



Indicate whether the following items have been inspected

Inspection of absorption system:

SAS ☐ Modified SAS ☐ Greywater Garden ☐ Other ☐

Condition of soil absorption system

Ponding anywhere in system? ☐ Yes ☐ No

Location of ponding: _____

Pressure distribution ☐ Gravity distribution ☐

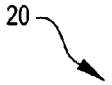
If pressure distribution, has system been inspected in accordance with 310 CMR 15.254? ☐ Yes ☐ No

System Components Inspected

Septic Tank:		☐ Yes	☐ No	☐ N/A
Condition of septic tank				
Pump Chamber:	22	☐ Yes	☐ No	☐ N/A
Condition of pump chamber				
Recirculation Tank:		☐ Yes	☐ No	☐ N/A
Condition of recirculation tank				
Overflow/Storage Tank:	28	☐ Yes	☐ No	☐ N/A
Condition of overflow/storage tank				
System Alarms:	24	☐ Yes	☐ No	☐ N/A
Condition of alarms				
Level Controls:	26	☐ Yes	☐ No	☐ N/A
Condition of level controls		☐ Yes	☐ No	☐ N/A

Pump(s) inspected:	☐ Yes	☐ No	☐ N/A	Number	
Distribution laterals:	☐ Yes	☐ No	☐ N/A	Cleaned: ☐ Yes	☐ No
Effluent tee filter:	☐ Yes	☐ No	☐ N/A	Cleaned: ☐ Yes	☐ No

FIG. 1C
(PRIOR ART)



General (continued)

Maintenance performed:

Comments/Deficiencies:

Sampling Information

Samples Taken: ☐ Influent ☐ Effluent ☐ None

Parameters sampled:

☐ pH ☐ BOD ☐ TSS ☐ Oil & Grease ☐ Surfactants

☐ Ammonia ☐ Nitrate ☐ TKN ☐ Fecal coliform* ☐ E. coli*

☐ Enterococci ☐ Water Use ☐ No. of Users

☐ Other (specify):

* Please attach laboratory test results.

Certification

I certify: I have inspected the greywater disposal system at the address above, have completed this report and attached technology operation and maintenance checklist, and the information report is true, accurate, and complete as of the time of the inspection. I am a Massachusetts Registered Professional Engineer or Massachusetts Registered Sanitarian

PE or RS Signature

Date

System owner must submit this report and any required sampling results to the local board of health and DEP for Greywater Piloting Use within 30 days of inspection date.

FIG. 2

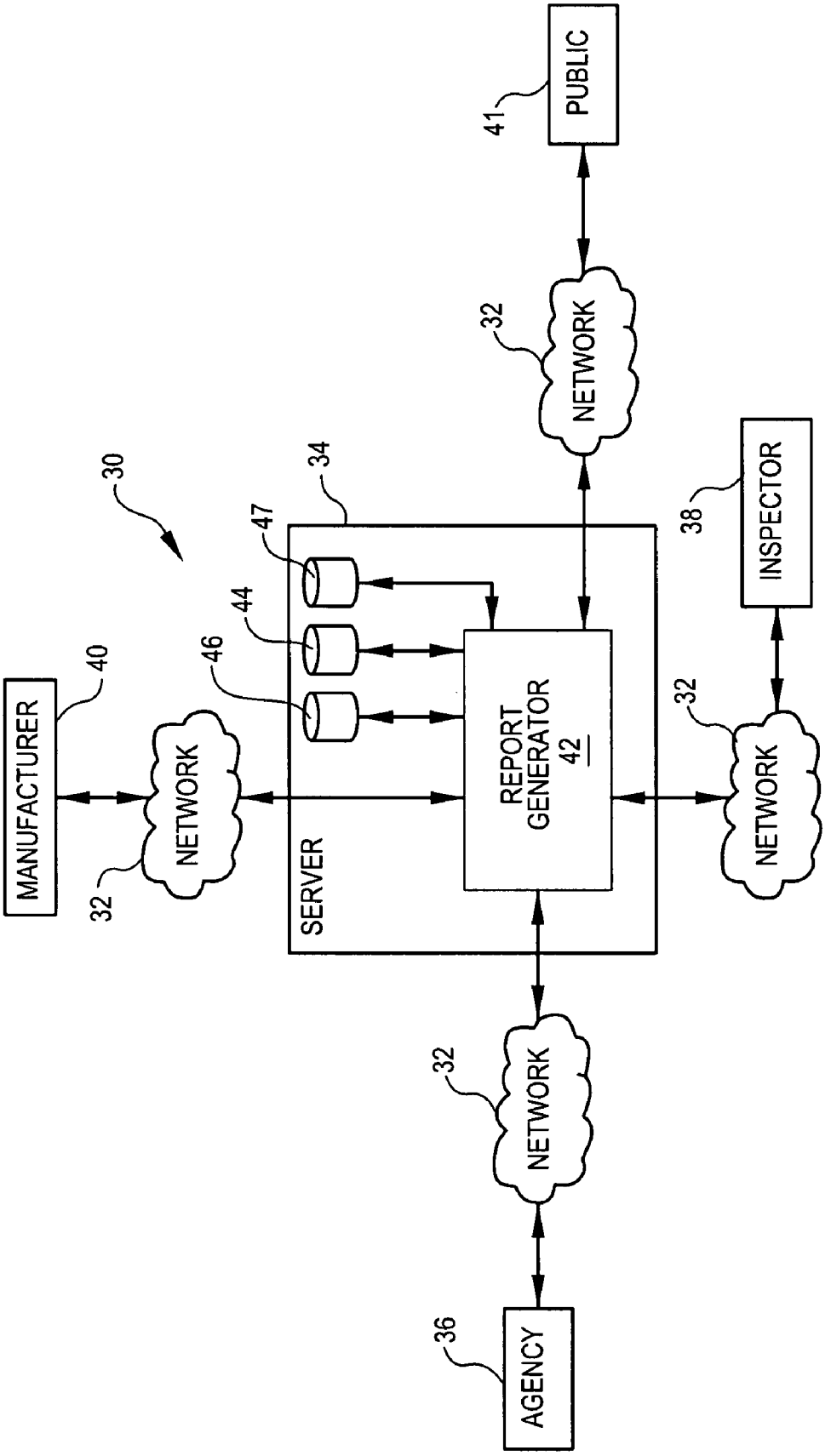

30
MANUFACTURER
40
NETWORK
32
SERVER
34
47
44
46
REPORT GENERATOR 42
NETWORK
32
PUBLIC
41
NETWORK
32
INSPECTOR
38
NETWORK
32
AGENCY
36

FIG. 3A

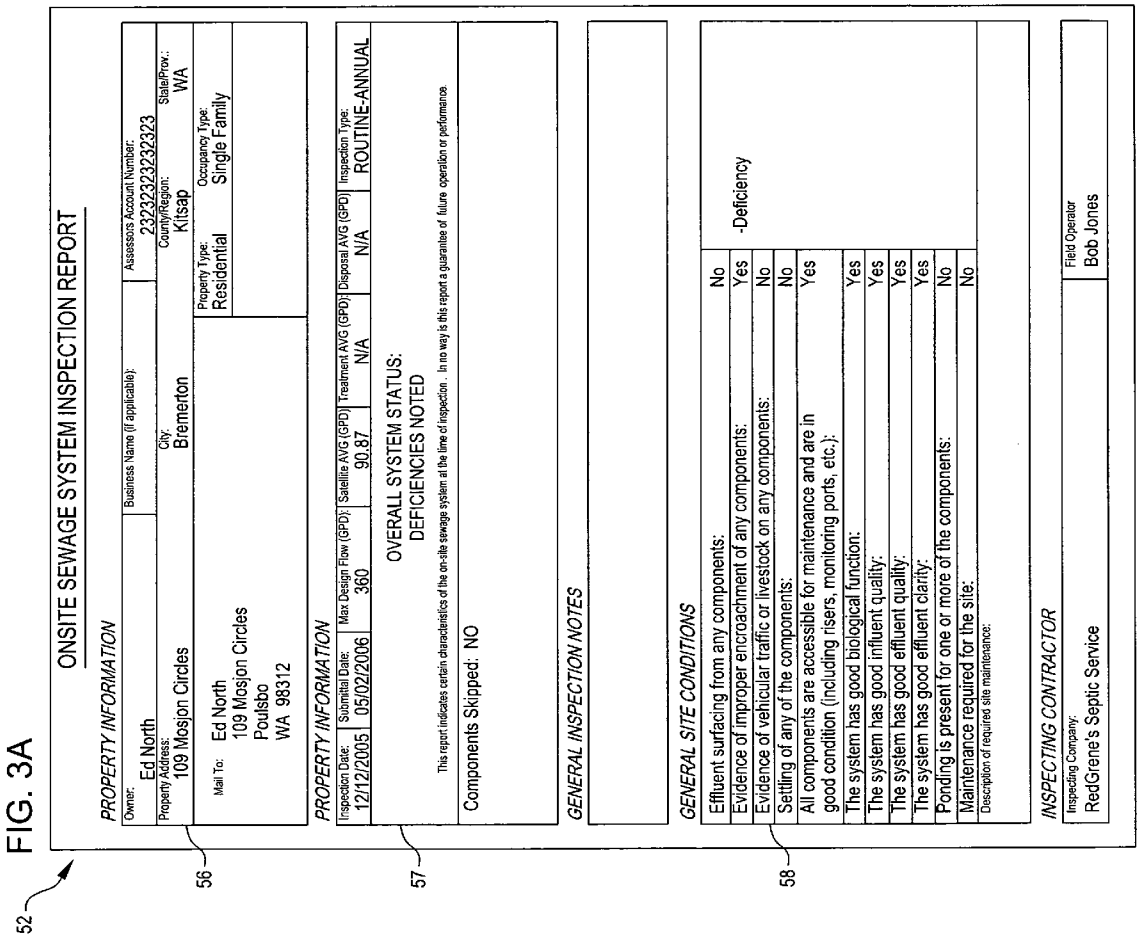

52
ONSITE SEWAGE SYSTEM INSPECTION REPORT
PROPERTY INFORMATION
Owner: Ed North
Business Name (if applicable):
Assessors Account Number: 232323232323
Property Address: 109 Mosjon Circles
City: Bremerton
County/Region: Kitsap
State/Prov.: WA
Mail To: Ed North 109 Mosjon Circles Poulsbo WA 98312
Property Type: Residential
Occupancy Type: Single Family
56
PROPERTY INFORMATION
Inspection Date: 12/12/2005
Submittal Date: 05/02/2006
Max Design Flow (GPD): 360
Satellite AVG (GPD): 90.87
Treatment AVG (GPD): N/A
Disposal AVG (GPD): N/A
Inspection Type: ROUTINE-ANNUAL
OVERALL SYSTEM STATUS: DEFICIENCIES NOTED
This report indicates certain characteristics of the on-site sewage system at the time of inspection. . In no way is this report a guarantee of future operation or performance.
57
Components Skipped: NO
GENERAL INSPECTION NOTES
GENERAL SITE CONDITIONS
Effluent surfacing from any components: No
Evidence of improper encroachment of any components: Yes
Evidence of vehicular traffic or livestock on any components: No
Settling of any of the components: No
All components are accessible for maintenance and are in good condition (including risers, monitoring ports, etc.): Yes
The system has good biological function: Yes
The system has good influent quality: Yes
The system has good effluent quality: Yes
The system has good effluent clarity: Yes
Ponding is present for one or more of the components: No
Maintenance required for the site: No
-Deficiency
58
Description of required site maintenance:
INSPECTING CONTRACTOR
Inspecting Company: RedGrene's Septic Service
Field Operator: Bob Jones

FIG. 3B

54

ONSITE SEWAGE SYSTEM INSPECTION DETAIL

Panel: Control - Satellite (Unit 1) No Deficiencies Noted

Manufacturer: Unknown, Model: NA, Serial #:

Control Panel functioning as intended:		Yes	
Alarm functioning as intended:		Yes	
Demand Dose Panel Type:		No	
GMP Parameters:	Tank Gallons Per Inch: 22	Draw Down Run Time (hh/mm/ss) 00/01/00	Inches Dropped: 2.00

CONTROL PANEL SETTINGS

Current Inspection:		*Last Inspection:* 05/02/2005	
Pump-Gallons Per Minute based on Draw Down	44.00	Pump-Gallons Per Minute based on Draw Down	44.00
"Off" Counter reading;		"Off" Counter reading;	
Cycle Counter reading:	1112	Cycle Counter reading:	159
ETM reading:	9.43	ETM reading:	1.72
Cycles Per Day:	12.00	Cycles Per Day:	12.00
Gallons Per Cycle:	30.00	Gallons Per Cycle:	30.00
"ON" time setting (hh/mm/ss):	0/0/41	"ON" time setting (hh/mm/ss):	0/0/41
"OFF" time setting (hh/mm/ss):	1/59/19	"OFF" time setting (hh/mm/ss):	1/59/19

59

Period "OFF" Counts:	Period Cycle Counts: 953	Period Run Hours: 7.71

DAILY FLOW AVERAGE COMPARISONS:

Maximum Daily Design Flow (GPD)	Current GPD Max (current settings)	Days in inspection period:	Last Period Average Gallons Per Day Based On:	
			ETM:	Cycle Counter:
360	360	224	90.87	127.63

Component Specific Notes:

TANK: Pump Tank 1000 Gallon (Unit 1) No Deficiencies Noted

Manufacturer: Unknown, Model: Concrete, Serial #:

Tank working as intended:	Yes	
All required baffles in place:	Yes	
Effluent Filter Cleaned:	N/A	
Compartment scum measurement (inches):	0	
Compartment sludge measurement (inches):	1	
Tank needs pumping:	No	
Amount of effluent to be pumped (gallons):		

59

Component Specific Notes:

FIG. 3C

55

ONSITE SEWAGE SYSTEM INSPECTION DETAIL

Aerobic Treatment Unit: ATU Brand X (Unit 1) Deficiencies Noted
Manufacturer: Unknown, Model: Concrete, Serial #: asefs

Unit functioning as intended:	Yes	
Settings verified as correct:	Yes	
Aerobic mechanism/Air Pumps functioning as intended:	Yes	
Aerobic Mechanism/Air Pumps cleaned:	Yes	
Effluent filter cleaned:	N/A	
Alarm working as intended:	Yes	
59 Settleable Solids test result:	40	
Venting functioning as intended:	Yes	
1st compartment scum measurement (inches):	3	
1st compartment sludge measurement (inches):	5	
2nd compartment scum measurement (inches):	1	
2nd compartment sludge measurement (inches):	8	
Unit needs pumping:	Yes	-Deficiency
Gallons of effluent to be pumped (approx):	1500	
Component Specific Notes:		

Disinfection: Chlorine (Unit 1) No Deficiencies Noted
Manufacturer: Unknown, Model: NA, Serial #:

Disinfection Unit functioning as intended:	Yes	
Alarm functioning as intended:	N/A	
59 Chlorine in place:	Yes	
Dechlorine in place:	Yes	
Component Specific Notes:		

Pump: Sewage Pump 1/2 hp (Unit 1) Deficiencies noted
Manufacturer: Unknown, Model: NA, Serial #: 123asd2

Pump (including siphons) functioning as intended:	Yes	
Pump controls functioning as intended:	Yes	
Alarm mechanism functioning as intended:	No	- Deficiency
59 The average 1 minute pump draw down (gallons per minute) (inches)	2.00	
Pump vault screen present and cleaned:	N/A	
Component Specific Notes:		

Drainfield: Pressure 267 Feet Chamber Type (Unit 1) No Deficiencies Noted

Disposal Component functioning as intended:	Yes	
Equal flow to Laterals:	N/A	
System flushed:	Yes	
59 Average Squirt Height measurement (inches):	68	
Disposal component rotated off:	No	
Component Specific Notes:		

FIG. 4

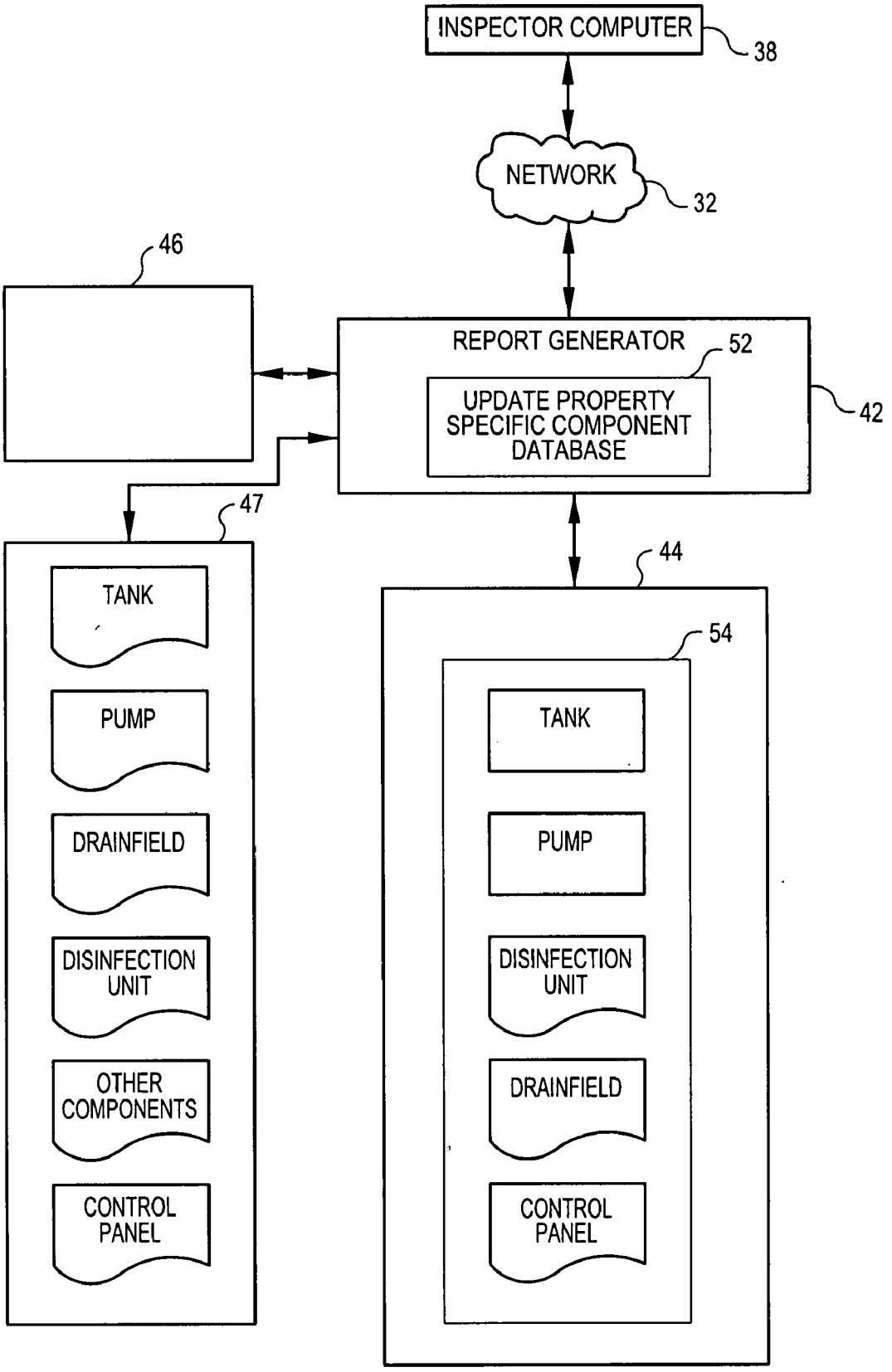

INSPECTOR COMPUTER
38
NETWORK
32
46
REPORT GENERATOR
52
UPDATE PROPERTY SPECIFIC COMPONENT DATABASE
42
47
44
TANK
PUMP
DRAINFIELD
DISINFECTION UNIT
OTHER COMPONENTS
CONTROL PANEL
54
TANK
PUMP
DISINFECTION UNIT
DRAINFIELD
CONTROL PANEL

FIG. 5

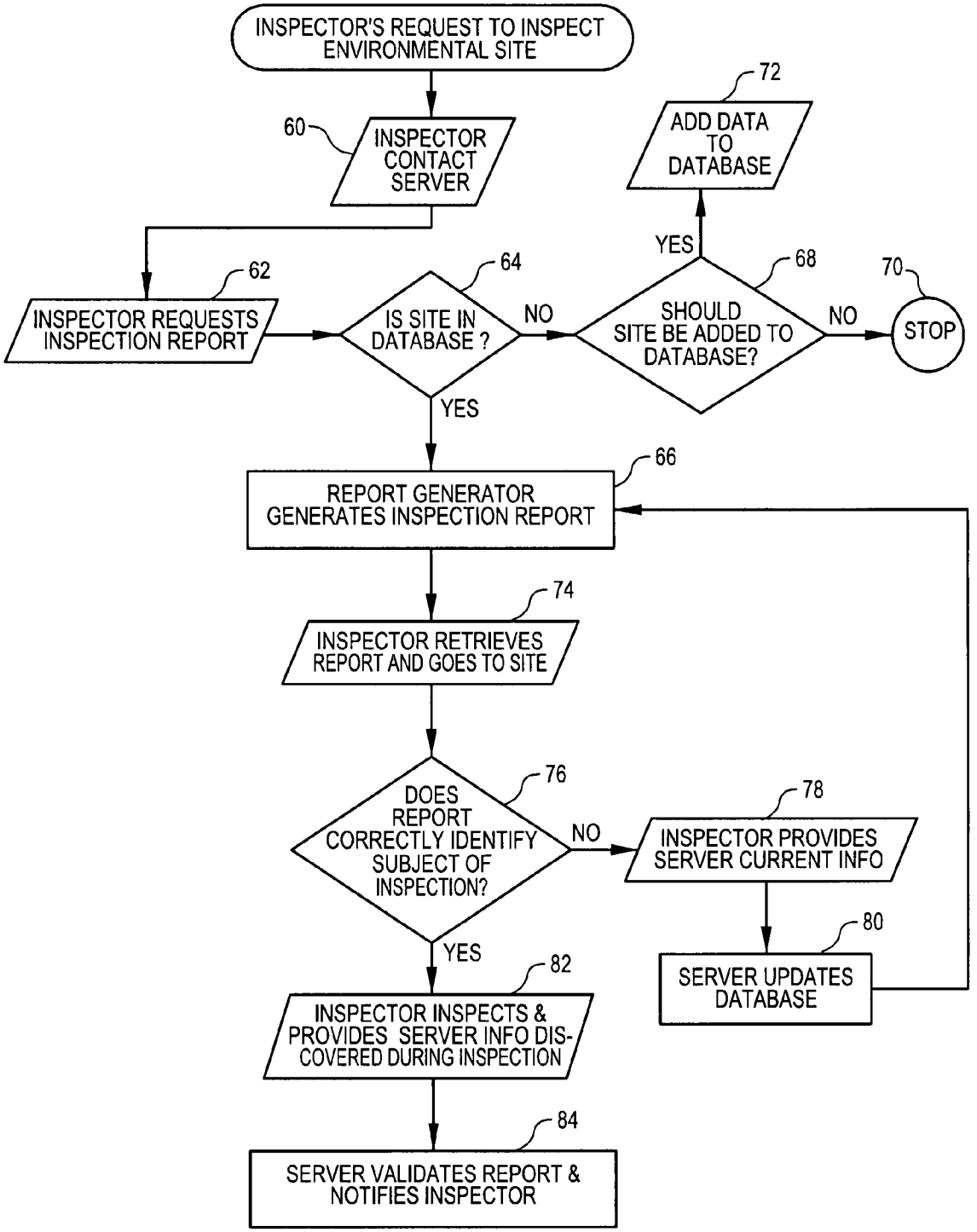

INSPECTOR'S REQUEST TO INSPECT ENVIRONMENTAL SITE
60
INSPECTOR CONTACT SERVER
62
INSPECTOR REQUESTS INSPECTION REPORT
64
IS SITE IN DATABASE ?
NO
YES
68
SHOULD SITE BE ADDED TO DATABASE?
YES
NO
70
STOP
72
ADD DATA TO DATABASE
66
REPORT GENERATOR GENERATES INSPECTION REPORT
74
INSPECTOR RETRIEVES REPORT AND GOES TO SITE
76
DOES REPORT CORRECTLY IDENTIFY SUBJECT OF INSPECTION?
NO
YES
78
INSPECTOR PROVIDES SERVER CURRENT INFO
80
SERVER UPDATES DATABASE
82
INSPECTOR INSPECTS & PROVIDES SERVER INFO DISCOVERED DURING INSPECTION
84
SERVER VALIDATES REPORT & NOTIFIES INSPECTOR

FIG. 6

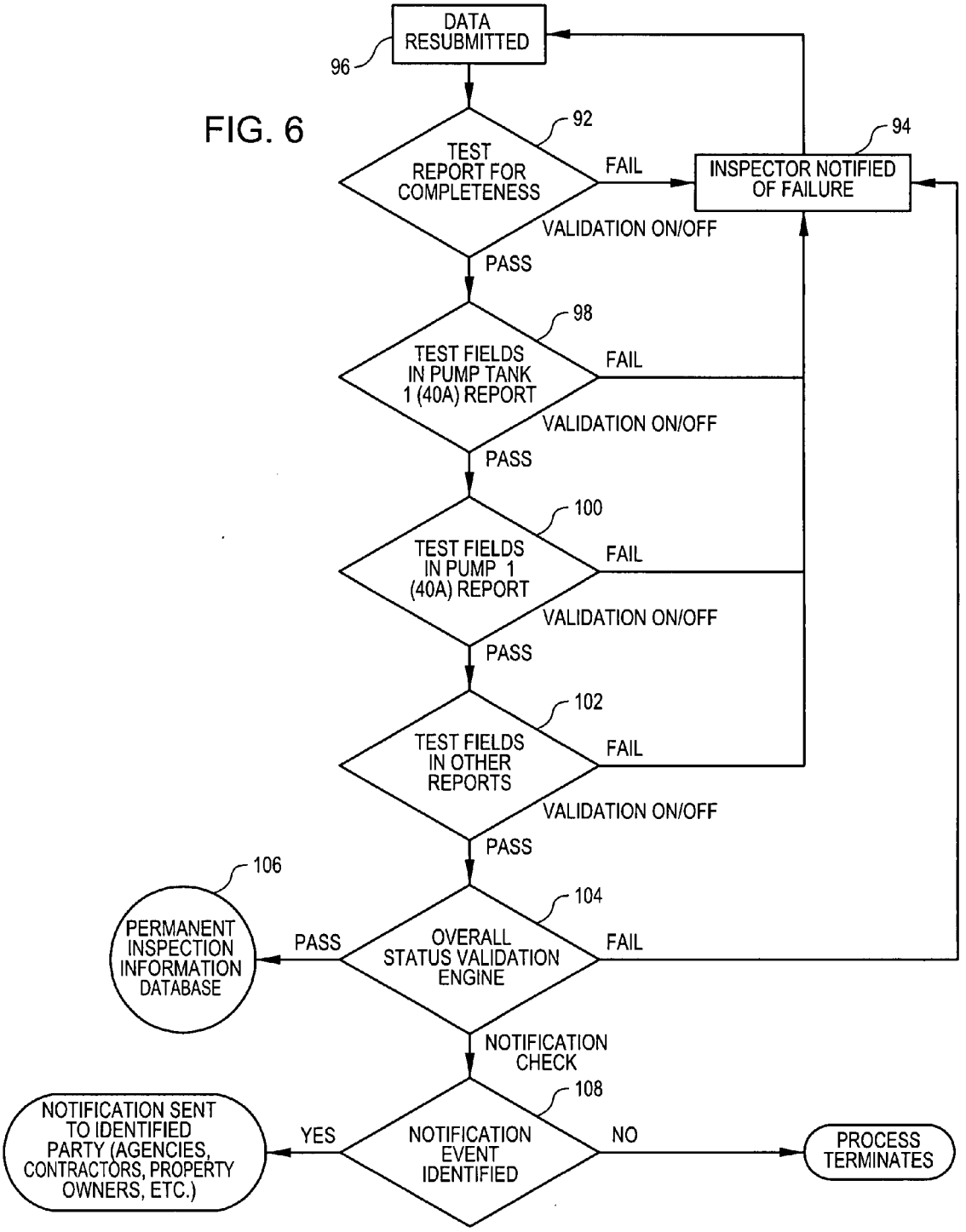

DATA RESUBMITTED
96
TEST REPORT FOR COMPLETENESS
92
FAIL
INSPECTOR NOTIFIED OF FAILURE
94
VALIDATION ON/OFF
PASS
TEST FIELDS IN PUMP TANK 1 (40A) REPORT
98
FAIL
VALIDATION ON/OFF
PASS
TEST FIELDS IN PUMP 1 (40A) REPORT
100
FAIL
VALIDATION ON/OFF
PASS
TEST FIELDS IN OTHER REPORTS
102
FAIL
VALIDATION ON/OFF
PASS
106
PERMANENT INSPECTION INFORMATION DATABASE
PASS
OVERALL STATUS VALIDATION ENGINE
104
FAIL
NOTIFICATION CHECK
NOTIFICATION SENT TO IDENTIFIED PARTY (AGENCIES, CONTRACTORS, PROPERTY OWNERS, ETC.)
YES
NOTIFICATION EVENT IDENTIFIED
108
NO
PROCESS TERMINATES

FIG. 7

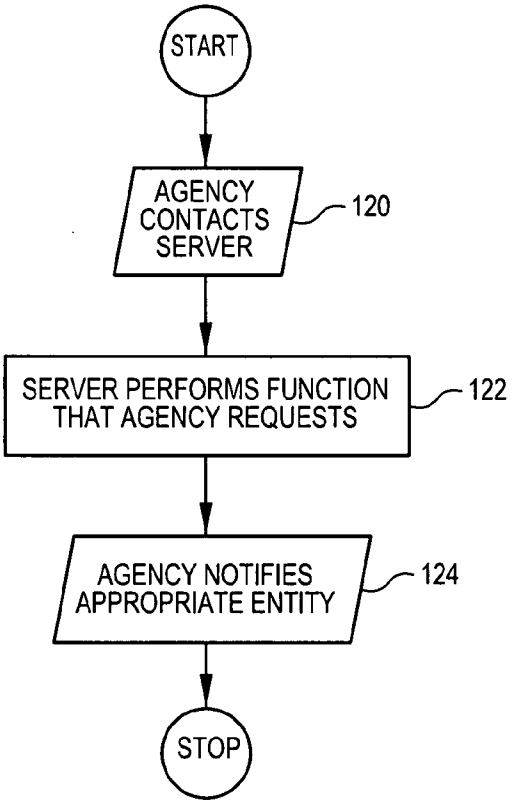
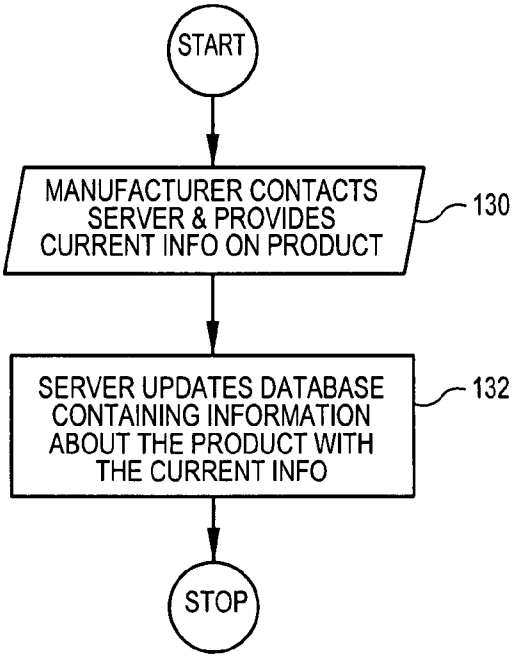

START
AGENCY CONTACTS SERVER
120
SERVER PERFORMS FUNCTION THAT AGENCY REQUESTS
122
AGENCY NOTIFIES APPROPRIATE ENTITY
124
STOP

FIG. 8


START
MANUFACTURER CONTACTS SERVER & PROVIDES CURRENT INFO ON PRODUCT
130
SERVER UPDATES DATABASE CONTAINING INFORMATION ABOUT THE PRODUCT WITH THE CURRENT INFO
132
STOP

SYSTEMS AND RELATED METHODS FOR MANAGING DATA CORRESPONDING TO ENVIRONMENTAL INSPECTIONS, AND FOR DYNAMICALLY GENERATING AN INSPECTION REPORT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from commonly owned U.S. Provisional Patent Application 60/777,849, filed 28 Feb. 2006, and titled DYNAMIC COMPONENT REPORT GENERATION, VALIDATION AND NOTIFICATION, presently pending, which is incorporated herein by reference in its entirety and for all its teachings and disclosures.

BACKGROUND

[0002] Many environmental government agencies are responsible for monitoring devices and systems located within their jurisdiction for compliance with the laws and regulations governing many environmental issues. For example, a state's Department of Ecology may have jurisdiction over wastewater systems, such as a sewer system, that handle a high volume of wastewater; a state's Department of Health may have jurisdiction over wastewater systems that handle a moderate volume of wastewater; and a county or local office may have jurisdiction over wastewater systems, such as a septic system, that handle a low volume of wastewater. Many environmental government agencies are also responsible for monitoring the quality of environmental elements, such as water, soil and air, located within their jurisdiction. For example, a state's Department of Health may also have jurisdiction over the quality of the drinking water provided at a site.

[0003] Before an agency can assess the compliance of a device, system or environmental element, inspectors inspect the device, system or environmental element to obtain the data required to assess compliance. Once obtained, the data is provided to the agency. When performing an inspection, an inspector uses an inspection report to focus the inspector's inspection and facilitate the transfer of the data to the agency. An example of a typical inspection report is shown in FIGS. **1A-1B**, which show respective pages of a three page inspection report **20**. The inspection report **20** basically includes two types of data. The first type of data identifies information about the location of the site and the devices, systems and or environmental elements located at the site to be inspected. The second type of data identifies information that the inspector needs to obtain during his/her inspection. After the inspector completes the inspection, the inspector provides the agency the completed inspection report. The agency, then inputs the data from the inspection report into a database, and saves the data.

[0004] Unfortunately, the typical inspection report **20** is cumbersome and time consuming to use. The inspection report **20** is cumbersome because the inspection report is often a generic template that contains more general data about the devices, systems, or environmental elements than is necessary, and not enough specific data about the specific devices, systems and environmental elements at a particular site that may be necessary to complete a thorough inspection. For example, the inspection report **20** includes data identifying information about a pump **22**, alarm systems and controls **24** and **26**, respectively, and an overflow storage tank **28**. If the septic system being inspected does not include these devices, the inspector still has to address them on the inspection report. As another example, the inspection report **20** does not include an indication that the tank has a unique inspection window, or that a specific disassembly instruction must be followed to inspect the septic system. Thus, the inspector has to spend time figuring out how to complete the inspection, or the inspector might not complete or might incorrectly complete the inspection.

[0005] The inspection report **20** is time consuming to use because the inspection report **20** is often printed on paper, and thus, the data that identifies information that the inspector needs to obtain during his/her inspection is also printed on paper. Consequently, when either the inspector or an agency employee enters the data from a completed inspection report into a database, the inspector or agency employee often enters the data manually. Furthermore, because the inspection report **20** is a generic template, the inspector will often write notes on the report discussing specific issues that he encountered during the inspection. These notes often include valuable information about the specific device, system, or environmental element inspected, but because they are handwritten, the agency might not save the inspector's notes in the agency's database. And, if the notes were to be saved, the agency would often have a difficult time finding and reviewing the notes to generate an historical perspective and/or a trend in the compliance of a specific device, system or environmental element at a particular site because the text of the inspector's notes would be very difficult to search with a search engine.

SUMMARY

[0006] In one aspect of the invention, a method for managing information generated from an environmental inspection includes: 1) retrieving, from a database, a first type of data that identifies the location of an environmental site to be inspected, and at least one of the following subjects located and to be inspected at the environmental site: a) a device, b) a system, and c) an environmental element; 2) retrieving, from a database, a second type of data that identifies information to be obtained from the inspection; 3) dynamically generating an inspection report that includes the first type data, and the second type of data; and 4) providing the inspection report to an inspector to facilitate the inspector's inspection of the environmental site.

[0007] With the dynamically generated inspection report, an inspector can receive an inspection report that only provides specific, current data required for the specific inspection to be performed. Thus, the inspector can avoid wasting time addressing irrelevant issues identified on a generic report, and can avoid wasting time figuring out a specific processes required to perform an inspection or to access a system component for inspection. In addition, a dynamically generated inspection report can provide data that identifies very specific, and often valuable, information to be obtained during an inspection. Thus, the governing agency's database is more likely to include the specific and

often valuable information to help the agency more accurately assess the compliance of a device, system, or environmental element.

BRIEF DESCRIPTION OF THE FIGURES

[0008] FIGS. **1**A-**1**C combined show a conventional inspection report.

[0009] FIG. **2** is a schematic diagram of a system, according to an embodiment of the invention.

[0010] FIGS. **3**A-**3**C combined show an inspection report dynamically generated by the system **30** in FIG. **2**, according to an embodiment of the invention.

[0011] FIG. **4** is a schematic diagram of an inspection report generator, according to an embodiment of the invention.

[0012] FIG. **5** is a flowchart of a process for inspecting an environmental site, according to an embodiment of the invention.

[0013] FIG. **6** is a flowchart of a process for validating an inspection report and for notifying an appropriate entity of a result of the validation process, according to an embodiment of the invention.

[0014] FIG. **7** is a flowchart of a process for a regulatory agency to review and track inspection results, or update data used to dynamically generate an inspection report, according to an embodiment of the invention.

[0015] FIG. **8** is a flowchart of a process for a manufacturer to review and update data used to dynamically generate an inspection report, according to an embodiment of the invention.

DESCRIPTION

[0016] Various modifications to the disclosed embodiments will be readily apparent and the generic principles herein may be applied to other embodiments and applications without departing from the spirit and scope of the present discussion. Thus, the present discussion is not to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein. For example, a computer-readable storage medium does include a signal that can carry a program that, when executed by a computer, performs a function.

[0017] The present invention provides a system for easily and efficiently managing a compliance monitoring process and for dynamically generating an inspection report. The system includes a database that contains data that identifies specific information about a device, system or environmental element that is located and to be inspected at a particular site. The database also contains data that identifies specific information to be obtained during an inspection of the specific devices, systems or environmental elements at a particular site. Furthermore, the database can be easily updated to correspond with changes in the laws and/or regulations applicable to a particular site, or to correspond with changes to the devices, systems or environmental elements located at a particular site. The inspection report includes the data from the database, and is dynamically generated soon before an inspector inspects a device, system or environmental element at a particular site. By generating an inspection report soon before an inspection is to occur, and using data from a database that is updated, the inspection report can provide just specific, current data required for the specific inspection to be performed.

[0018] FIG. **2** is a schematic diagram of a system **30**, according to an embodiment of the invention. The system **30** includes, a communications network **32**, and a server **34** for dynamically generating an inspection report and for storing the data used to generate the inspection report and the data obtained from a particular inspection. The network **32** can be any desired network, for example, the internet, any desired intranet, a phone network, or a postal network. The system **30** also includes one or more agency computers **36** (only one shown here) that can communicate with the server **34** via a portion of the network **32** to allow an agency to retrieve data obtained during an inspection and to update the data used to dynamically generate an inspection report. In addition, the system **30** also includes one or more inspector computers **38** (only one shown here) that allows, via a portion of the network **32**, an inspector to retrieve a dynamically generated inspection report, to provide the server **34** the data obtained from an inspection, and to update the data used to dynamically generate an inspection report.

[0019] In this and certain other embodiments of the system **30**, the system **30** also includes one or more manufacturer computers **40** (only one shown here), and one or more public computers **41** (only one shown here). The one or more manufacturer computers **40** allow a manufacturer to update, via a portion of the network **32**, specific information about a device or system that it manufactures. This may be desirable when a device or system to be inspected includes an uncommon feature that must be used or disabled to complete an inspection of the device or system, or when there is an update to the specific information to be obtained during an inspection of the specific device or system. The one or more public computers **41** allow a member of the public, such as the owner of an inspected environmental site, to view, via a portion of the network **32**, data obtained from an inspection, and, if desired, compliance assessments performed by the agency. This may be desirable to help keep actions taken by the agency open to public review. Although shown in FIG. **1**, other embodiments of the system do not include one or more manufacturer computers **40** or one or more public computers **41**.

[0020] The server **34** includes a report generator **42** to dynamically generate an inspection report, an example of which is discussed in further detail in conjunction with with FIGS. **3**A-**3**B, and a database that contains two types of data that the inspector requires to complete an inspection. The first type of data includes information that identifies the location of an environmental site, and the one or more devices, systems or environmental elements that are located and to be inspected at the environmental site. For example, In some embodiments, the first type of data includes the address of a residential dwelling, and identifies the type and size of the septic system that the residents use to treat wastewater, and the devices or components of the septic system, such as a pump (if used) and the type and size of the system's drain field. In other embodiments, the first type of data may include all of the previously discussed information and a schematic showing the location of the septic tank on the site and any particular design information that the inspector might need to know to facilitate his inspection of the septic system.

[0021] The second type of data includes data that identifies the information that the inspector needs to obtain during the inspection. For example, in some embodiments, the second type of data includes queries on the overall condition and

flow rate of a septic system, and more particularly to the volume of the septic tank, how well the drain field and/or pump operate and whether or not there is standing water in the drain field. In other embodiments, the second type of data includes queries on the concentration levels of one or more specific chemicals in drinking water provided to the residential dwelling.

[0022] In this and certain other embodiments, the server **34** includes three databases **44**, **46**, and **47**. The database **44** contains the first type of data, and the database **46** contains the second type of data. The database **47** contains a third type of data that includes information that lists available devices, systems, and their respective specific information, which the report generator **42** can use to update the first type of data. The third type of data is similar to the first type except the third type of data does not include information that associates a specific device, system or environmental element with a particular environmental site.

[0023] With the different types of data contained in the different databases **44**, **46** and **47**, a level of security can exist on the server to help maintain the integrity of the three types of data. For example, in some embodiments, an inspector, via the inspector computer **38**, may only be allowed to access the first type of data contained in the database **44** to update the data as required by a change in the system or device located at a site. An agency, via the agency computer **36**, may only be allowed to access the second type of data contained in the database **46** to update the data as required by a change in the laws and/or regulations. And, a manufacturer, via the manufacturer computer **40**, may only be allowed to access the third type of data contained in the database **47** to update the data as required by a change in the design of an existing device or system, or by an introduction of a new device or system.

[0024] In other embodiments, the database **44** may contain both the first and second types of data, and the database **46** may contain data that identifies the information currently required to be obtained from an inspection. In such embodiments, the report generator can compare the data in database **44** with the current data in the database **46**, and revise the data in database **44** as required to dynamically generate a current inspection report. In still other embodiments, the server can include a single database that contains the two types of data required for the inspector to perform an inspection.

[0025] Still referring to FIG. **2**, the report generator **42** can dynamically generate an inspection report at any time before the inspector completes an inspection. For example, the inspector can have an inspection scheduled for a certain day and can have the server dynamically generate an inspection report a week before the scheduled inspection. Thus, the inspection report that the inspector uses for an inspection should identify the current devices, systems and/or environmental elements to be inspected at a site. As another example, the inspector can have the server dynamically generate an inspection report while the inspector is performing an inspection to accommodate for a modification to a system or a device or component of a system that was not previously accounted for in the databases **44** and **46**. Thus, the inspector can efficiently adapt to changes in his required inspection protocol.

[0026] With the system **30**, an agency or entity that is responsible for monitoring devices, systems and environmental elements within a jurisdiction can easily and efficiently manage the monitoring process and the information that is obtained and generated during the process. In addition, an inspector responsible for inspecting devices, systems and environmental elements located at an environmental site, can obtain an inspection report that includes current and specific information about the devices, systems or environmental elements to be inspected at a particular site.

[0027] Still referring to FIG. **2**, the server **34** can include any desired hardware and any desired corresponding software that allows one to control the hardware. Furthermore, the server **34** can include any desired software that enables the server **34** to maintain the databases, dynamically generate an inspection report, and communicate with one or more of the agency, inspector, and/or manufacturer computers **36**, **38** and **40**, respectively. For example, in this and certain other embodiments, the server **32** is a conventional server that executes a conventional operating system software to support the hardware and software used by the server **34**. The server **34** also executes SQL software to maintain and retrieve data in the databases.

[0028] Still referring to FIG. **2**, the agency, inspector, and manufacturer computers **36**, **38**, and **40**, respectively, each can include any desired hardware and any desired corresponding software that allows one to control the hardware. For example, in this and certain other embodiments, the agency computer **36**, the inspector computer **38**, and the manufacturer computer **40** are each conventional personal computers that execute conventional operating system software to support the respective hardware and respective software that each of the respective computers **36**, **38**, and **40** use.

[0029] FIGS. **3**A-**3**C combined show an inspection report **50** dynamically generated by the system **30** in FIG. **2**, according to an embodiment of the invention. FIG. **3**A shows a first page **52** of the three page inspection report **50**. FIG. **3**B shows a second page **54** of the three page inspection report **50**. And FIG. **3**C shows a third page **55** of the three page inspection report **50**. The inspection report **50** includes current and specific information about the devices, systems or environmental elements to be inspected at a particular site. The inspection report **50** also identifies specific information to be obtained from an inspection.

[0030] For example, in this and certain other embodiments of the inspection report **50**, the first page **52** includes a Property Information section **56** that identifies the specific address of the site to be inspected, an Inspection Summary section **57** that summarizes the results of the inspection, and a general site conditions section **58** that identifies general information to be obtained form an inspection. The second and third pages page **54** and **55**, respectively, list the specific devices and systems that are located at the site and that the inspector is to inspect. The pages **54** and **55** also include specific information **59** grouped with its respective device and system, that identifies the make and model of each device and system, and that is to be obtained from an inspection of the device and system.

[0031] Compared to the inspection report **20** FIG. **1**, an inspector, after reviewing the inspection report **50**, will have a better idea of the devices and system that he will have to inspect, and thus can be better prepared for the specific inspection. And the agency, after reviewing the inspector's completed inspection report, will be able to receive more detailed information about the condition of the devices and

systems at the specific site, and thus perform a more complete compliance assessment.

[0032] Other inspection reports can be dynamically generated by the system **30**. For example, the system **30** can dynamically generate an inspection report specific to a chemical manufacturer's wastewater and toxic byproduct disposal systems. Furthermore, other types of reports can be generated by the system **30** that help an agency easily and efficiently manage a compliance monitoring process, and that help an inspector perform inspections. For example, the system **30** can keep track of scheduled events, such as inspections and updating, generate a reminder for the event, and send the reminder via the network **34** to the appropriate entity. The system **30** can also generate, send and track notification reports that notify the appropriate entity of the results of the agencies compliance assessment. As another example, the system **30** can manage an agency's permit process, as desired. Permits are often required to add a new device or system, to add a new use to an existing device or system, or to modify an existing device or system. The system **30** can track applications for a permit and provide status updates to an application for a permit. As another example, the system **30** can also provide reports that show trends over time relative to a specific site, inspector and/or manufacturer.

[0033] FIG. **4** is a schematic diagram of the report generator **42** in FIG. **2**, according to an embodiment of the invention. The process by which the report generator **42** dynamically generates an inspection report, such as the inspection report **50** in FIGS. **3**A-**3**B, can be any desired process.

[0034] For example, in this and certain other embodiments, the report generator **42** generates an inspection report for a particular site by first retrieving from the database **44** a file **54** having the first type of data for the particular site. If the report generator **42** can not find a file **54** for the particular site, then the report generator **42** communicates this to the inspector computer **38**, and discontinues the dynamic generation of an inspection report for the particular site. If, however, the report generator **42** does find a file **54** for the particular site, then the report generator **42** reads the data that identifies the specific devices, systems, or environmental elements to be inspected at the site. Next, the report generator **42** retrieves from the database **46** the second type of data for the specific devices, systems or environmental elements located in a specific jurisdiction, and reads the data. Then, the report generator **42** combines the first type of data with the second type of data to dynamically generate an inspection report, and provides the report to the inspector computer **38**.

[0035] The report may be provided to the inspector in any desired manner. For example, in this and certain other embodiments, the report may be transmitted electronically over the network **32**, and saved electronically by the inspector computer **38** for future use. In other embodiments, the report may be printed and faxed or mailed to the inspector computer **38** for future use.

[0036] If the inspector discovers that the inspection report does not accurately reflect the devices, systems or environmental elements that he/she is to inspect at a particular site, then the inspector can revise the inspection report. For example, in this and certain other embodiments, the inspector can communicate with the report generator **42** via a laptop computer (not shown) and the internet. Once connected, the inspector can have the update component **52** of the report generator **42** revise the first type of data in the database **44**. To do this, the inspector provides the update component **52** data that identifies the device, system or environmental element to be removed or added. If the device, system or environmental element is to be removed, then the update component **52** retrieves the first type of data, and deletes the information specific to the device, system or environmental element to be removed. If the device, system or environmental element is to be added, then the update component **52** retrieves the appropriate third type of data from the database **47**, and reads the data. The update component **52** than retrieves the first type of data from the database **44** to be revised, and adds the third type of data to update the first type of data.

[0037] In other embodiments, the report generator **42** can dynamically generate an inspection report by first retrieving from the database **44** previously used first and second type data associated with a particular site, and reading the data. Next, the generator can retrieve from another database first and second type data that is current, and read this current data. Then, the generator can compare both sets of data. If the current data is not different than the previously used data, the report generator uses the previously used data to dynamically generate an inspection report. If, however, the current data is different than the previously used data, the report generator will combine the two sets of data to dynamically generate an inspection report that includes the current data.

[0038] FIG. **5** is a flowchart of a process for inspecting an environmental site, according to an embodiment of the invention. In this and certain other embodiments, the process begins with an inspector establishing communication between his inspector computer **38** (FIG. **2**) and the server **34** (FIG. **2**) via the network **32** (FIG. **2**).

[0039] After communication is established at step **60**, the inspector, at step **62**, requests from the server **32** an inspection report for the particular site to be inspected. The server **32** then executes the report generator **42** (FIG. **2**). As discussed in conjunction with FIG. **4**, at step **64**, the report generator **42** determines whether or not data of the first type for the particular site exists in a database of the server **32**. If the data does not exist in a database of the server **32**, then the server **32** informs the inspector computer **38** as discussed in conjunction with FIG. **4**. Then at step **68**, a decision whether or not to generate and save data of the first type for the particular site is made. If the decision is no, then at step **70** the inspection process stops. If the decision is yes then at step **72** data of the first type is generated for the particular site and saved in a database of the server **32**.

[0040] If the report generator **42** does find data of the first type for the particular site, then at step **66**, the report generator dynamically generates an inspection report as discussed in conjunction with FIG. **4**. Next, at step **74**, the inspector retrieves the dynamically generated inspection report and goes to the particular site that he/she is to inspect. At step **76**, the inspector determines whether or not the dynamically generated inspection report accurately identifies the devices, systems and environmental elements located at the site and that are to be inspected. If the inspection report is not accurate, then at step **78**, the inspector requests from the report generator **32** a revised dynamically generated inspection report. Then, at step **80**, the report generator **42** updates the first type of data for the particular site, as discussed in conjunction with FIG. **4**. Once this

update is completed, the report generator **42** dynamically generates at step **66** another inspection report that is current.

[0041] If, however, the first generated inspection report (not the updated inspection report) is accurate, then at step **82**, the inspector inspects the devices, systems or environmental elements and records his findings on the inspection report, and provides the server **32** the data included in the completed inspection report. Next at step **84**, and as discussed in greater detail in conjunction with FIG. **6**, the server **32** validates the completed inspection report and notifies the appropriate entities.

[0042] FIG. **6** is a flowchart of a process for validating a completed inspection report and for notifying an appropriate entity of a result of the validation process, according to an embodiment of the invention. In this and certain other embodiments, the validation and notification process begins when the server **32** receives data from a completed inspection report.

[0043] The data received from the inspector is entered into the system and tested, at step **92**, to determine if all of the required data was provided. If the inspection report fails this test, then at step **94** the server **32** notifies the inspector. The notification can be made by any desired means, such as via the internet, intranet, or by phone call. After being notified of the failure, the inspector determines the cause for the failure and, if appropriate, completes the inspection and submits the data associated with newly completed inspection report to the server **32**. If, however, the failure was not caused by an incomplete inspection report, then at step **96**, the inspector resubmits the data associated with the previously completed inspection report to the server **32**. The server **32** then tests the newly submitted data to determine if all of the data to be obtained during the inspection was provided.

[0044] If the inspection report passes the first test, then at steps **98-102**, the data obtained during the inspection is reviewed to determine if the data makes sense. For example, if a specific portion the data contains numbers when it should contain letters, or if specific data is present that is triggered by the presence of other data. If the inspection report fails any of these tests, then at step **94** the server notifies the inspector, and the process for correcting the failure described in the previous paragraph is performed again.

[0045] If the data included in the inspection report does make sense, then at step **104**, the overall conclusion of the inspection report is reviewed to determine whether or not it agrees with the conclusion of the inspection of each of the specific devices, systems or environmental elements. The overall conclusion can not be more favorable than the least favorable conclusion of one or more of the specific devices, systems or environmental elements. For example, an inspection report that shows the pump located a site as a failing the inspection, must show a failure for the overall conclusion of the inspection. The inspection report can not show a pass for the overall conclusion of the inspection. If the overall conclusion does not agree with the conclusion of each of the specific devices, systems or environmental elements, then the server **32** notifies the inspector at step **94**, and the process for correcting the failure described elsewhere herein is performed again.

[0046] If the overall conclusion does agree with the conclusion of each of the specific devices, systems or environmental elements, then the data in the inspection report is saved in a database **106** for future use by an agency. At step **108**, the server **32** checks to see if one or more appropriate entities should be notified of the results of the validation process or the specific results of the inspection. If one or more appropriate entities should be notified, then the server **32** notifies them. If not, then the validation and notification process terminates.

[0047] Other embodiments of the process are possible. For example, the process may not include a notification process after the inspection report passes the validation process.

[0048] FIG. **7** is a flowchart of a process for a regulatory agency to review and track inspection results, or update data used to dynamically generate an inspection report, according to an embodiment of the invention. In this and certain other embodiments, the review, track or update process begins when the agency computer **36** (FIG. **2**) communicates with the server **32** (FIG. **2**) at step **120**. After communication has been established, the agency requests that the server **32** perform certain functions appropriate for the agency's purpose, and the server **32** then performs these functions.

[0049] If the agency wants to review or track inspection results, then the server **32** retrieves the data in the database **106** (FIG. **6**). The server **32** then provides the data to the agency computer **36**. In this and certain other embodiments, if the agency then wants to analyze the data or use the data for another analysis, the agency requests that the server **32** execute software to arrange or configure the data as desired, or to perform the analysis. Then at step **122** the server executes the appropriate software to perform the requested arrangement, configuration or analysis. Once finished, the server **32** then provides the agency computer **36** the results of the arrangement, configuration or analysis. Thus, the server **32** stores and executes software that the agency can use to asses compliance and perform other analyses. Then, at step **124**, the server **32** notifies the appropriate entity affected by the results of the arrangement, configuration or analysis.

[0050] Other embodiments are possible. For example, the server **32** can provide the agency computer **36** the data that the agency requests, and the agency computer **36**, not the server **32**, can store and execute software that the agency can use to assess compliance and perform other analyses.

[0051] If the agency wants to update data used to dynamically generate an inspection report, then the agency computer **36** provides the server **32** the updated data. The server **32** then retrieves from the appropriate database the data that is no longer current and adds the updated data to the database in the place of the outdated data.

[0052] FIG. **8** is a flowchart of a process for a manufacturer of a device or system to review and update the data used to dynamically generate an inspection report, according to an embodiment of the invention. In this and certain other embodiments, the review and update process begins when the manufacturer computer **40** (FIG. **2**) communicates with the server **32** (FIG. **2**) at step **130**. After communication has been established, the manufacturer requests that the server **32** perform certain functions appropriate for the manufacturer's purpose, and the server **32** then performs these functions. If the manufacturer wants to review the data associated with the specific device or system made by the manufacturer, then the server **32** retrieves and provides the data to the manufacturer computer **40**.

[0053] If the manufacturer wants to update the data associated with the specific device or system made by the

manufacturer, then the manufacturer computer **40** provides the server **32** the updated data. The server **32** at step **132** then retrieves from the appropriate database the data that is no longer current and adds the updated data to the database in the place of the no longer current data.

[0054] If the updated data from the agency directly conflicts with the updated data from the manufacturer, then the updated data from the manufacturer is used by the report generator **42** (FIG. **2**) to dynamically generate an inspection report. An example of data that directly conflicts is data that identifies the flow rate of a pump. The agency might request that the flow rate not exceed a certain level, and the manufacturer might indicate that the pump can provide a flow rate greater than the maximum level requested by the agency.

[0055] From the foregoing, it will be appreciated that, although specific embodiments have been discussed herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the discussion herein. Accordingly, the systems and methods include such modifications as well as all permutations and combinations of the subject matter set forth herein and are not limited except as by the appended claims.

What is claimed is:

1. A method for managing information generated from an environmental inspection, the method comprising:
- retrieving, from a database, a first type of data that identifies the location of an environmental site, and at least one of the following subjects located and to be inspected at the site:
  - a device,
  - a system, and
  - an environmental element,
- retrieving, from a database, a second type of data that identifies information to be obtained from the inspection;
- dynamically generating an inspection report that includes the first type of data and the second type of data; and
- providing the inspection report to an inspector to facilitate the inspector's inspection of the environmental site.

2. The method of claim **1** wherein:
- retrieving both types of data includes retrieving them from a single database;
- and
- generating an inspection report includes comparing the retrieved data that identifies information to be obtained from the inspection with data from a second database that identifies the information currently required to be obtained from the inspection.

3. The method of claim **1** wherein:
- retrieving the first type of data includes retrieving the data from a first database,
- retrieving the second type of data includes retrieving data from a second database that identifies the information currently required to be obtained from the inspection, and
- dynamically generating the inspection report includes combining the first type of data with the second type of data.

4. The method of claim **1** wherein the inspection report is dynamically generated before the inspector arrives at the environmental site.

5. The method of claim **1** wherein the inspection report is dynamically generated after the inspector arrives at the environmental site, before the inspector completes the inspection at the site, and in response to an update of at least one of the two types of data.

6. The method of claim **1** further comprising updating the data.

7. The method of claim **1** wherein the second type of data includes information from at least one of the following sources:
- a regulation of the jurisdiction in which the site is located, and
- a design of the device.

8. The method of claim **1** wherein the environmental element includes water.

9. The method of claim **1** wherein the device includes a septic tank.

10. The method of claim **1** further comprising:
- receiving information obtained from the inspector's inspection of the environmental site; and
- storing the information.

11. The method of claim **1** further comprising:
- receiving information obtained from the inspector's inspection of the environmental site; and
- validating the information.

12. The method of claim **1** further comprising:
- receiving information obtained from the inspector's inspection of the environmental site; and
- comparing the information with acceptable, predetermined limits to determine the acceptance or failure of a device's performance or an environmental element's constitution.

13. The method of claim **1** further comprising notifying at least one of the following entities:
- an owner of the environmental site,
- a possessor of the environmental site,
- a manufacturer of a device or system inspected at the environmental site,
- the regulatory agency responsible for administering compliance of environmental regulations, and
- the inspector who inspected the environmental site.

14. A method for inspecting an environmental site, the method comprising:
- retrieving an inspection report that is dynamically generated from data that identifies the location of the environmental site, and at least one of the following subjects of the inspection located at the environmental site:
  - a device,
  - a system, and
  - an environmental element,
- and from data that identifies information to be obtained from an inspection of the environmental site.

15. The method of claim **14** further comprising reviewing the one or more subjects located at the site.

16. The method of claim **14** further comprising:
- reviewing the one or more subjects located at the site; and
- recording the information obtained from the review;

17. The method of claim **16** wherein recording the information includes uploading the information to a computer.

18. The method of claim **17** wherein uploading the information includes communicating with the computer over the internet.

19. The method of claim **14** further comprising:
reviewing the one or more subjects located at the site;
updating the data that identifies the one or more subjects located and to be inspected at the site;
retrieving another inspection report that includes the updated data and current, corresponding data that identifies the information to be obtained from the inspection;
completing the inspection; and
recording the information obtained from the inspection

20. A method for tracking compliance with environmental regulations, the method comprising:
reviewing dynamically generated inspection reports that include:
data that identifies the location of the environmental site inspected, the one or more subjects inspected at the site, and
data that identifies information obtained from the inspection of the site.

21. A computer-readable storage medium storing a program that, when executed by a computer generates an inspection report that an inspector can use to facilitate an inspection of an environmental site by performing operations comprising:
retrieving, from a database, a first type of data that identifies the location of an environmental site, and at least one of the following subjects located and to be inspected at the site:
a device,
a system, and
an environmental element,
retrieving, from a database, a second type of data that identifies information to be obtained from an inspection of the environmental site;
dynamically generating an inspection report that includes:
the first type of data, and
the second type of data; and
providing the inspection report to an inspector to facilitate the inspector's inspection of the environmental site.

22. A computer system comprising:
a database that includes a first type of data that identifies the location of an environmental site, and at least one of the following subjects located and to be inspected at the site:
a device,
a system, and
an environmental element,
a database that includes a second type of data that identifies information to be obtained from an inspection of the environmental site; and
a report generator operable to retrieve:
the first type of data, and
the second type of data
and operable to combine the first type of data with the second type of data to dynamically generate an inspection report to facilitate an inspector's inspection of the environmental site.

23. A computer network comprising:
a server system including:
a database that includes a first type of data that identifies the location of an environmental site, and at least one of the following subjects located and to be inspected at the site:
a device,
a system, and
an environmental element,
a database that includes a second type of data that identifies information to be obtained from an inspection of the environmental site,
a report generator operable to retrieve:
the first type of data, and
the second type of data,
and operable to combine the first type of data with the second type of data to dynamically generate an inspection report to facilitate an inspector's inspection of the environmental site; and
a client system operable to communicate with the server.

24. The computer network system of claim **23** wherein the client system communicates with the server system via the internet.

25. The computer network system of claim **23** wherein the client system includes an agency computer.

26. The computer network system of claim **23** wherein the client system includes an inspector computer.

27. The computer network system of claim **23** wherein the client system includes a manufacturer computer.

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