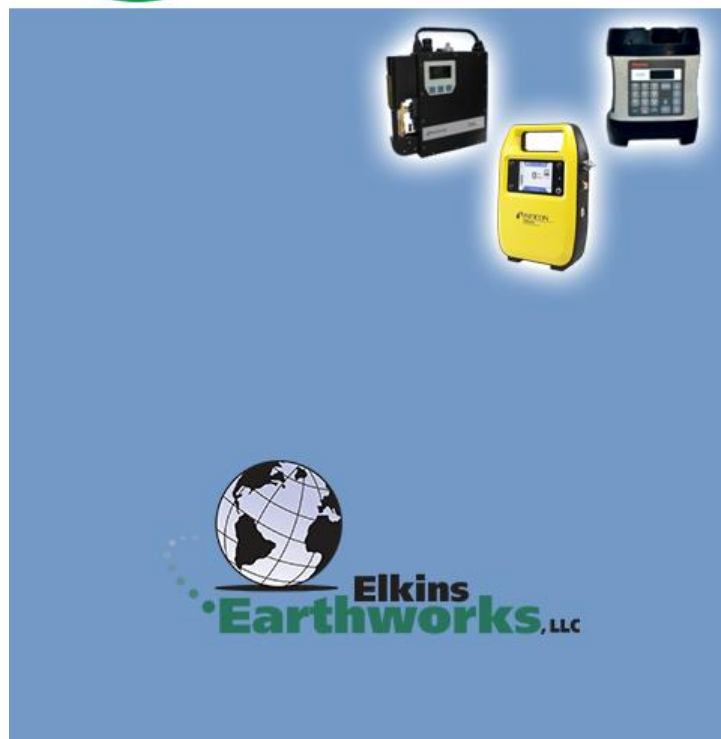


Elkins Earthworks ProSEM Software User Guide



EEW ProSEM Software
User Guide
Revision
February 2019



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Revisions

Revision	Date	Contributors	Description of Changes
1.0	02/2011	Environmental Solutions	Initial Release of SEMonitor
2.0	06/2019	Elkins Earthworks	Updates for ProSEM screenshots and functionality

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Purpose

This user guide details the instructions to set up and operate the ProSEM software. This software runs on a GPS enabled handheld device (Nomad or Archer) with a touch screen (Windows Mobile 6). The handheld device controls operation of various SEM (surface emissions monitoring) equipment including Trimble's SiteFID, Thermofisher's TVA1000 and TVA2020, and Inficon's Irwin. The ProSEM software controls the verification and operation of the SEM instrument, records landfill gas surface monitoring results and GPS locations of samples, and transfers recorded field data to CSV files for storage on other computer systems.

The ProSEM software is specifically designed to meet the requirements for conducting a Landfill Gas Surface Monitoring survey as detailed in USEPA 40 CFR 60, 40 CFR Part 60 - Method 21 and USEPA Guidance Document, "Municipal Solid Waste Landfills, Volume 1 Summary Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills (EPPA-453R/96-004)". The ProSEM Software was designed to gather data in a manner that complies with the current and pending California Rule 1150.1, "Control of Gaseous Emissions from Active Landfills" requirements.

To start the ProSEM software press the main menu or Windows button on the handheld device and navigate to the EEW ProSEM icon. Follow the directions in this user's guide to:

- Set up and configure the ProSEM software
- Use the SEM instrument to record verification, background, and field monitoring measurements

Login Screen



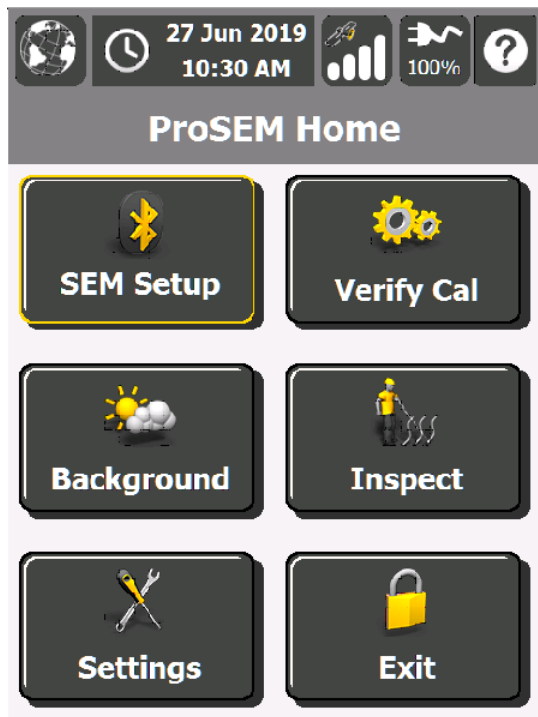
First Name

Last Name

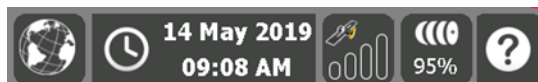

The first screen to appear after launching the software is the login screen. Enter the technician's first and last name in the boxes provided (keypad will pop up when box is pressed) then press the "Sign On" button.

Main Menu



After the technician logs in, the ProSEM Home menu appears. From this menu the technician can navigate to the appropriate area to enter application settings, site settings, verify SEM calibration, record background levels, inspect a site, or log out of the program.

The status bar at the top of the screen will display the current time and date, GPS signal status, and battery power percentage remaining. Tapping the EEW Globe Icon will bring up a display screen showing the ProSEM software version number. Tapping the GPS Icon will bring up a screen that displays the GPS status. Tapping the question mark icon will bring up a help file.



When starting the ProSEM software for the first time or when working at a new site, set up a new site by tapping the Settings button. Input the appropriate options for both the site and the application software so that the monitoring event will comply with the regulatory requirements and site permit conditions.

To verify calibration for the SEM, tap the Verify Cal button and follow the steps provided.

To determine site background levels of methane, tap the Background button and follow the steps provided.

To conduct a landfill gas surface monitoring integrated or instantaneous sampling event tap the Inspect button and follow the steps provided.

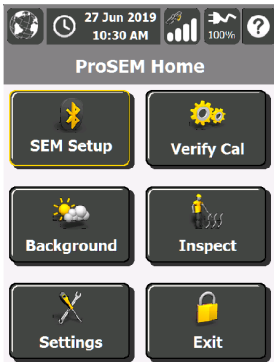
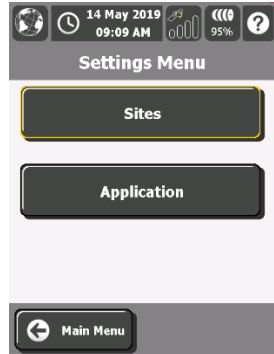
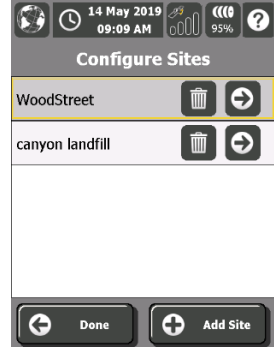
To end the ProSEM application tap the Exit button.





Each of these buttons is explained in more detail in the sections below.


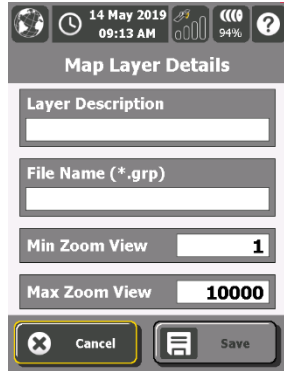

Settings


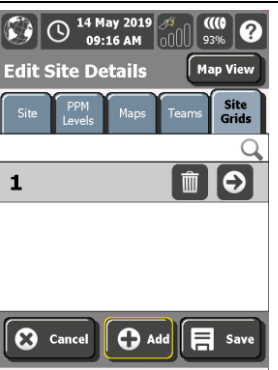
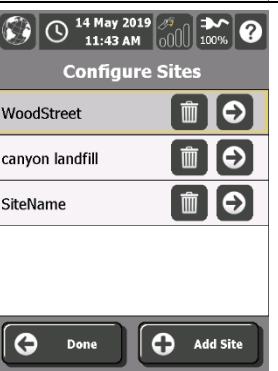
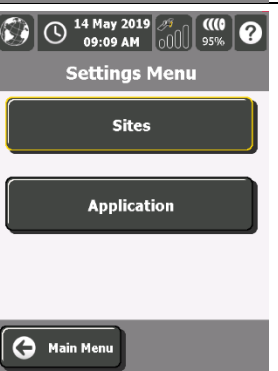
Landfill gas surface monitoring regulatory compliance requirements can vary from site to site based on Federal, State and local regulations. The settings section is designed to allow the Environmental Professional to set up a site along with the site-specific parameters for landfill gas monitoring. These settings should be set by an environmental professional who is knowledgeable about the site regulatory requirements. The settings should be reviewed to make sure they are correct before starting a landfill gas survey.

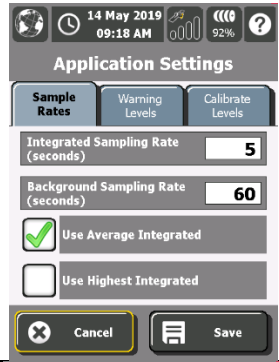
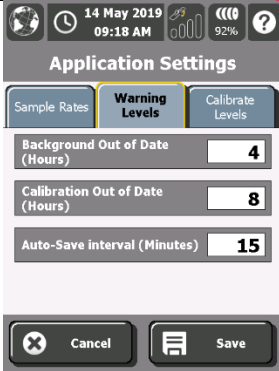
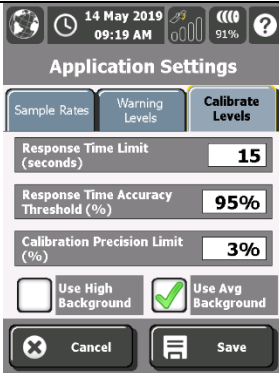
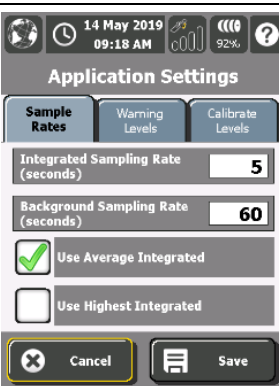
The following is a description of the process to be followed when using the ProSEM Software to input site specific settings for a landfill.

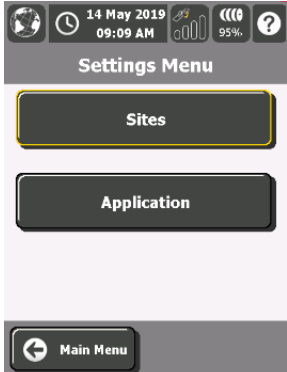
1	Select Settings .	
2	Select Sites This allows the user to set up new sites and to edit information on existing sites.	
3	To add a site, press the Add Site button. To edit an existing site, select the arrow icon . To delete an existing site, select the trash can icon . <i>Note: If you delete an existing site, the data files of existing measurements will remain, but all site-specific information will be deleted from the program.</i>	

4	<p>Site ID</p> <p>Enter a site ID that you want to use to reference the site.</p>	 <p>The screenshot shows the 'Edit Site Details' screen with the 'Site' tab selected. The 'Site ID' field contains the number '3'. Other fields like 'Name' and 'Use Integrated Monitoring' are visible but not the focus of this step.</p>
5	<p>Name Site.</p> <p>Enter a site name.</p> <p><i>Hint:</i></p> <p><i>Keep the site name short. The screen real estate on the handheld device is limited due to the screen size and a long name will only partly display on some screens. Site names of less than 10 characters are recommended.</i></p>	 <p>The screenshot shows the 'Edit Site Details' screen with the 'Name' field containing the text 'SiteName'. The 'Site ID' field still shows '3'.</p>
6	<p>Use Integrated Monitoring</p> <p>Check the integrated site box if you are required to perform an integrated survey of the site. An integrated survey records all readings during a traverse of the landfill.</p> <p>If the box is not checked, the site will be set up for Instantaneous readings only. A reading will only be collected and stored during an inspection when the Log Reading button is pressed.</p> <p><i>Note: If you want to save the GPS locations of your inspection traverse across the landfill to compare to the planned traverse, you need to select the Integrated option!</i></p>	 <p>The screenshot shows the 'Edit Site Details' screen with the 'Use Integrated Monitoring' checkbox checked, indicated by a green checkmark. The 'Name' field contains 'SiteName'.</p>
7	<p>PPM Levels</p> <p>This screen allows the user to set up warning levels and the regulatory exceedance levels for the site. Select the warning or exceedance level you want to change and enter the value. Two warning levels can be set for instantaneous readings. When a warning or exceedance level is exceeded during an inspection, a visual and/or auditory warning will sound to alert the user.</p>	 <p>The screenshot shows the 'Edit Site Details' screen with the 'PPM Levels' tab selected. It displays four input fields for levels: 'Instantaneous Warning Level 1 (PPMV)' set to 200, 'Instantaneous Warning Level 2 (PPMV)' set to 400, 'Instantaneous Exceedance Level (PPMV)' set to 500, and 'Integrated Exceedance Level (PPMV)' set to 25.</p>

<p>8</p>	<p>Maps</p> <p>The maps tab allows you to name and set up map layers for display during the site inspection. Select the Add button to add a new map layer. Press the Arrow icon to edit an existing layer. Select the Trash Can icon to delete a layer.</p> <p><i>Note:</i> The map layers are created by Elkins Earthworks using the Trimble Map Production Utility. See Appendix A for more information on how to obtain and load map layers.</p>	
<p>9</p>	<p>Map Layer Details</p> <p>The Layer Description is the name of the map layer that will display in the Inspection screen. Keep this name short and descriptive e.g. Photo, Map, Grid, Traverse.</p> <p>The file name (*.grp) for the layer needs to be the exact file name of the layer created in the Map Production utility with the grp extension. This is the file that references all the necessary map images and associated data files that the handheld device needs to display the map layer.</p> <p>Minimum zoom level. Set this to 1</p> <p>Maximum zoom level. Set this to 10,000 to start and if the map image in the inspection section does not provide the needed detail at the appropriate zoom level during a site inspection adjust this number up and down by a level of magnitude e.g. 10,000 to 1,000.</p>	
<p>10</p>	<p>Site Grids</p> <p>Whether the site is set up as integrated or instantaneous, the software requires at least one grid to be set up. Select Add to enter new grids for the site. When you are done entering all the grids for the site select the Save button.</p>	

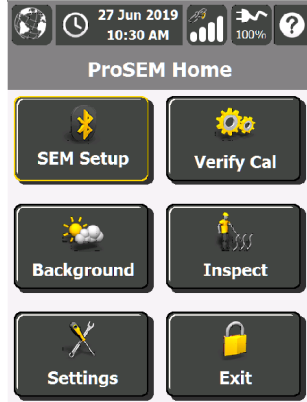
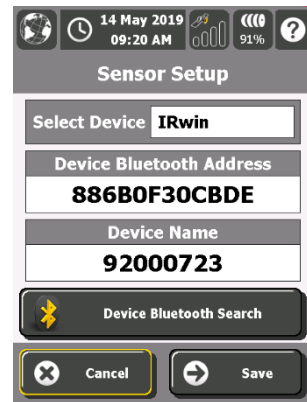
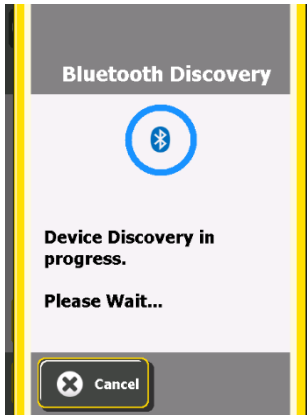
<p>11</p>	<p>Add Site Grid</p> <p>Enter the Grid name or number and select OK.</p> <p><i>Note:</i></p> <p><i>You can divide your site into multiple monitoring areas using grids. You can either add and name each grid individually or enter the total number of grids to generate. In this instance the software will auto generate all the grids by appending numbers to the Grid ID you enter. The inspection data for each area will be saved under the grid name.</i></p>	
<p>12</p>	<p>Delete Grid</p> <p>You can delete an existing grid that is no longer in use at the site by selecting the Trash Can icon.</p> <p>When done select the Save option.</p>	
<p>13</p>	<p>Configure Sites</p> <p>When done creating a new site or editing an existing site select the Done button to return to the Settings Menu</p>	
<p>14</p>	<p>Application Settings</p> <p>Select Application Settings to set the defaults for the ProSEM software. These settings apply to all sites managed by the ProSEM software.</p>	



15	<p>Select the Sample Rate Tab.</p> <p>Integrated and Background Sampling rates can be set here. Select “Use Average” or “Use Highest” Integrated measurement as the value of the level that will be reported by the software.</p>	
16	<p>Select the Warning Levels tab.</p> <p>Enter the number of hours for a background out of date warning and Calibration out of date warning. These values set the number of hours that background or calibration readings are valid for. After these set times expire it is necessary to collect new background or calibration data before a site inspection is allowed.</p>	
17	<p>Select Calibrate Levels tab.</p> <p>Response Time Limit, Response Time Accuracy Threshold % and Calibration Precision Limit % can all be set by the user. For collecting a background reading at a site, you can either select to average all the readings during the background sampling time period or take the highest reading during the period.</p>	
18	<p>When complete with all the Setting changes in each of the tabs select Save.</p>	

19	<p>Done</p> <p>Select the Main Menu button when all applications settings are complete.</p>	
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SEM Setup

The SEM Setup screens are used to establish a Bluetooth wireless link to the specific SEM instrument being used for landfill gas surface monitoring. If more than one SEM gas monitor is present the software will provide a list of instruments to choose from.

1	Select SEM Setup	
2	Select the SEM model by pressing the Select Device selection box. Press the Device Bluetooth Search button. If the SEM Bluetooth address is known, it may be typed into the Device Bluetooth Address field. In this case, there is no need to do the Device Bluetooth Search .	
3	The Software will search for all SEM Instruments of the specified model type selected that are within range of the Bluetooth wireless transmitter. This search will take approximately 30 seconds to complete.	

4	<p>At the end of the search all SEM units in Bluetooth wireless range will be listed. Select the Bluetooth address that matches the instrument you plan to use and then select Save.</p> <p><i>Note:</i></p> <p><i>If no SEM instruments are found, an error message “no Bluetooth devices found” will be displayed. Select Cancel to return to the search menu. Check to make sure that Bluetooth is turned “On” for both the handheld device and the SEM. Retry Device Bluetooth Search.</i></p>	
5	<p>The selected SEM Bluetooth address and the SEM device name will now be displayed on the screen. If the selected SEM instrument is the correct one, select Save. You will be returned to the ProSEM Home Menu and the Nomad and SEM instrument will be connected by Bluetooth.</p>	

Verify Cal

The Verify Calibration option allows you to gather and store precision and response time calibration information for the SEM portable gas monitor.

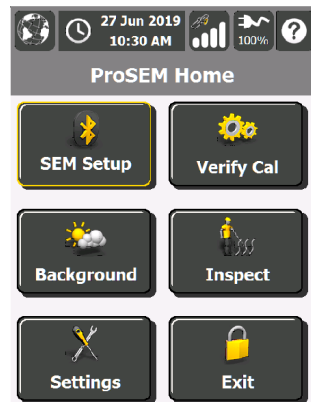
Important set-up tip: The SEM instrument itself must be calibrated to an appropriate calibration gas following the procedures detailed in the instrument's manual prior to running these site-specific calibration verifications for precision and response time.

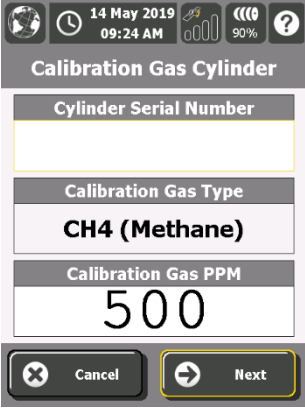
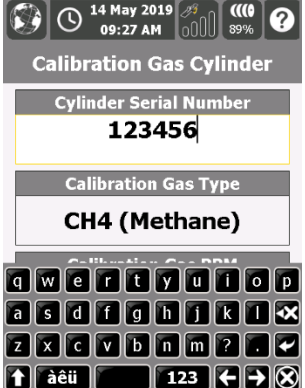
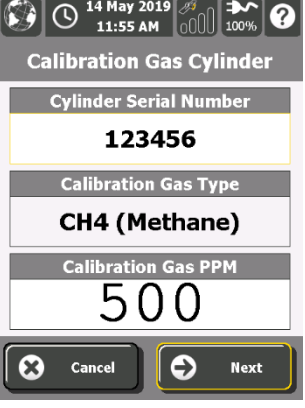
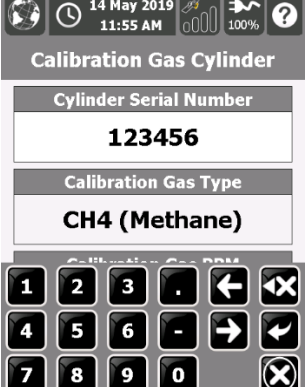
Information on the calibration gas cylinder is entered at the start of calibration procedure. To verify the SEM calibration for landfill gas surface monitoring, three (3) measurements against the calibration gas standard are recorded and the average value is calculated. This value is called the calibration precision value and it is compared against a regulatory required precision value. *Note: The allowed pass criteria for the precision value (e.g. + or - 10%) can be set in the Settings section.*

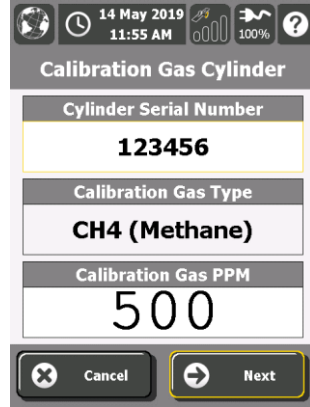
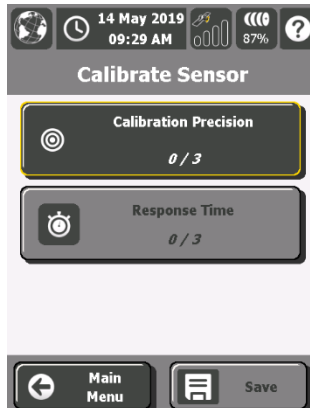
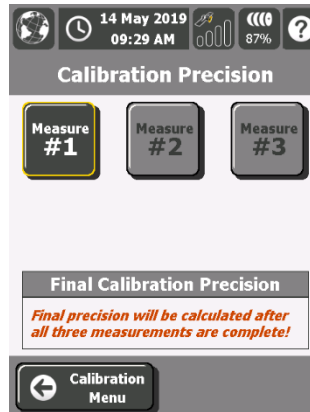
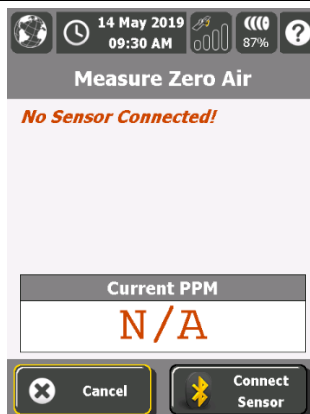
The response time for the instrument is the time it takes to register 90% of the calibration gas value. Three response time measurements are made and the average response time calculated. The average response time is compared to a regulatory required value.

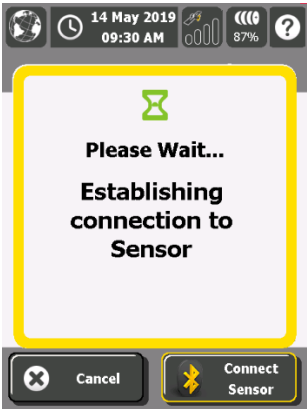
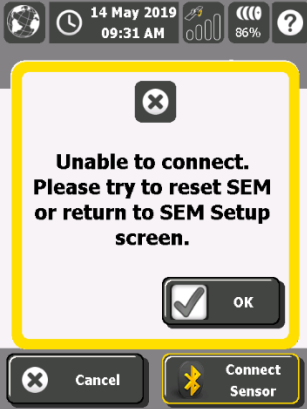
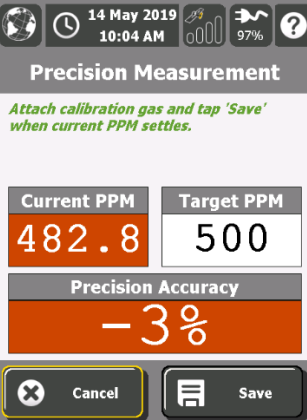
Note: The response time standard (e.g. 30 seconds) can be set in the Settings section.

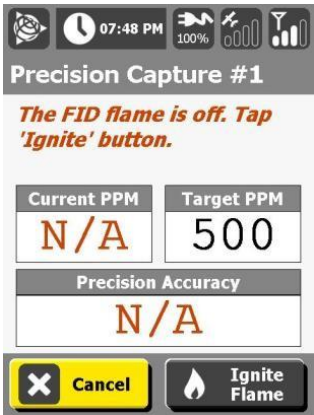
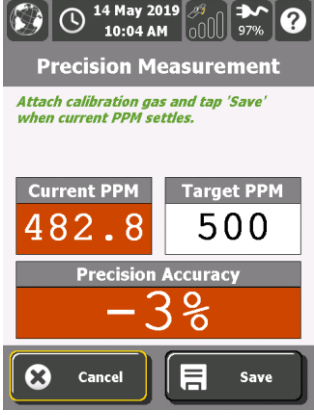
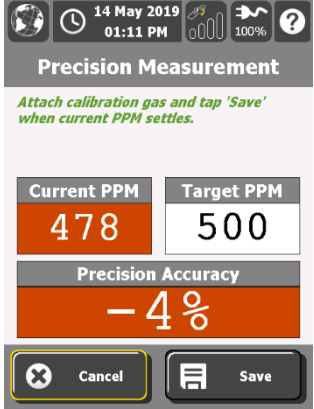
The following is a description of the process to be followed to use the ProSEM software to verify calibration of a SEM portable gas monitor.

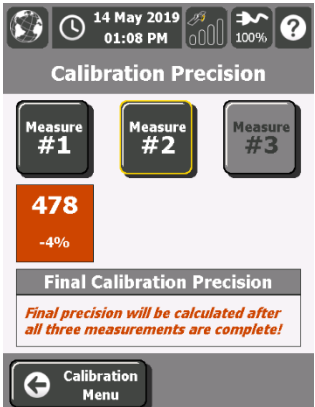
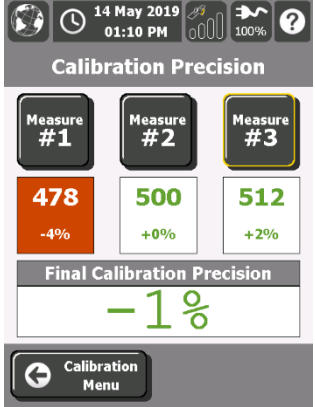
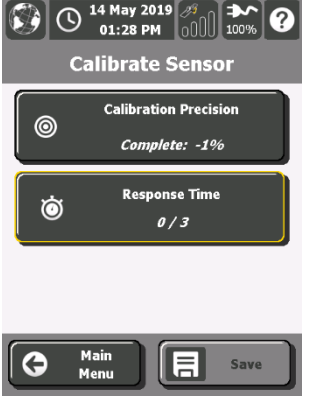

1	Select Verify Cal	 <p>The screenshot shows the ProSEM Home interface. At the top, there is a status bar with icons for a globe, a clock showing '27 Jun 2019 10:30 AM', a bar chart, a signal strength indicator at '100%', and a help icon. Below the status bar is the title 'ProSEM Home'. The main area contains six large, dark grey buttons with yellow icons and text: 'SEM Setup' (wrench and screwdriver icon), 'Verify Cal' (gear icon), 'Background' (sun and cloud icon), 'Inspect' (person with a clipboard icon), 'Settings' (wrench and screwdriver icon), and 'Exit' (yellow padlock icon). The 'Verify Cal' button is highlighted with a yellow border.</p>
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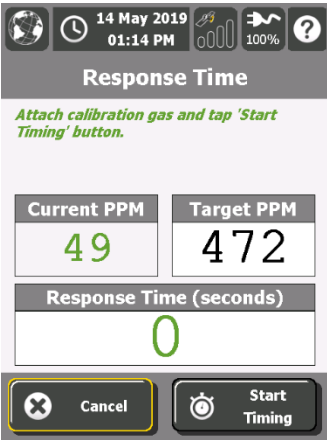
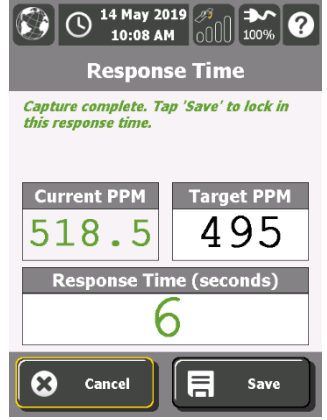
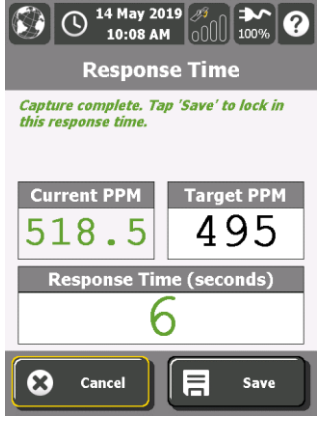
2	<p>Select Cylinder Serial Number.</p> <p>Select the calibration serial number to go to the entry screen.</p>	
3	<p>Enter the serial number or Lot # on the calibration gas cylinder.</p>	
4	<p>The calibration gas used for landfill gas monitoring should be Methane which is the default for the Calibration gas type.</p> <p>Select Calibration Gas PPM.</p>	
5	<p>Enter the Calibration Gas PPM value from the calibration gas cylinder. Select OK.</p>	



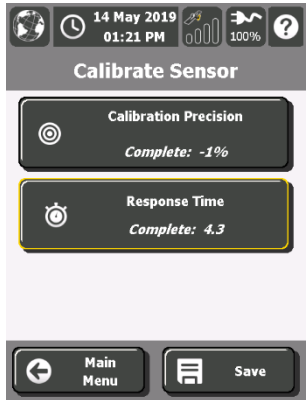
6	Select Next to go the Calibrate Sensor screen	
7	Select Calibration Precision to verify the SEM calibration. Three (3) measurements are required to verify the SEM for landfill gas surface monitoring. The number of measurements completed are displayed on the Calibration Precision button.	
8	Select Measure #1 .	
9	If this is the first time this screen has been accessed, the SEM instrument needs to be connected to the handheld device to send data over the Bluetooth connection which was established in the SEM Setup Procedure. Select Connect Sensor	

10	<p>Establishing connection</p> <p>As the software is establishing a connection to the SEM portable gas monitor the information screen will appear for approximately 10 seconds</p>	
11	<p>If the software was not able to establish a connection to the SEM gas monitor you will see this screen.</p> <p>Check the following and try to connect again:</p> <ol style="list-style-type: none"> 1. The Bluetooth option is turned on in the handheld device. 2. The SEM is set up to stream real time data. <p><i>Note:</i> <i>On the SiteFID monitor select: SiteFID Setup>Enter Password>Real Time Data> Real Time Data ON</i></p> <p>If you still have problems, refer to the manual for the SEM being used.</p>	
12	<p>The ProSEM Software will establish a connection to the SEM instrument using Bluetooth. When the connection is established the SEM will start sending measurements to the ProSEM software.</p>	

13	<p>If the SEM instrument is a FID (flame ionization detector) and the flame has not been ignited, a FID flame off warning will be displayed. If the Ignite Flame button is present, pressing it will cause the ProSEM software to send a command to the FID that will turn on the pump and ignite the hydrogen flame in the detector. It may take 2 or 3 tries to ignite the flame. If the flame does not ignite (or the Ignite Flame button is not present) refer to the FID manual to see how to ignite the flame directly from the FID unit itself.</p> <p><i>Note: Make sure the hydrogen tank is turned on and there is hydrogen in the tank.</i></p>	
14	<p>Once the connection is established to the SEM instrument, readings will appear in the Current PPM window. Start the calibration with zero air. Then attach the calibration gas and let the reading stabilize. With the calibration gas connected the readings should stabilize near the Calibration gas value.</p> <p><i>Note:</i></p> <p>If using a tedlar bag to calibrate the SEM, do not over inflate the tedlar bag with the calibration gas. The bag should only be full enough to extend the bag 1 inch in the middle of the bag. If the bag is over inflated, the pressure forces more calibration gas through the detector, and the verification will not be accurate. Readings at normal atmospheric pressure will then be biased low and the measurements will drift more than if calibrated properly. See the SEM User Manual for more details.</p>	
15	<p>Once the reading has stabilized select Save. The accuracy of the SEM instrument measurement as compared to the Calibration gas standard is displayed in the Precision Accuracy window. If the accuracy is outside the acceptable percentage range (that is set in the Settings section), the background in the Precision Accuracy window will be colored red. If the value is within the established accuracy range, the background color will be white.</p>	

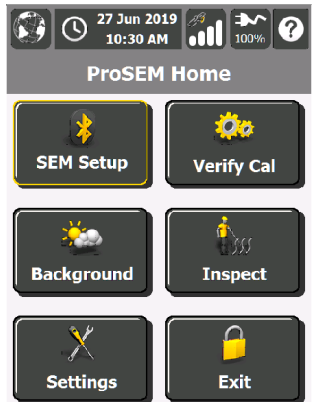
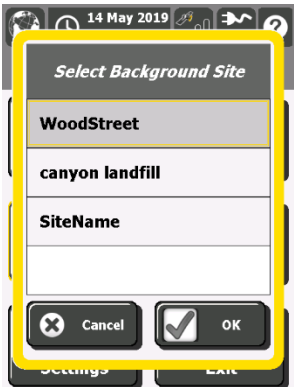
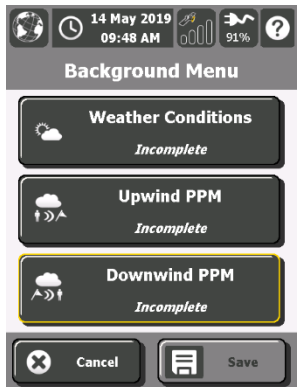
16	<p>Repeat the above calibration verification procedure for Measure #2 and Measure #3.</p> <p><i>Note:</i> For each verification you need to detach the calibration gas and let the instrument return to reading zero air before attaching the calibration gas and taking the next reading.</p>	
17	<p>At the completion of the third verification measurement, the Final Calibration Precision percentage for the three readings is calculated and displayed in the Final Calibration Precision window.</p> <p>Compare the calculated precision value with the regulatory requirement for landfill gas surface monitoring at your landfill. If the value is out of range, the SEM may need to be recalibrated (according to its manual) before it can be used.</p> <p>Select Calibration Menu</p>	
18	<p>Once the Calibrate Precision steps are finished “Complete: X%” is displayed in the Calibrate Precision button.</p> <p>To complete the next step in the verification process, select Response Time.</p>	
19	<p>Select Measure #1</p>	

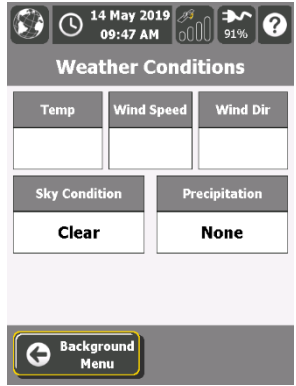

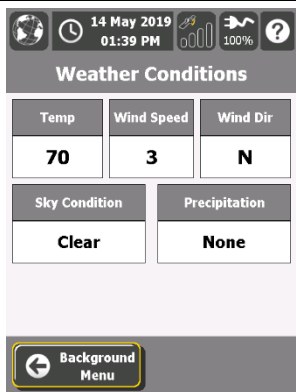
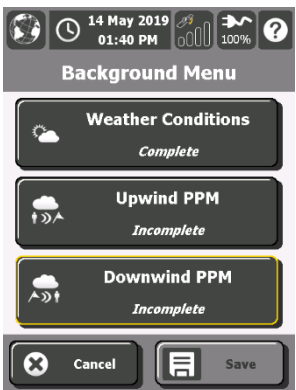
20	<p>Disconnect the calibration gas and let the SEM stabilize to the background concentration. Then connect the calibration gas to the SEM while simultaneously pressing the Start Timing button.</p> <p><i>Note:</i> The response time should be measured using the hose and probe that will be used in the field for collecting samples.</p>	
21	<p>The Response Time will be measured as the time it takes the SEM instrument to reach 90% of the calibration gas concentration. This concentration is calculated by the software based on the site-specific values entered in the settings section for the site.</p>	
22	<p>When this value is reached, the response time value is displayed in the Response Time window.</p> <p>Select Save</p>	

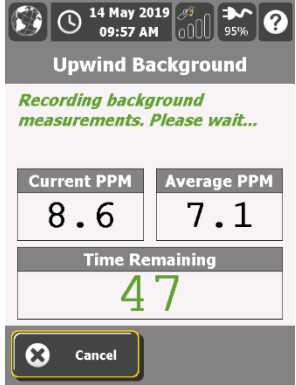
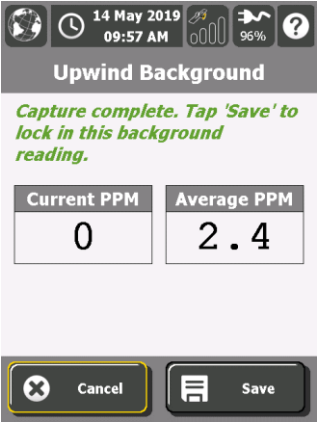
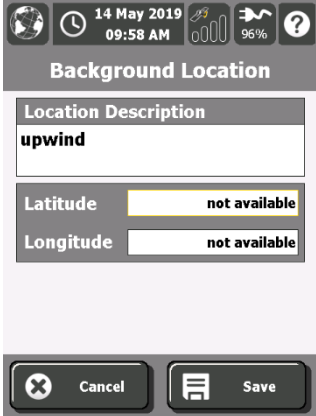
23	<p>The response time for measurement #1 is displayed on the Response Times Screen. The starting and ending concentrations for the response times are both recorded.</p> <p>Repeat the above response time procedure for Measure #2 and Measure #3.</p>	
24	<p>At the completion of the third response time reading, the average response time is calculated and displayed in the Final Average Response Time Window. Compare the calculated average response time with the regulatory requirement value for landfill gas surface monitoring at your landfill.</p> <p>If the value is out of range, refer to the user's manual for the SEM instrument you are using.</p> <p><i>Note:</i> <i>Make sure there is no obstruction or blockage in the sample hoses.</i></p> <p>Select Calibration Menu</p>	
25	<p>Once the Response Time steps are finished "Complete: X seconds" is displayed in the Response Time button.</p> <p>Once both the Calibration Precision and Response Time calibration steps are complete select Save then Main Menu.</p>	

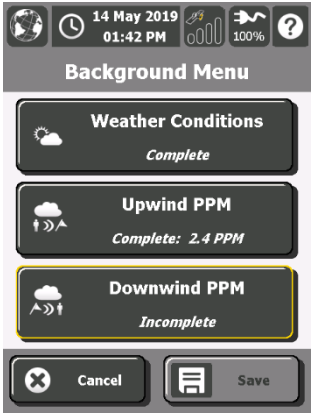
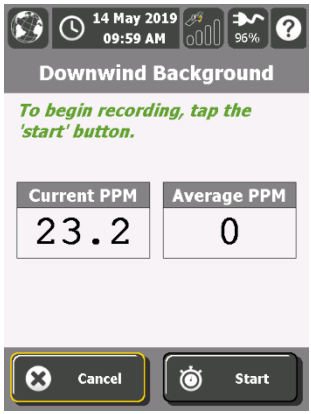
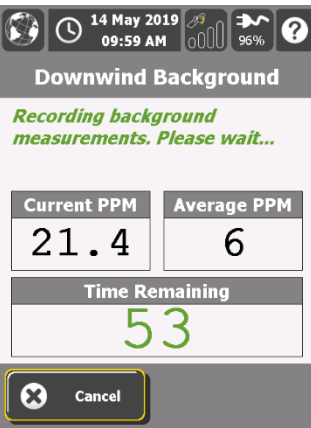

Background


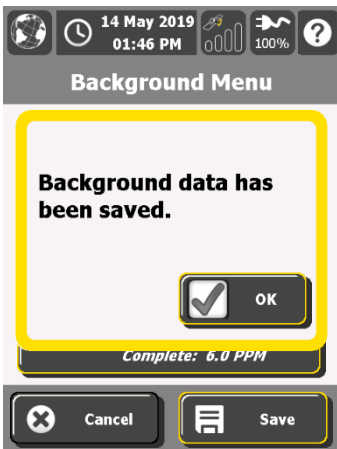
A background measurement should be taken before conducting landfill gas surface monitoring at the landfill. To perform the background measurement, the wind direction needs to be determined. Upwind and downwind background readings should be collected at the landfill to determine ambient levels at the site. These levels will be subtracted from the surface gas monitoring measurements. If background conditions at the site change during monitoring, new background readings may be taken. Landfill gas surface monitoring readings from this point on will be adjusted for the new background level. The following is a description of the process to be followed to use the ProSEM Software to measure background conditions at the site using the SEM portable gas monitor.

1	Select Background	
2	<p>Select the landfill site name from the list. Once the site is selected and highlighted select OK.</p> <p>If your site is not listed, it needs to be added. See the Settings section on how to add a new landfill site to the ProSEM software.</p>	
3	Select Weather Conditions	

4	<p>Tap the Temp, Wind speed, Wind Direction, Sky Condition and Precipitation buttons one at a time.</p> <p>Use the touch screen keypad or select an option from a drop-down menu to enter the Weather Conditions at the site.</p>	 
5	<p>When all weather conditions for the site have been entered, select Background Menu</p>	
6	<p>After weather conditions have been entered, Complete is indicated on the Weather Conditions Button. Select Upwind PPM.</p>	

7	<p>Take the SEM instrument to an upwind point at the landfill and allow the ambient readings to stabilize.</p> <p>Select Start to measure the upwind background level.</p> <p><i>Note:</i></p> <p><i>The length of time to gather a background sample can be set in the Settings Section as well as if you are using an average or maximum reading for the background level.</i></p> <p><i>Make sure that you are getting a stable GPS signal before taking the Background sample so that the location will be recorded accurately.</i></p>	
8	<p>The SEM instrument will start reading the ambient air concentration of methane. The upwind background reading will take a measurement over user defined period (defined in Settings Section) and average the readings. The average upwind background reading will be displayed in the Average PPM window.</p> <p>When complete select Save.</p>	
9	<p>Enter a location description for the upwind background sample location. The latitude and longitude of the location will automatically be stored with the upwind sample location value.</p> <p>Select Save.</p>	

10	<p>After the upwind background reading is complete, the background reading is displayed in the Upwind PPM Button as “Complete: X ppm”</p> <p>Select Downwind PPM</p> <p><i>Note:</i> The upwind and downwind background readings can be taken in any order, e.g., the Upwind reading does not need to be collected first.</p>	
11	<p>Take the SEM instrument to a downwind point at the landfill and allow the ambient readings to stabilize.</p> <p>Select Start to measure the downwind background level.</p>	
12	<p>The SEM instrument will start reading the ambient air concentration of methane. The average downwind background reading will be displayed in the Average PPM window.</p> <p>When complete select Save.</p>	
13	<p>Enter a location description for the downwind background sample location. The latitude and longitude of the location will automatically be stored with the downwind sample location value.</p> <p>Select Save.</p>	

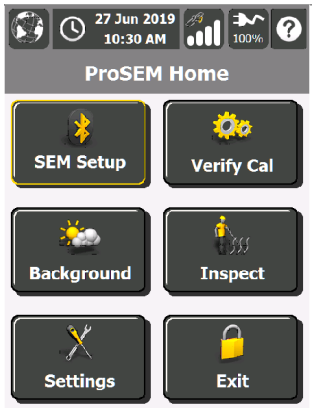
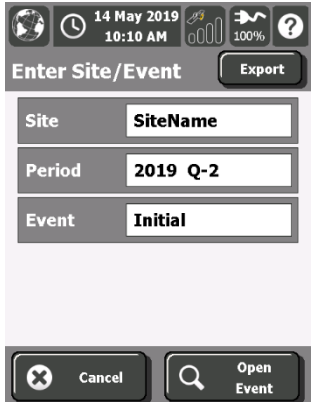
14	<p>When all the Weather Conditions, Upwind PPM, and Downwind PPM measurements are complete select Save.</p>	 <p>The screenshot shows the 'Background Menu' interface. At the top, there's a status bar with a globe icon, a clock showing '14 May 2019 01:45 PM', a battery level icon at '100%', and a help icon. Below this, the title 'Background Menu' is centered. There are three main sections: 'Weather Conditions' with a sun and cloud icon and the status 'Complete'; 'Upwind PPM' with a cloud and wind icon and the status 'Complete: 2.4 PPM'; and 'Downwind PPM' with a cloud and wind icon and the status 'Complete: 6.0 PPM'. The 'Downwind PPM' section is highlighted with a yellow border. At the bottom, there are two buttons: 'Cancel' with a close icon and 'Save' with a save icon.</p>
15	<p>A message will be displayed that the background file has been saved. The background value for the site will be added to the regulator action levels for the landfill gas monitoring activities. For example, if the regulatory action level is 500 ppm and the background level is 23 ppm, the action level for the landfill gas surface monitoring will be 523 ppm. This takes into account the site ambient air background level of 23 ppm.</p>	 <p>The screenshot shows the 'Background Menu' interface after saving. A large yellow-bordered box in the center contains the text 'Background data has been saved.' with an 'OK' button that has a checkmark icon. Below this box, the 'Downwind PPM' status is still visible as 'Complete: 6.0 PPM'. The 'Cancel' and 'Save' buttons remain at the bottom.</p>

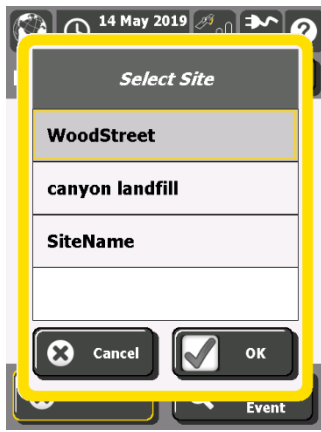
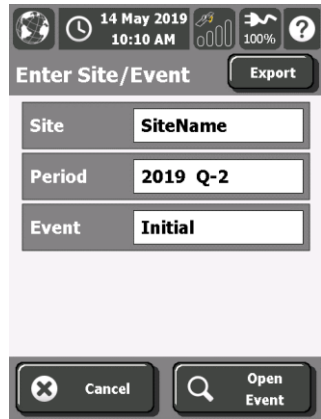
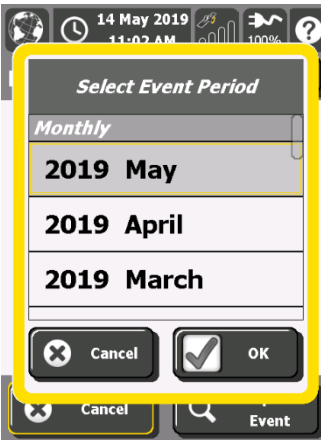
Inspect

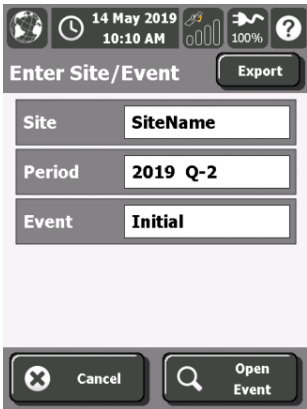
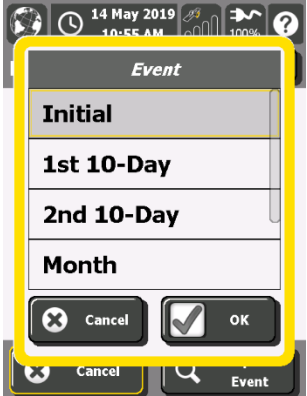
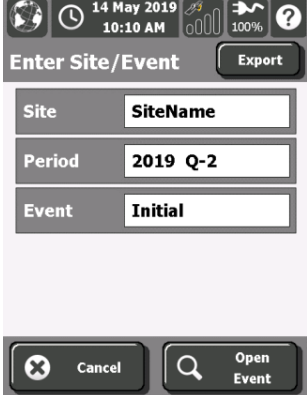
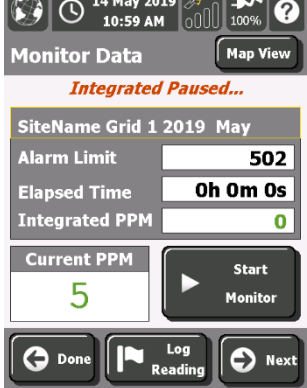
The calibration and background readings should be completed before selecting the inspect button. Inspection consists of collecting landfill gas surface monitoring data for the landfill. ProSEM software collects integrated and instantaneous data simultaneously. An integrated landfill gas monitoring event can be paused to collect an instantaneous reading and then resumed. The ProSEM software manages the data gathering of: Initial, First 10-day, Second 10-day, Month, and Month + 10-day surface monitoring data. See the Appendix B remonitoring flowchart which shows what happens when exceedances are encountered for each event.

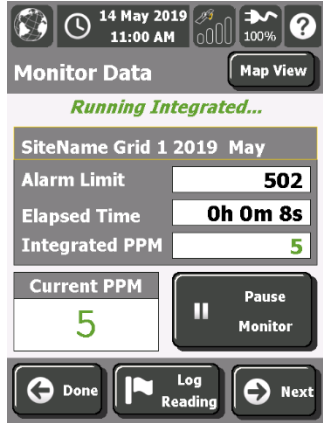
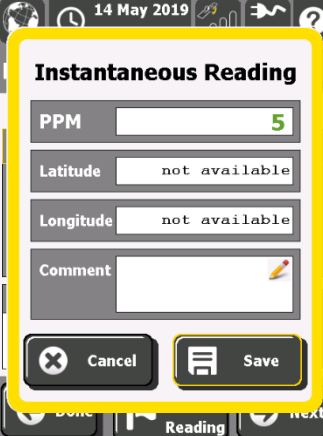
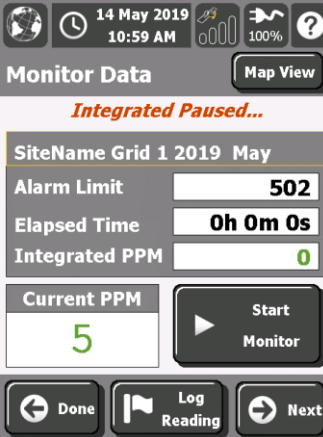
The software uses the handheld device's GPS positioning capability to mark exceedances and record the locations for subsequent follow-up compliance monitoring (e.g. First 10-day re-measurement). If a georeferenced site base map or air photo of the landfill has been loaded to the program, the environmental professional conducting the site survey can monitor and track their sampling traverse across the landfill using the ProSEM map view feature. The ProSEM software records the position of all samples collected during the landfill gas surface monitoring event using the handheld device's GPS functionality.

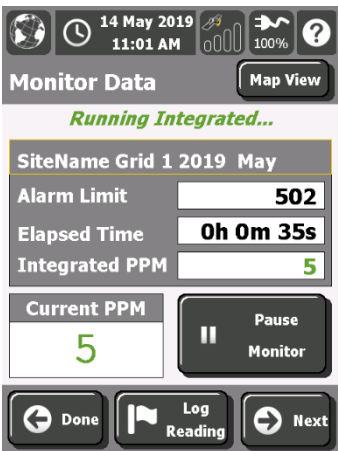
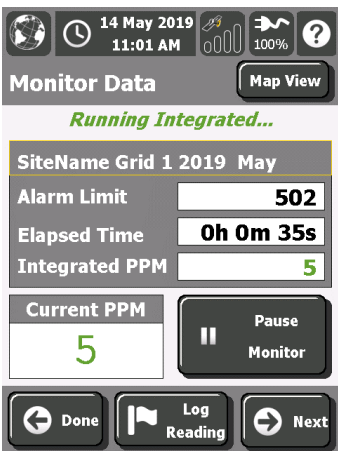
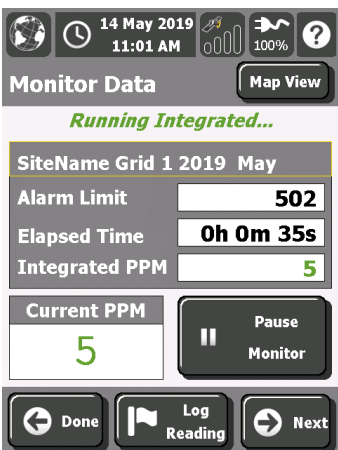
The following is a description of the process to be followed to use the ProSEM Software to collect integrated and instantaneous landfill gas surface sample data at a landfill using a SEM portable gas monitor.



1	Select Inspect .	
2.	Select Site .	

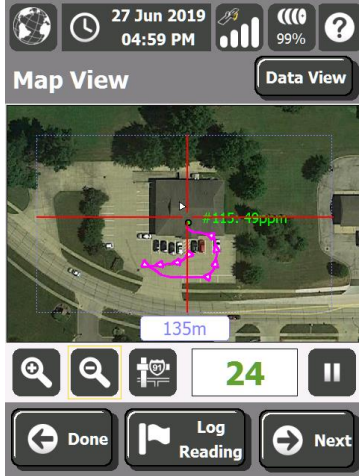
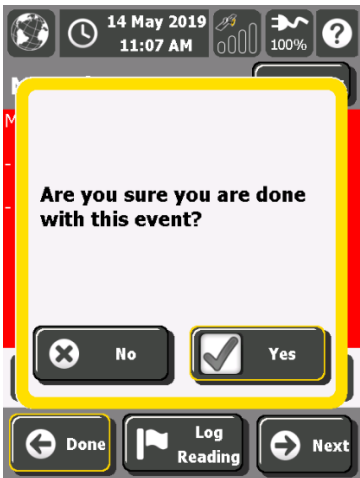
<p>3.</p>	<p>Choose the site from the dropdown list and select OK.</p> <p>If the landfill site is not listed, go to the Settings section and follow the instructions on how to add a new landfill site to the ProSEM software.</p> <p><i>Hint: When making the site name keep it short so that it displays on the limited size screen of the handheld device.</i></p>	
<p>4</p>	<p>Select Period.</p> <p>Select the period you want to collect monitoring data for. The data for each monitoring period will be saved in separate files.</p> <p><i>Note: The current quarterly period will display at the top. When a new quarter starts, the next quarter will automatically show up on the list. The program uses the handheld device's date and time to determine when to add the next quarterly monitoring period.</i></p>	
<p>5</p>	<p>Choose the monthly or quarterly period for the sampling event. Select OK.</p>	

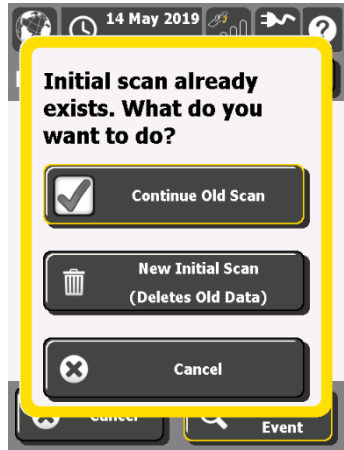
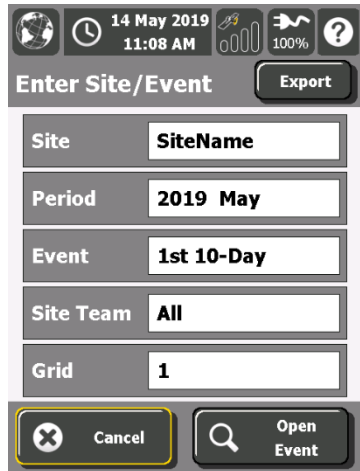
6	<p>Select Open Event.</p> <p>The initial event is the first inspection to gather landfill surface gas data at a facility. The First 10 day, Second 10 day, Month, and Month + 10 events are sequential occurrences after the Initial monitoring. The exceedances recorded in the previous event are passed on to the subsequent event for re-monitoring. If you need to record a discrete sample that is not related to landfill gas surface monitoring, select the Point Check option.</p>	
7	<p>Choose the type of event.</p> <p>You need to conduct an Initial inspection of a site before the additional remonitoring options are available.</p> <p>Select OK.</p> <p><i>Note:</i> See the Appendix B remonitoring flowchart which shows what happens when exceedances are encountered for each event.</p>	
8	<p>After the Site, Period and Event are chosen, select Open Event.</p>	
9	<p>Select Start Monitor to start an integrated monitoring event.</p> <p><i>Note:</i> The type of monitoring can be Instantaneous or Integrated. The type of monitoring for the site is set in the Settings Section. An Instantaneous site does not store monitoring data on the traverses but only when instantaneous readings are taken. An integrated site allows you to record your traverse information and displays it on the site base map on the handheld device. An integrated site stores data by grids which are set up in the Settings Section.</p>	


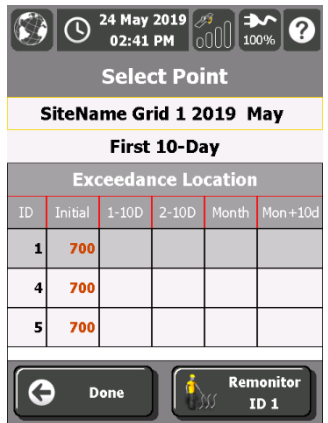
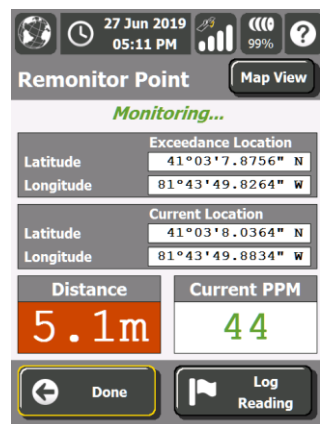
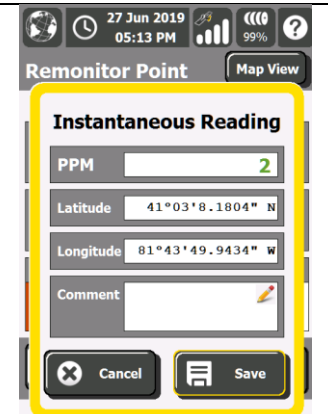
10	<p>Select Pause Monitor to pause an integrated monitoring event.</p> <p>Go to the area where you want to take an instantaneous reading. Let the reading stabilize in the Current PPM window.</p> <p>Select Log Reading.</p>	
11	<p>The SEM instantaneous reading value and location are displayed.</p> <p>Select Save to store reading or Cancel to reject.</p> <p>Saving will store the instantaneous reading location and mark it on the site map.</p>	
12	<p>Return to the location where the integrated reading was paused and select Start Monitor to resume the integrated monitoring event.</p>	

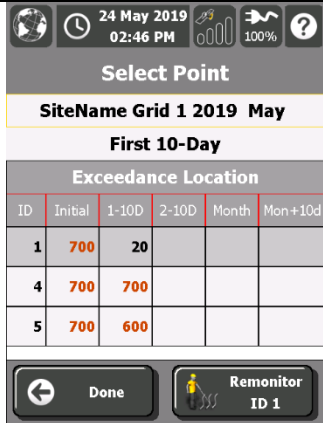
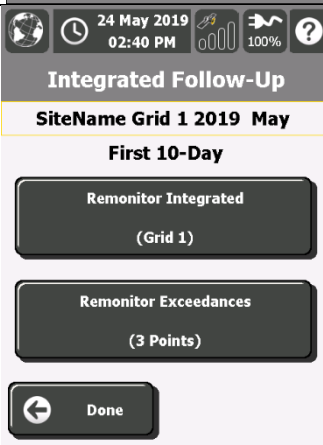
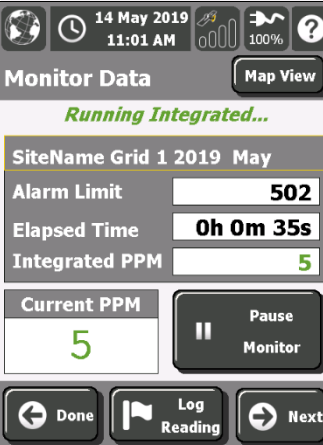
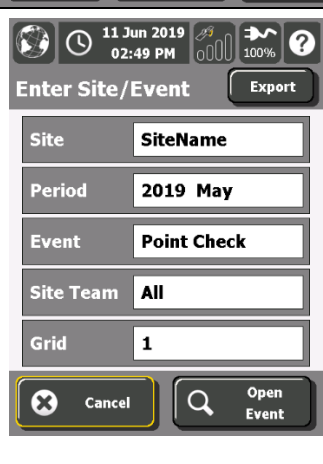
13	<p>When the integrated monitoring event is complete, select Next to go to the next grid or Done to complete the event and return to the Site/Event screen.</p> <p>The landfill gas surface monitoring data is stored in data files on the handheld device.</p>	
14	<p>Instantaneous Monitoring</p> <p>When an instantaneous monitoring set-up is selected for the site, the data screen will display the SEM reading and allow the User to Start/Pause the GPS tracking of the site survey route. Use the Log Readings button to record an instantaneous reading. The Map View Button will display the site Base maps and if the GSP Track is on, a breadcrumb trail of the inspection route will be displayed on the Map View.</p>	
15	<p>Map View</p> <p>Select the Map View Button on the data view screen</p>	

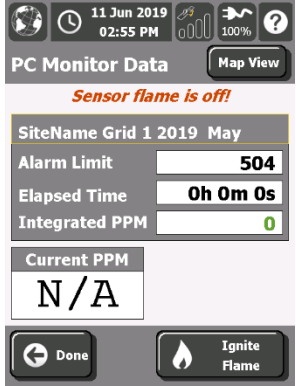
16	<p>The Map View allows the user to display a base map of the facility that can be a combination of layers including air photo, CAD Base Map, GIS base map, and planned traverses for the landfill gas surface monitoring. To select the available layers, tap the Map Layer Icon (Road Map I-91). The + and – icons zoom in and out of the map to provide the appropriate scale for working at the site.</p> <p>The current reading of the SEM is displayed in the reading window. To pause or continue an integrated scan you can select the Play/Pause button. To return to the data view, select the Data View button.</p>	
17	<p>Map Layers</p> <p>Map option can display several layers on the handheld device for the field personnel. Select the Map Overlays and then the check box to turn a layer on or off. Select OK when done to return to the map view.</p> <p>The data gathered during the site inspection are also stored on separate layers that can be turned on and off by the users. The Measurements option displays the instantaneous measurements and the GPS Track displays the sample route for the inspection.</p> <p><i>Note:</i></p> <p><i>When you first go to Map view at a site, you need to go here and turn on a layer before anything will show up in the map view screen.</i></p>	

<p>18</p>	<p>The Map View provides a view of your location marked by a red cross overlaid on a facility CAD map or air photo. As you move around on the site, the map will show your location and re-center itself automatically when your location nears the edge of the map on the screen.</p> <p>The integrated or instantaneous route surveyed is marked in pink with a breadcrumb trail of yellow dots. An instantaneous reading is indicated on the map as a green symbol with the sample number and the reading showing next to the point. If the instantaneous reading is above the action level, the symbol and label are red in color.</p> <p>Select the Next button to go to the next grid.</p> <p>When you have completed the monitoring event, select the Done button.</p> <p><i>Note:</i> To start the integrated survey after taking an instantaneous reading, be sure to select the Play symbol to start up the integrated survey again from the place you left off.</p>	
<p>19</p>	<p>Complete warning.</p> <p>When you have selected the Done option to end inspection activities, you will get this warning to provide you an opportunity to continue monitoring in case the Done key was hit by accident. Select Yes to complete the monitoring or No to return to the site inspection.</p> <p><i>Note:</i> The inspection may be resumed at a later time even if you replied "Yes" to this pop-up window.</p>	

20	<p>Continue Scan</p> <p>If you do not complete an initial inspection during a work session, you can stop the inspection and restart it later. To re-start an initial inspection, select the inspection site, period, and event that was interrupted. If data for this event exists, a screen will be displayed to ask if you want to</p> <p>Continue Old Scan (continue an Inspection).</p> <p>If you select the Continue Old Scan option, new data will be appended to the existing site inspection data.</p> <p>If you select the New Initial Scan option, the existing data is deleted. This option is used when there is a problem with the previous scan and it needs to be re-done.</p> <p><i>Note: The historical measurement data still exists in the site's database directory even if a New Initial Scan is selected.</i></p> <p>The Cancel option is used if you select the wrong site, period or scan option to return to the main Inspect Menu.</p>	
21	<p>Additional Follow-up</p> <p>After the initial scan the ProSEM Software allows you to follow-up and record 1st 10 day, 2nd 10 day, Month, and Month + 10 day exceedance points. To conduct follow-up monitoring select the Event you want to monitor e.g. 1st 10 Day. Select the Open Event button.</p> <p><i>Note: See Appendix B to see a flowchart of how follow up events work in the ProSEM software.</i></p>	

22	<p>Select if you want to Remonitor Instantaneous exceedances or a grid Integrated Exceedance.</p>	
23	<p>Select Exceedance to remonitor. Highlight the exceedance you want to remonitor and select the Remonitor ID x button.</p>	
24	<p>To remonitor an exceedance point, navigate to the point. The screen will display the original GPS coordinates, your current coordinates, and the distance to the original location. You can use the Map View to navigate to the original point. When you have arrived and are prepared to log a new reading select the Log Reading button.</p>	
25	<p>Add any comment you want about the location and select the Save button. The latitude and longitude of the new reading will be stored along with the new sample concentration.</p>	

26	<p>Select additional points to monitor. Points that are below the site exceedance level are displayed in black and points that continue to exceed the site regulatory limit are displayed in Red.</p> <p>Repeat the above remonitoring procedure for the 2nd 10-day, month, and month + 10 day as required. Select the Done button when complete with the remonitoring survey.</p>	
27	<p>Remonitoring Integrated Exceedance</p> <p>Select the Remonitor Integrated exceedance from the follow-up options. Select the grid to be monitored from the next screen.</p>	
28	<p>Remonitor the grid to obtain the new average integrated value for the grid. Repeat the above integrated remonitoring procedure for the 2nd 10 day, month, month+10 day as required. Select the Done button when complete.</p>	
29	<p>Point Check</p> <p>This function allows the user to monitor and record points at the site that are not part of the landfill surface monitoring compliance program. To monitor and record a point at the site use the Point Check option in the Event selection options on the main screen. The point check data will be stored in a separate .csv file from the landfill gas surface monitoring data and is available to download and opened with Microsoft Excel.</p>	

30	<p>If a FID is being used as the SEM instrument and the flame is extinguished, a warning, “Sensor Flame is off!” is displayed. Select Ignite Flame to restart the FID detector. If the flame relights continue the survey. If the Flame does not relight refer to the FID instrument User Guide.</p>	 <p>The screenshot displays the 'PC Monitor Data' interface. At the top, it shows the date '11 Jun 2019' and time '02:55 PM'. Below this, a status bar indicates 'Sensor flame is off!' in red text. The interface includes several data fields: 'SiteName Grid 1 2019 May', 'Alarm Limit' set to '504', 'Elapsed Time' at '0h 0m 0s', and 'Integrated PPM' at '0'. A 'Current PPM' field shows 'N/A'. At the bottom, there are two buttons: 'Done' and 'Ignite Flame'.</p>
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ProSEM Data

Site data collected during a landfill gas surface monitoring survey is stored on the handheld device in comma separated value (csv) files. These files can be copied to a desktop computer and opened with Microsoft Excel.

Directory Structure

ProSEM uses the following directory structure to store files on the handheld device.

Root directory

- ProSEM Data

 - Calibration Verification

 - Site Data

 - Site Name 1

 - Background

 - Database

 - Maps

 - Monitoring

 - Site Name 2

 - Background

 - Database

 - Maps

 - Monitoring

 - ...

 - Site Name X

 - Background

 - Database

 - Maps

 - Monitoring

- Application Data

 - ProSEM

 - AUTO_SAVE

 - MasterData

Data File Definitions

Important tip: All the latitude and longitude GPS coordinates in the data files are in the WGS84 latitude and longitude decimal degrees. Northing and easting are in the site projection coordinate system (e.g. System=US State Plane 1983, Zone=Maryland 1900, Datum NAD 1983(Conus)).

ProSEM exports data into four main types/directories:

1. Calibration Verification
2. Site Background
3. Site Monitoring
4. Site Database

All files are exported in comma-separated value (.CSV) format. The first column in every row is a descriptor which identifies the row type. Files may include header labels to make the files easier to understand. Header labels appear above the data rows. Header labels can be identified (and ignored by software processing) by an EMPTY first column (i.e. no row descriptor).

The description and column definitions for each file type are contained in the following pages.

Calibration Verification File

The Calibration Verification File contains summary and detail information about Calibration Precision and Response Time tests for a given SEM instrument. A Single CALIBRATION SUMMARY line includes the averages and general information. This line is followed by three PRECISION MEASUREMENT lines and three RESPONSE TIME MEASUREMENT lines which give the details of each measurement test.

File Naming Convention:

VERIFICATION_fidHardwareId_year_month_day_hour_minute.CSV

Note: Date/Time in file names use UTC 24-hour clock.

Row Type: CALIBRATION SUMMARY

Column	Description	Data Type
1	ROW DESCRIPTOR [always "CALIBRATION SUMMARY"]	String
2	OPERATOR NAME	String
3	FID ID	String
4	FILE SAVE TIME	Date/Time
5	AVG PRECISION (%)	Decimal
6	AVG RESPONSE TIME (seconds)	Decimal

Row Type: PRECISION MEASUREMENT

Column	Description	Data Type
1	ROW DESCRIPTOR [always "PRECISION MEASUREMENT"]	String
2	CAL GAS SERIAL NUMBER [Serial # of Cal Gas Cylinder]	String
3	CAL GAS TYPE [always "CH4 (Methane)"]	String
4	CAL GAS CONCENTRATION (ppm) [Marked concentration of Cal Gas Cylinder]	Decimal
5	MEASURED CONCENTRATION (ppm) [Actual reading from FID]	Decimal
6	DIFFERENCE (ppm) [Measured Concentration – Cal Gas Concentration]	Decimal
7	DIFFERENCE (%)	Decimal
8	ZERO AIR PPM	Decimal

9	TIMESTAMP	Date/Time
10	INSTRUMENT ID [Identifier for SEM hardware used in monitoring]	String

Row Type: RESPONSE TIME MEASUREMENT

Column	Description	Data Type
1	ROW DESCRIPTOR [always “RESPONSE TIME MEASUREMENT”]	String
2	CAL GAS SERIAL NUMBER [Serial # of Cal Gas Cylinder]	String
3	CAL GAS TYPE [always “CH4 (Methane)”]	String
4	CAL GAS CONCENTRATION (ppm) [Marked concentration of Cal Gas Cylinder]	Decimal
5	TARGET CONCENTRATION (ppm) [Cal Gas Concentration * acceptable %]	Decimal
6	INITIAL CONCENTRATION (ppm) [Actual reading at the start of measuring – should be 0)]	Decimal
7	RESPONSE TIME (seconds) [Seconds elapsed before target concentration reached]	Integer
8	TIMESTAMP	Date/Time
9	INSTRUMENT ID [Identifier for SEM hardware used in monitoring]	String

Site Background File

The Background file contains information about the background concentration levels near the inspection site. All data is contained in a single BACKGROUND SUMMARY row.

File Naming Convention:

BACKGROUND_sitename_year_month_day_hour_minute.CSV

Note: Date/Time in file names use UTC 24-hour clock.

Row Type: BACKGROUND SUMMARY

Column	Description	Data Type
1	SITE NAME	String
2	MONITOR TYPE [always "BACKGROUND SUMMARY"]	String
3	FID ID [Identifier for SEM hardware used in monitoring]	String
4	UPWIND TIMESTAMP	Date/Time
5	AVG BACKGROUND DETECTOR CONCENTRATION (ppm) [Avg of upwind and downwind readings]	Decimal
6	TEMPERATURE (DegF)	Integer
7	WIND SPEED	Integer
8	WIND DIRECTION [N, NE, E, SE, S, SW, W, NW]	String
9	SKY CONDITION [Clear, Partly Cloudy, Mostly Cloudy, Overcast, Obscured]	String
10	PRECIPITATION [None, Drizzle, Rain, Freezing Rain, Sleet, Hail, Snow]	String
11	UPWIND DETECTOR CONCENTRATION (ppm)	Decimal
12	UPWIND NORTHING [Latitude of upwind reading location]	Decimal
13	UPWIND EASTING [Longitude of upwind reading location]	Decimal
14	UPWIND DESCRIPTION [Comments for upwind reading location]	String

15	DOWNWIND DETECTOR CONCENTRATION (ppm)	Decimal
16	DOWNWIND TIMESTAMP	Date/Time
17	DOWNWIND NORTHING [Latitude of downwind reading location]	Decimal
18	DOWNWIND EASTING [Longitude of downwind reading location]	Decimal
19	DOWNWIND DESCRIPTION [Comments for downwind reading location]	String
20	PDOP [GPS position dilution of precision]	Decimal
21	HDOP [GPS horizontal dilution of precision]	Decimal
22	VDOP [GPS vertical dilution of precision]	Decimal
23	SATELLITES [GPS number of satellites being used]	Integer
24	UTC [GPS date/time]	Date/Time
25	OPERATOR NAME	String
26	FILE SAVE TIME	Date/Time

Site Monitoring Files/Directory

The site monitoring directory contains the traditional Monitor files along with any other file types (.csv, .kml, or .xml) the user has chosen to export.

Important tip: KML files contain walking path information similar to what is shown on the ProSEM maps screen. This file may be dragged onto an open Google Earth window to show the path.

The traditional Monitoring File contains both summary information and all measurements from a specific monitoring event. There are 4 sections in this file:

1. Monitor Summary
2. Integrated Reading
3. Instantaneous Reading
4. Position Tracking

The single MONITOR SUMMARY line contains summary information about the site and inspection. This line is followed by multiple INTEGRATED READING lines and multiple INSTANTANEOUS READING lines which give the details of individual readings captured. Each file may also contain multiple POSITION TRACKING lines which record the path taken during the inspection. The same file format is used for both integrated and non-integrated inspections. In the case of non-integrated inspections, unused summary columns will be blank, and there will be no INTEGRATED READING rows.

File Naming Convention:

MONITOR_sitename_GRID_gridID_year_quarter_event.CSV

Note: For POINT CHECK events, since there can be multiple point check files per period, the file name is suffixed with the current system time. For example, a point check performed on March 15, 2011 at 10:05am would be named...

MONITOR_MySite_GRID_A1_2011_Q1_PointCheck_2011_03_15_10_05.csv

Row Type: MONITOR SUMMARY

Column	Description	Data Type
1	ROW DESCRIPTOR [always "MONITOR SUMMARY"]	String
2	SITE NAME [Name of Site being monitored]	String
3	INSTRUMENT ID [Identifier for SEM hardware used in monitoring]	String
4	FILE SAVE TIME	Date/Time
5	BACKGROUND DETECTOR CONCENTRATION (ppm) [imported from background file]	Decimal

6	INTEGRATED DETECTOR CONCENTRATION (ppm) [Avg of all integrated readings – Blank if non-integrated]	Decimal
7	ELAPSED TIME (seconds) [Total seconds spent doing integrated scan – Blank if non-integrated]	Integer
8	INTEGRATED READING COUNT [Number of INTEGRATED READING rows that follow]	Integer
9	INSTANTANEOUS READING COUNT [Number of INSTANTANEOUS READING rows that follow]	Integer
10	OPERATOR NAME [Full Name of operator performing monitoring]	String
11	GRID ID [Grid # being monitored – Blank if non-integrated]	String
12	YEAR	Integer
13	EVENT [Init,1-10D,2-10D,30D,PC]	String
14	PERIOD TYPE [Daily, Weekly, Monthly, Quarterly, or Annual]	String
15	PERIOD [Number of period types]	Integer
16	VERIFICATION FILE [Reference to name of verification file used]	String
17	BACKGROUND FILE [Reference to name of background file used]	String

Row Type: INTEGRATED READING

Column	Description	Data Type
1	ROW DESCRIPTOR [always "INTEGRATED READING"]	String
2	ID [Measurement number]	Integer
3	TIMESTAMP	Date/Time
4	MONITORED DETECTOR CONCENTRATION (ppm) [Actual value reported from SEM instrument]	Decimal
5	ADJUSTED DETECTOR CONCENTRATION (ppm) [= Monitored – Background, Never less than 0]	Decimal
6	BACKGROUND DETECTOR CONCENTRATION (ppm) [Avg or High Background from Background File]	Decimal
7	NORTHING [In Local Coordinate System]	Decimal
8	EASTING [In Local Coordinate System]	Decimal
9	LAT WGS84 [Latitude in WGS84 Decimal Degrees]	Decimal
10	LON WGS84 [Longitude in WGS84 Decimal Degrees]	Decimal
11	PDOP [GPS position dilution of precision]	Decimal
12	HDOP [GPS horizontal dilution of precision]	Decimal
13	VDOP [GPS vertical dilution of precision]	Decimal
14	SATELLITES [GPS number of satellites being used]	Integer
15	UTC [GPS date/time]	Date/Time
16	INTEGRATED INTERVAL READING TYPE [Averaged or Highest]	String
17	COMMENTS	String

Row Type: INSTANTANEOUS READING

Column	Description	Data Type
1	ROW DESCRIPTOR [always "INSTANTANEOUS READING"]	String
2	ID [Measurement number]	Integer
3	TIMESTAMP	Date/Time
4	MONITORED DETECTOR CONCENTRATION (ppm) [Actual value reported from SEM instrument]	Decimal
5	ADJUSTED DETECTOR CONCENTRATION (ppm) [= Monitored – Background, Never less than 0]	Decimal
6	BACKGROUND DETECTOR CONCENTRATION (ppm) [Avg or High Background from Background File]	Decimal
7	COVER INTEGRITY	String
8	REPAIRS	String
9	COMMENTS	String
10	NORTHING [In Local Coordinate System]	Decimal
11	EASTING [In Local Coordinate System]	Decimal
12	LAT WGS84 [Latitude in WGS84 Decimal Degrees]	Decimal
13	LON WGS84 [Longitude in WGS84 Decimal Degrees]	Decimal
14	PDOP [GPS position dilution of precision]	Decimal
15	HDOP [GPS horizontal dilution of precision]	Decimal
16	VDOP [GPS vertical dilution of precision]	Decimal
17	SATELLITES [GPS number of satellites being used]	Integer
18	UTC [GPS date/time]	Date/Time

Row Type: POSITION TRACKING

Column	Description	Data Type
1	ROW DESCRIPTOR [always "POSITION TRACKING"]	String
2	TIMESTAMP	Date/Time
3	NORTHING [In Local Coordinate System]	Decimal
4	EASTING [In Local Coordinate System]	Decimal
5	LAT WGS84 [Latitude in WGS84 Decimal Degrees]	Decimal
6	LON WGS84 [Longitude in WGS84 Decimal Degrees]	Decimal
7	POINT TYPE *Either "Start Point", "Stop Point", or blank, indicating a continuation of a line segment]	String
8	PDOP [GPS position dilution of precision]	Decimal
9	HDOP [GPS horizontal dilution of precision]	Decimal
10	VDOP [GPS vertical dilution of precision]	Decimal
11	SATELLITES [GPS number of satellites being used]	Integer
12	UTC [GPS date/time]	Date/Time

Site Database Files Directory

The Site Database Files were created to augment the existing monitoring files to make them more database upload friendly. There are three types of database files:

1. Integrated
2. Instantaneous
3. Position

Whereas the monitor type files (explained earlier) are only stored when a user ends a monitoring event, the database files are updated (appended) for every single measurement. Therefore, if a user takes data during a monitoring event and later chooses to overwrite the earlier monitoring event, the data will still exist in the database files.

File Naming Conventions:

sitename_Integrated_month-day-year.CSV
 sitename_Instantaneous_month-day-year.CSV
 sitename_Position_month-day-year.CSV

New files are created whenever the date (day) changes or whenever a new site is being monitored. These files have the same columns as the monitoring files with the addition of 4 new (string type) columns:

1. Site Name
2. Grid ID
3. Operator Name
4. Instrument ID

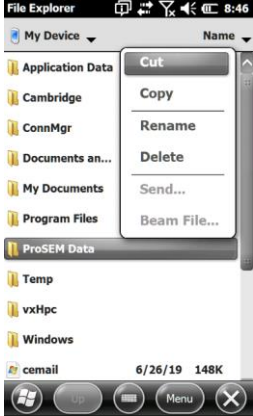

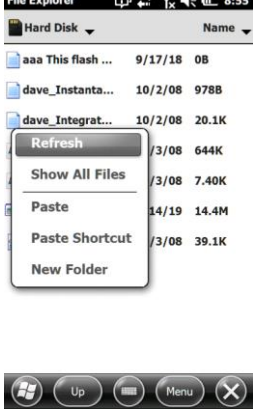
The new columns are shown highlighted in green in the table below.

<u>Database Integrated File</u> <u>Columns</u>	<u>Database Instantaneous File</u> <u>Columns</u>	<u>Database Position File</u> <u>Columns</u>
MONITOR TYPE	MONITOR TYPE	MONITOR TYPE
ID	ID	SITE NAME
SITE NAME	SITE NAME	GRID ID
GRID ID	GRID ID	TIMESTAMP
TIMESTAMP	TIMESTAMP	NORTHING
MONITORED DETECTOR CONCENTRATION (ppmv)	MONITORED DETECTOR CONCENTRATION (ppmv)	EASTING
ADJUSTED DETECTOR CONCENTRATION (ppmv)	ADJUSTED DETECTOR CONCENTRATION (ppmv)	LAT WGS84
BACKGROUND DETECTOR CONCENTRATION (ppmv)	BACKGROUND DETECTOR CONCENTRATION (ppmv)	LON WGS84
NORTHING	COVER INTEGRITY	Point Type
EASTING	REPAIRS	PDOP
LAT WGS84	COMMENTS	HDOP
LON WGS84	NORTHING	VDOP
PDOP	EASTING	SATELLITES
HDOP	LAT WGS84	UTC

VDOP	LON WGS84	OPERATOR NAME
SATELLITES	PDOP	INSTRUMENT ID
UTC	HDOP	
INTEGRATED INTERVAL READING TYPE	VDOP	
COMMENTS	SATELLITES	
OPERATOR NAME	UTC	
INSTRUMENT ID	OPERATOR NAME	
	INSTRUMENT ID	

Copying Files to Desktop PC

The preferred method to copy files from a handheld device to a desktop PC is by using a USB flash drive.

1	<p>Insert the USB flash drive into the USB port on the handheld device. On the handheld device open File Explorer and navigate to the data to be copied. Instead of copying individual files, it is easier to copy entire directories. Press and hold the stylus on the directory to be copied until a menu appears. Select copy.</p>	 <p>The screenshot shows the File Explorer interface on a handheld device. The 'My Device' button is selected at the top. A list of folders is visible on the left, including 'Application Data', 'Cambridge', 'ConnMgr', 'Documents an...', 'My Documents', 'Program Files', 'ProSEM Data', 'Temp', 'vxHpc', and 'Windows'. A context menu is open over the 'ProSEM Data' folder, with options: 'Cut', 'Copy', 'Rename', 'Delete', 'Send...', and 'Beam File...'. The 'Copy' option is highlighted.</p>
2	<p>Select the My Device button at the top of the screen (changes to “Show” when selected) and choose hard disk (which is the USB flash drive).</p>	 <p>The screenshot shows the File Explorer interface. The 'Show' button is selected at the top. A list of folders is visible on the left, including 'My Device', 'Documents an...', 'Hard Disk', 'My Documents', 'Program Files', 'ProSEM Data', 'Temp', 'vxHpc', and 'Windows'. A context menu is open over the 'My Device' folder, with options: 'Hard Disk' and 'Select Files >'. The 'Hard Disk' option is highlighted.</p>
3	<p>Press and hold the stylus in a blank area until a menu appears. Select Paste.</p> <p>Remove the flash drive from the handheld device and insert into your desktop PC. Use file explorer to copy the files to their final locations.</p>	 <p>The screenshot shows the File Explorer interface. The 'Hard Disk' button is selected at the top. A list of files is visible on the left, including 'aaa This flash ...', 'dave_Instanta...', 'dave_Integrat...', and others. A context menu is open over a blank area, with options: 'Refresh', 'Show All Files', 'Paste', 'Paste Shortcut', and 'New Folder'. The 'Paste' option is highlighted.</p>

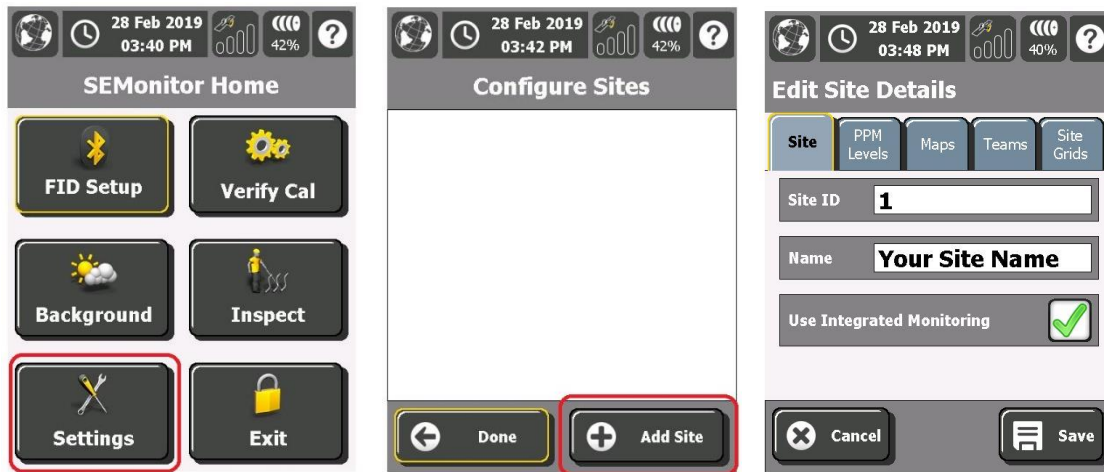
Appendix A – How to Add Map Files

Map files traditionally consist of a walking path or grid overlaid on an aerial image of the site. The Trimble Map Production Utility is used to create the maps from Google Earth aerial images and customer CAD files (for walking paths and grids). Elkins Earthworks provides the map creation service for a nominal fee.

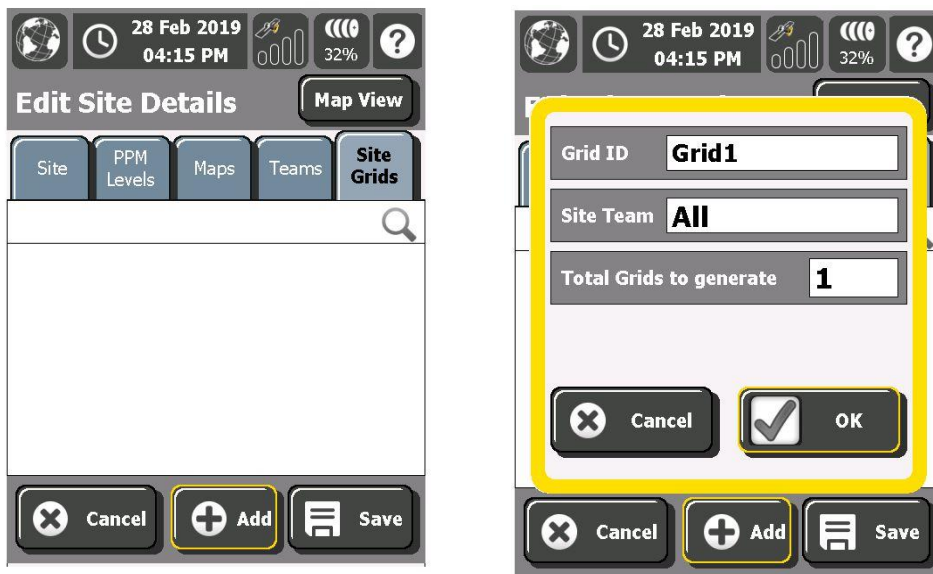
1. Add Your Site Information to ProSEM

Follow the steps below if your site has not already been set up in the ProSEM software.

- a. Open the ProSEM application, log in, and go to Settings>Sites>Add Site. Check “Use Integrated Monitoring” and then tap the “Name” box. Type in your site name.



- b. Navigate to the “Site Grids” tab to create the number of desired grids. If you don’t use grids, create only a single grid by entering a grid name of your choice.



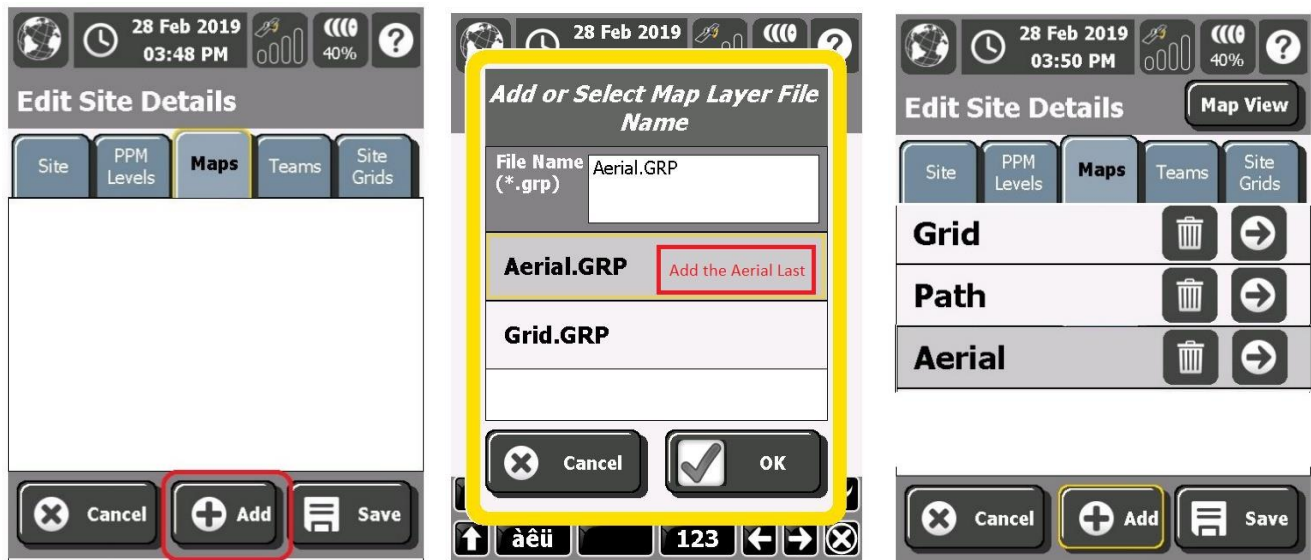
- c. Save the site information by pressing the “Save” button.

2. Transfer Files to the Handheld PC

- a. On your computer, find the zipped map file that you received from Elkins Earthworks.
- b. Unzip the file. On Windows 10, unzip it by right-clicking on the file and then clicking “Extract All...”
- c. Using a flash drive or Windows Mobile Device Center, copy the contents of the unzipped folder to the \\ProSEM\\Site Data\\SiteName\\Maps folder. This folder should have been automatically created when the site was added in step 1 above.

3. Set Up the Maps

- a. First, add the walking path to the map. In ProSEM go to: Maps tab>Add. The map files from the zipped file should show up with extensions “.GRP”. Choose the walking path and click “OK”. Now click in the “Layer Description” box and call it “Path”.



- b. To add the grid, do the same thing. Go to: Add>File Name>Tap the grid image (“Grid.GRP”). Call it “Grid”.
- c. Last, add the Aerial the same way. It’s important to add the aerial **after** the grid and walking path otherwise the Aerial will cover up the grid and path. Add>File Name>Tap the aerial image (“Aerial.GRP”). Call it “Aerial”.

4. Check the Maps

To preview the map, tap Map View, and click the Map Overlays button (I-90 sign), and check all the maps. Everything should show up.



Appendix B – Recheck Flow Chart

The flow chart below shows how the ProSEM software handles monitoring event exceedances.

