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ANALYZER DIFFICULTY FACTOR MANUAL

FINAL RELEASE

DECEMBER 13, 2013

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ANALYZER DIFFICULTY FACTOR PROGRAM

FINAL RELEASE

The Analyzer Difficulty Factor (ADF) program developed jointly between SABIC and Smith Analytical, LLC is ready for Final release. The purpose of this program is to provide a diagnostic and predictive tool which will allow SABIC to calculate a Analyzer Difficulty Factor (ADF) for each individual analyzer or a group of identical analyzers. In addition to calculating the ADF, the program also calculates the staffing required to maintain the equipment entered into the program.

The following is a brief overview of how to use the program.

1. To launch, select the ADF-FINAL Program Icon (**Figure 1**)

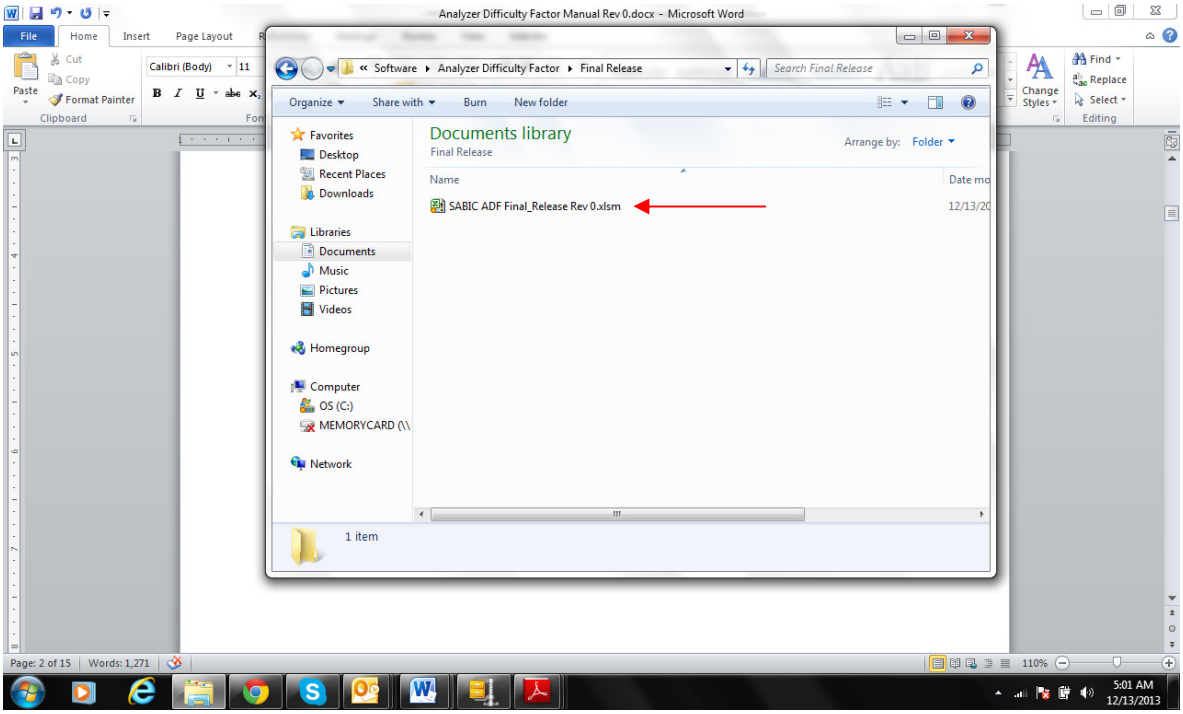

FIGURE 1 – ADF ICON

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2. Click on the "Calculate Difficulty and Man-hours" button (FIGURE 2)

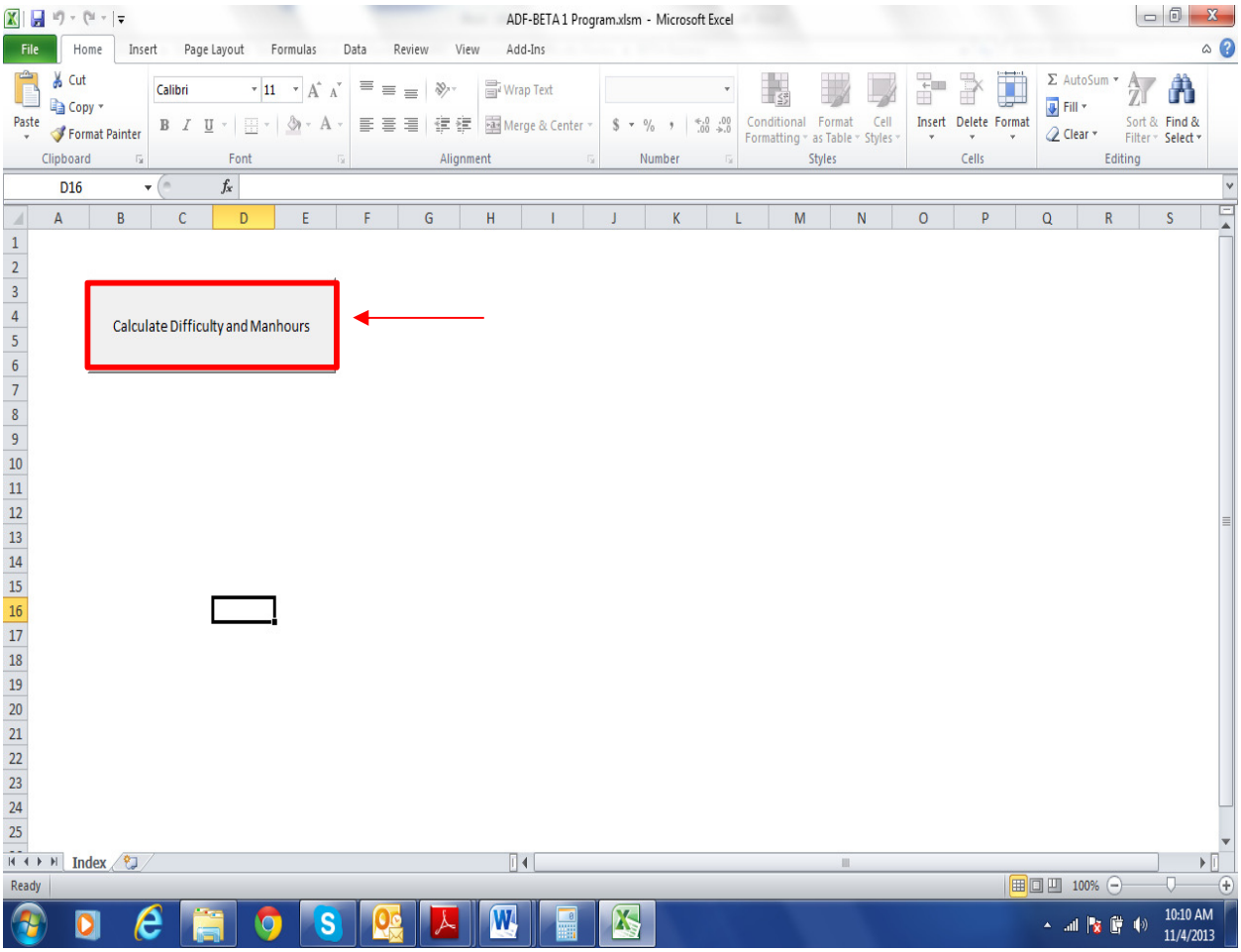

FIGURE 2 – CALCULATE DIFFICULTY

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3. On the "Project Details Tab" enter the information for the site the analyzer data will belong to. (**FIGURE 3**)

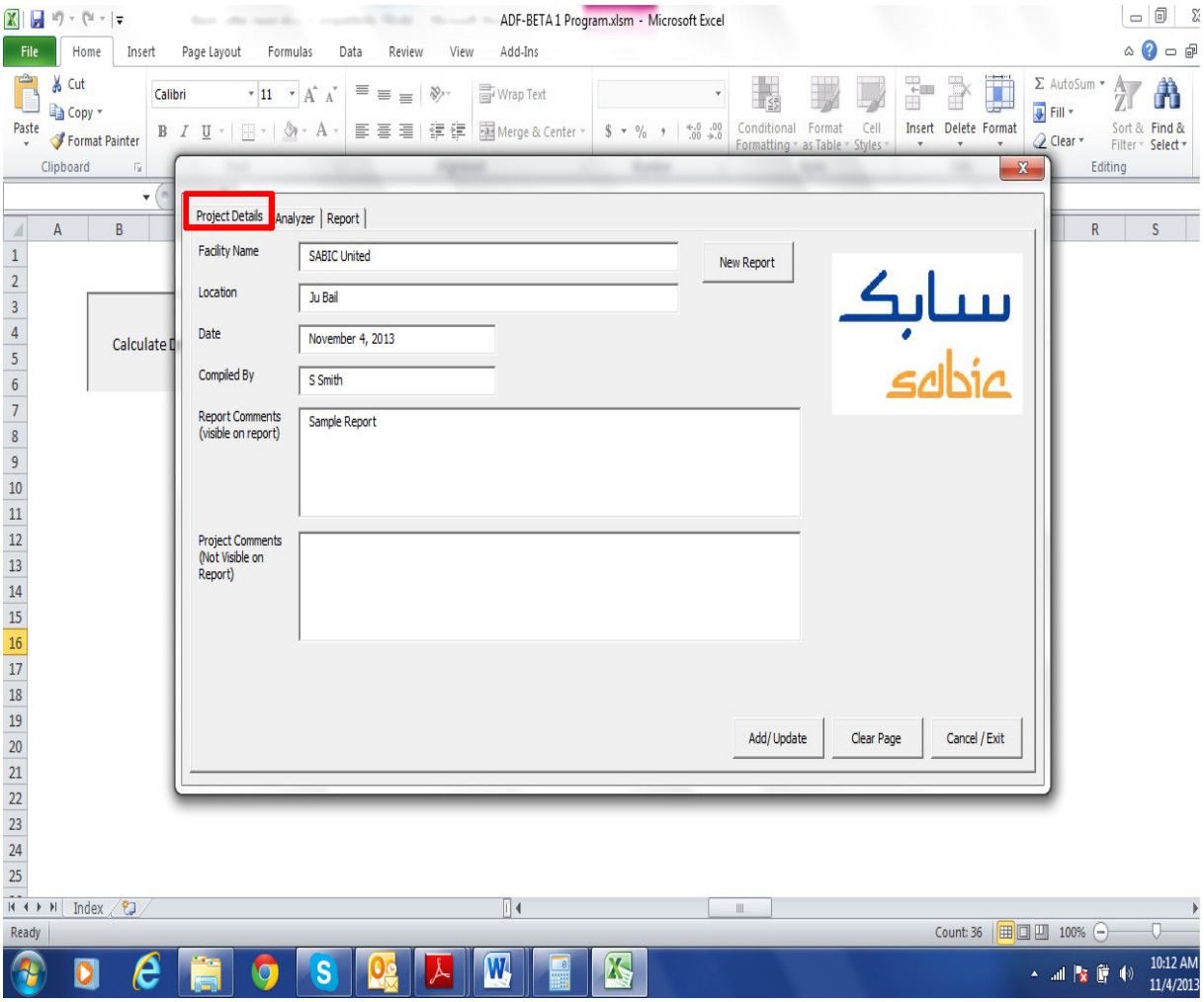

FIGURE 3 – PROJECT DETAILS TAB

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4. On the "Analyzer Tab" (**FIGURE 4)** enter the information for the equipment you want to place in the report. The information to be included:

   a. **Analyzer** - Here you can enter a discrete Analyzer Tag Number (i.e. AT-101) OR if you want to enter a group of identical Analyzers for a specific area, then Enter "X1". Please note that whether you use a discrete tag number such as "AT-101" or a Analyzer Group Number such as "X1", this value can only be used once in the program.
   b. **Analyzer Location**-Then enter the operating area or Shelter the equipment is located.
   c. **Analyzer Type**- Simply select the type of analyzer from the equipment list.
   d. **Age –** Enter the age of the equipment used in the provided drop down list.
   e. **Quantity**- If you are entering a discrete analyzer number (i.e. AT-101), then leave the default value = 1. If you entered "X1, X2, X3" etc. instead of a discrete Analyzer Tag Number, this indicates o the program that you want to enter a multiple of identical devices (i.e. pH meters) and want to do this at one time without entering each and every unit. In this event, enter the total number of identical analyzers by typing in the Quantity.
   f. **Number of Detectors** - Enter the number of detectors for the analyzer. In most cases this will be a value of one. The maximum number of detectors you can enter is 3.
   g. **Detector Type** – For each Detector, then select the type of detector that is located in the analyzer.
   h. **Manufacturer** – Under each Detector type, you can enter the Manufacturer from the pull down menu.
   i. **Cycle Time** – This will only appear if you selected a Gas Chromatograph as the Analyzer Type in Item C above. If you select any other type of analyzer, you will not see this question. Simply enter the cycle time for the GC at this location.
   j. **Columns** - This will only appear if you selected a Gas Chromatograph as the Analyzer Type in Item C above. Enter the type of columns that are used in your application.
   k. **Application** - This will only appear if you selected a Gas Chromatograph as the Analyzer Type in Item C above. Enter the type of application that is used in your GC.
   l. Number of Streams / Components – The program is set-up to handle 10 streams. Simply enter the number of components your analyzer measures on each stream. Leave the streams blank that are not measured.

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m. **Number of Primary Sample Systems-** If your analyzer has a primary sample system (i.e. Pygas Sampler), then enter this information here. You can select between Gas, Liquid or Solid Primary Sample System. Simply enter the number of these units that each analyzer has.
n. **Number of Sample Systems –** Enter the type (gas, liquid, solid) and the number of sample systems supplying sample to your analyzer.
o. **Shelter In/Out –** Use the pull down menu to answer this question. Simply want to know the location of the analyzer. If you select "Out", this indicates the analyzer is "Field Mounted" and is subject to a higher difficulty factor.
p. **Frequency –** This is how often major preventative maintenance task are conducted by the Analytical Maintenance Staff. Major PM's could be considered calibration frequency. Sample system maintenance, etc. Using the pull down menu you can select Daily, Weekly, Monthly or User Defined. If you select "User Defined", then you must enter the number of weeks between PM's.
q. **Add-Update**-After entering all of the information, then press the **ADD/UPDATE** key. This will add the information to the report.

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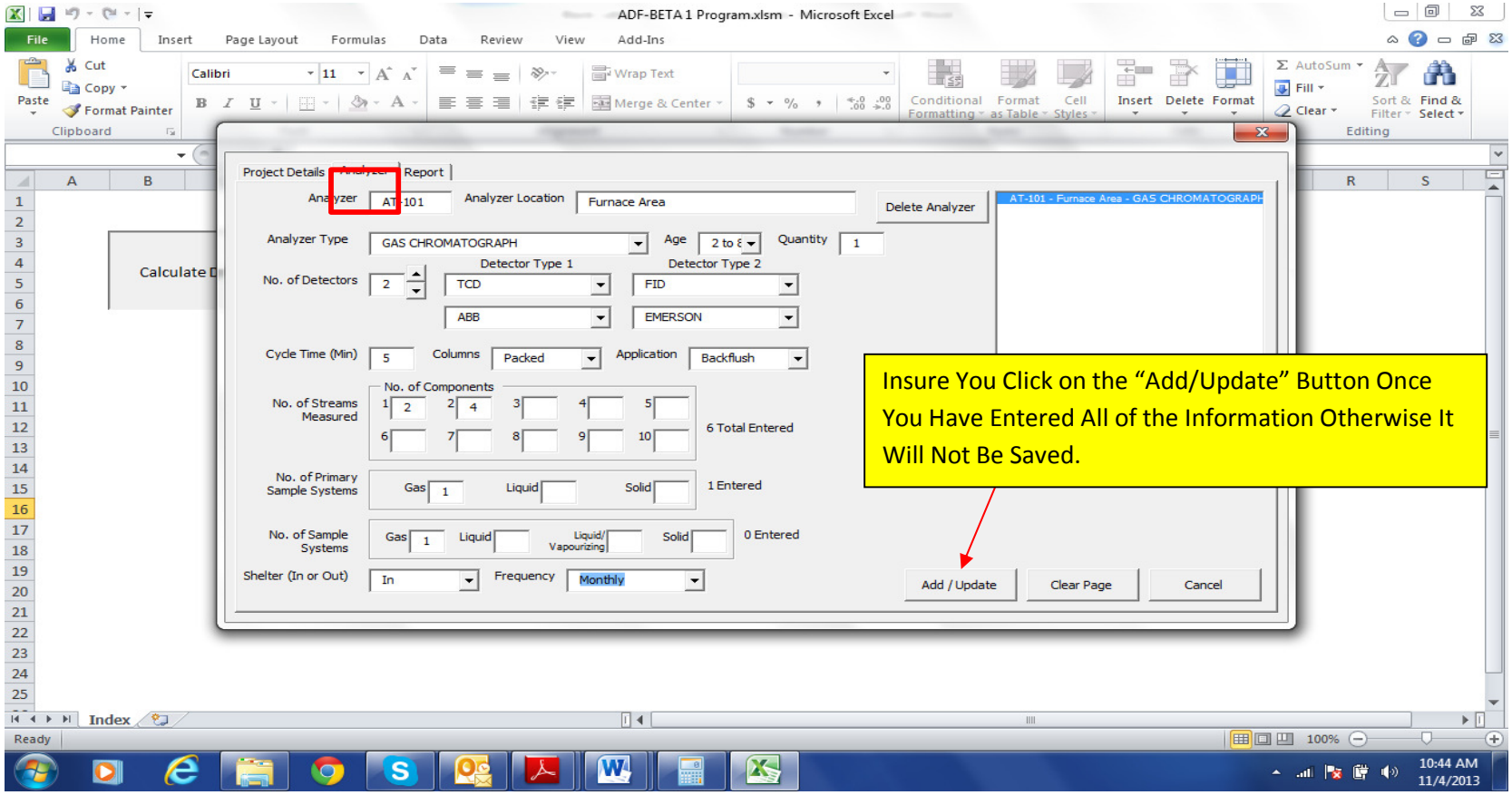

FIGURE 4 – ANALAYZER INFORMATION PAGE

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5. On the "Report Tab" (**FIGURE 5)** the information entered will be summarized and will provided you with the following information for each piece of equipment:

   a. Analyzer Tag Number of Group Number (X1)
   b. Quantity of Analyzers
   c. Analyzer Type
   d. Each of the Detector Types Up to the Maximum Allowed
   e. Calculated Difficulty Factor. The lower the value, the easier the analyzer is to maintain
   f. Man-Hours to Maintain. This is the calculated annual man-hours to maintain one analyzer with the enter parameters.
   g. Total Man-Hours to Maintain. This is the total annual man-hours to maintain the analyzer or a group of identical analyzers. If you entered a discrete tag number for the analyzer (i.e. AT-101), then values in F and G will be the same. If you enter a group number (X1, X2, X3, etc.) in the "Analyzer Field" and then selected a quantity of than 1, then the total man-hours is calculated for all of this equipment.
   h. In addition, at the top of the report, the man-power required to maintain the equipment is also calculated as the information is entered into the program. The program calculates the number of:

      - Analyzer Engineers
      - Analyzer Specialist
      - Sr. Analyzer Technicians which are individuals with 10+ years of experience
      - Analyzer Technicians which are individuals with 5-10 years of experience
      - Jr. Analyzer Technicians which are individuals with 0-5 years of experience.

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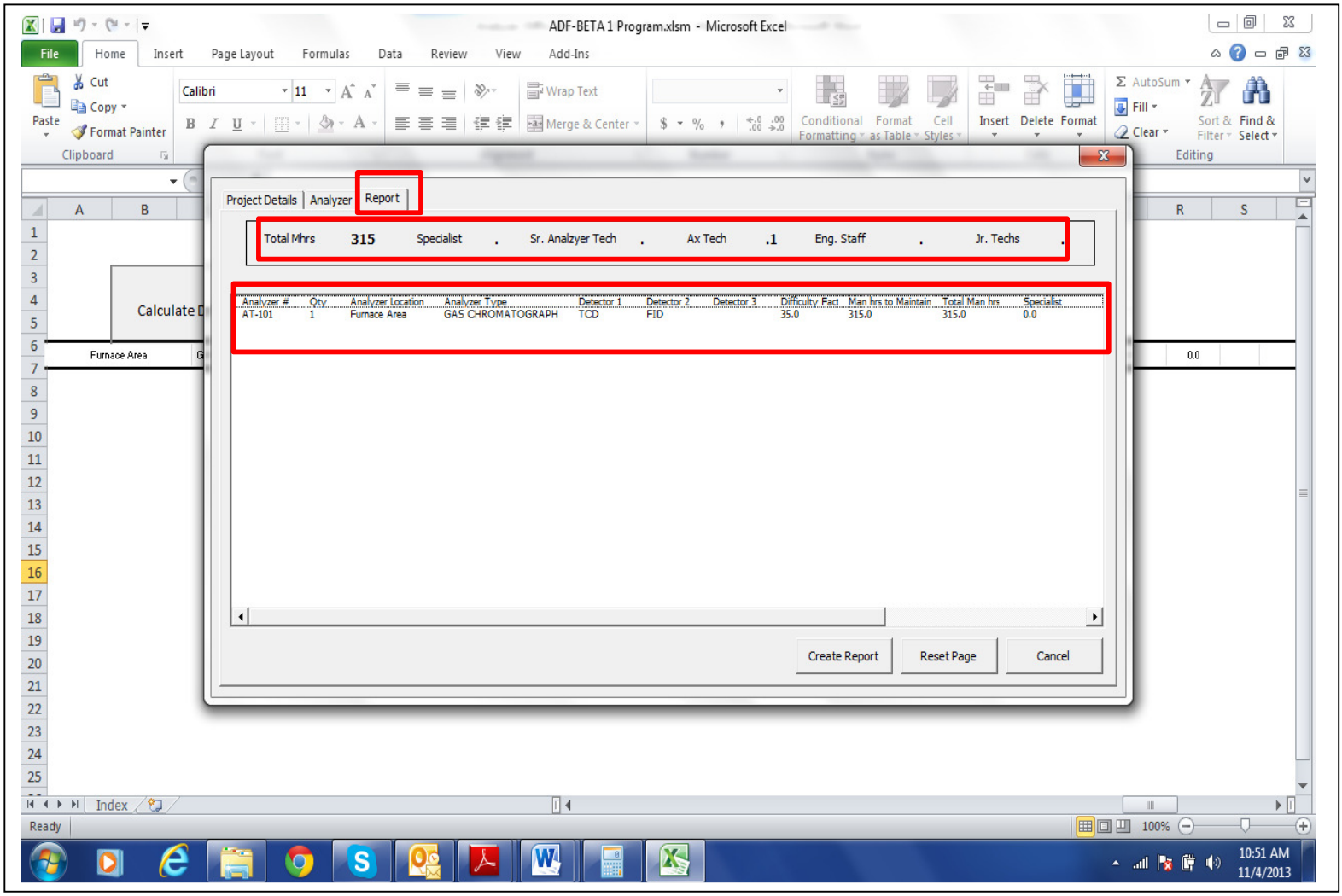

FIGURE 5 – REPORT SUMMARY

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6. To modify information for an analyzer, select the "Analyzer Tab" (**FIGURE 6**) and then highlight the analyzer you want to modify the information for. Then:
   a. Change or enter the new information for this analyzer
   b. Then press "ADD/UPDATE" at the bottom of the page

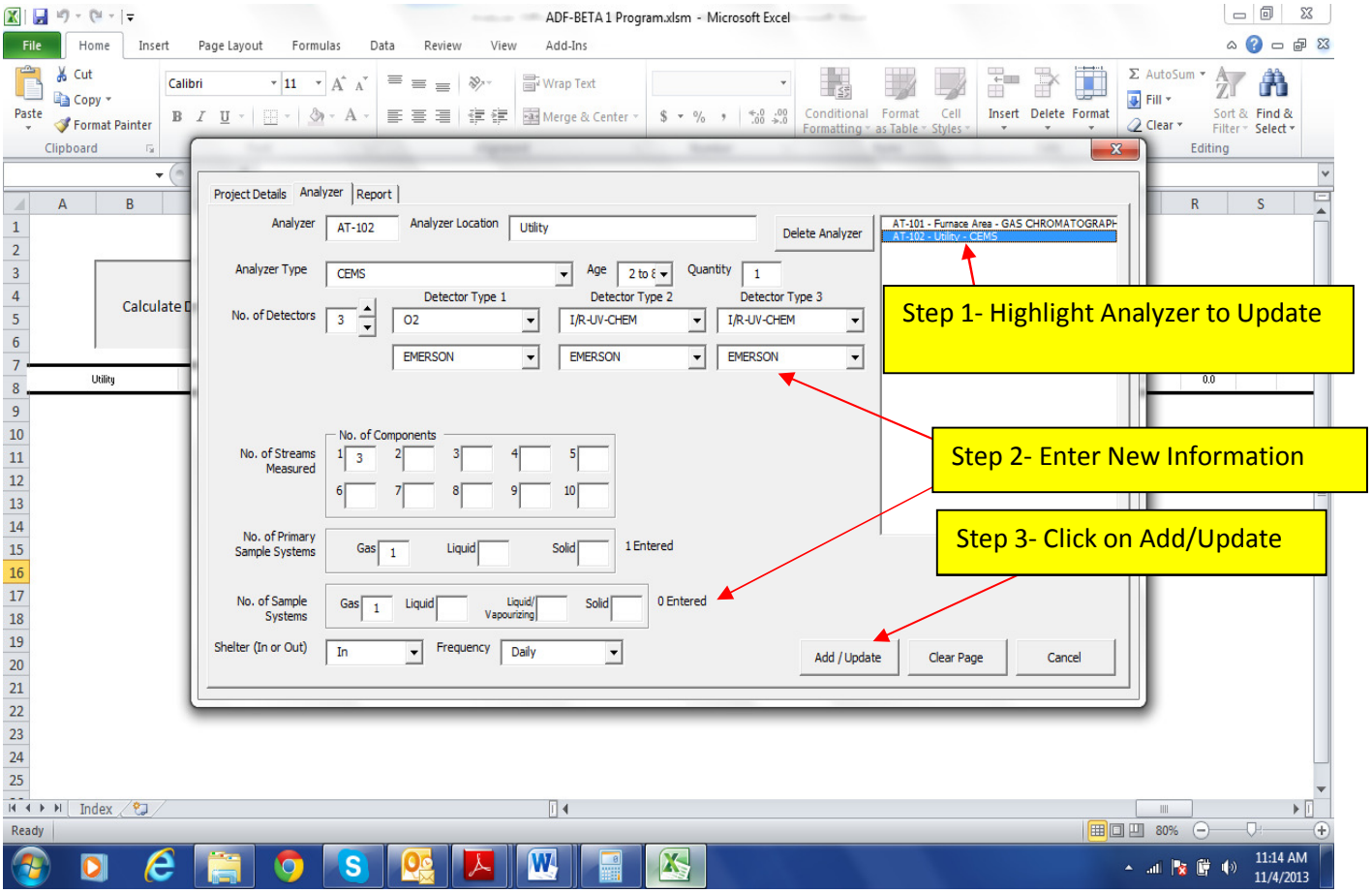

FIGURE 6 – MODIFY ANALYZER INFORMATION

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7. To DELETE information for an analyzer, select the "Analyzer Tab" (**FIGURE 7**) and then highlight the analyzer you want to DELETE. Then:
   c. Press the "Delete Analyzer" key
   d. Then press "Yes" or "No" on the dialog box that appears (**FIGURE 8**)

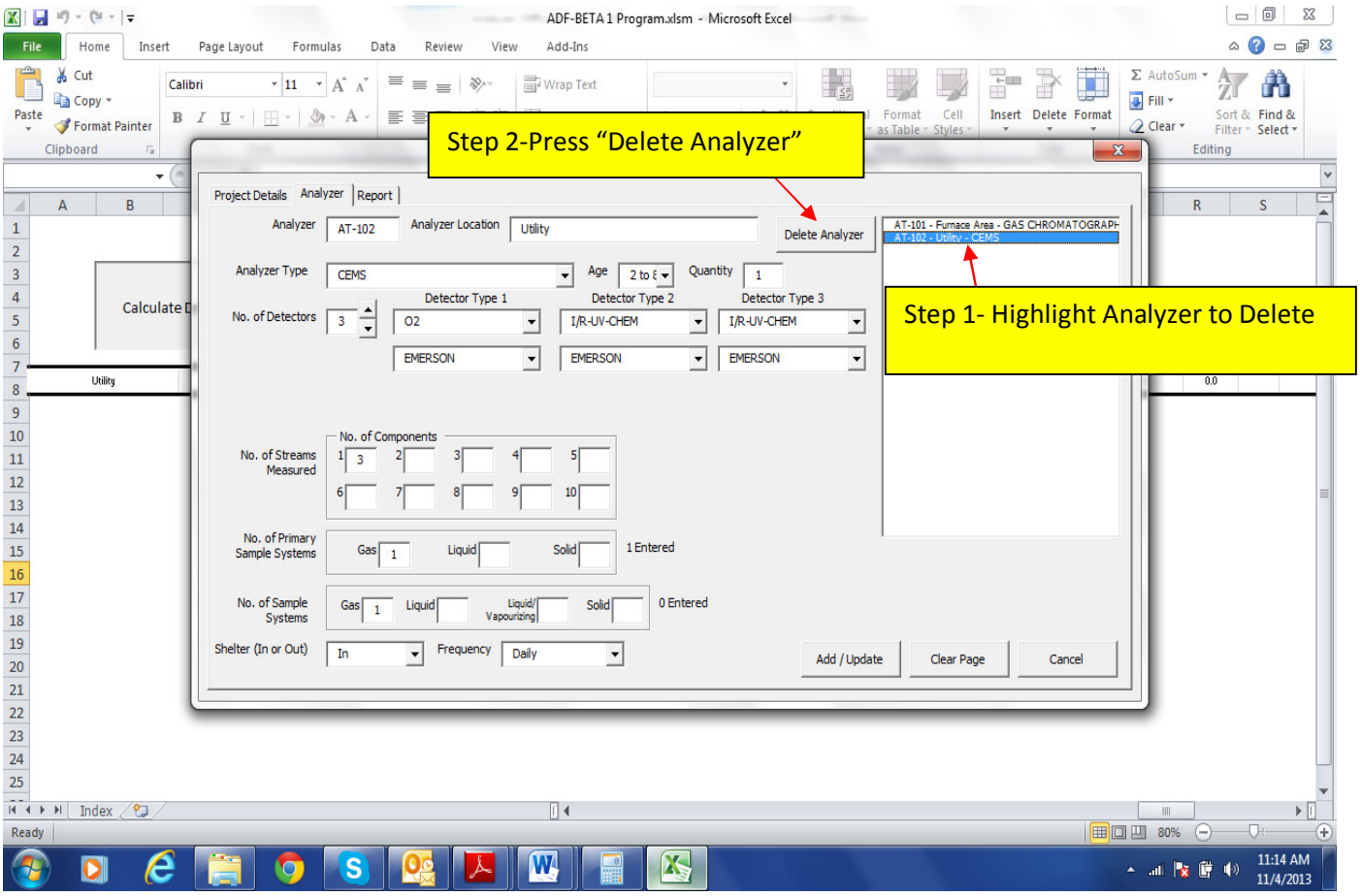

FIGURE 7 – DELETE ANALYZER INFORMATION

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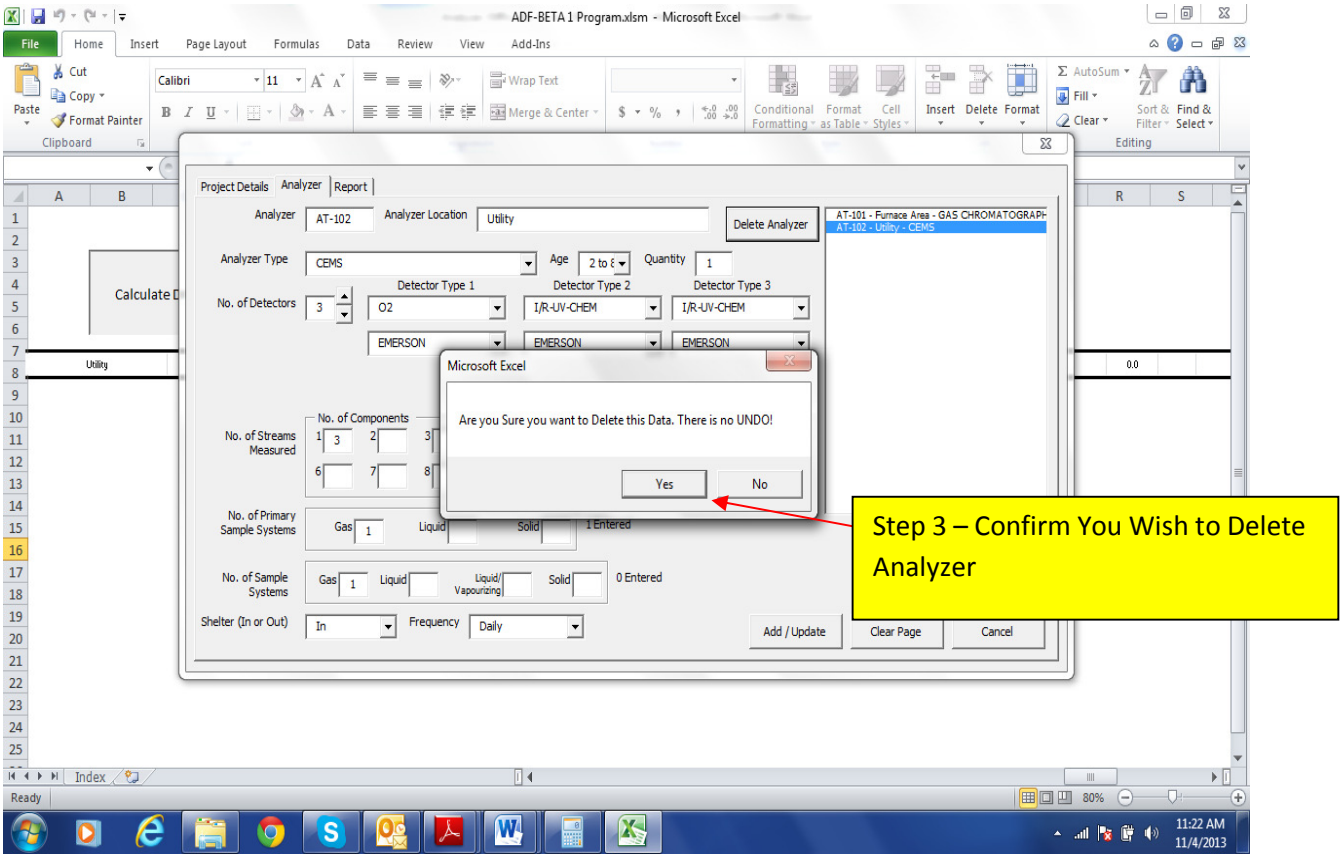

FIGURE 8 – DELETE ANALYZER INFORMATION

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8. To generate a "Report" listing all of the information analyzer entered for the site:
   a. Select the "Report" tab
   b. Click on "Create Report" (See Figure 9)

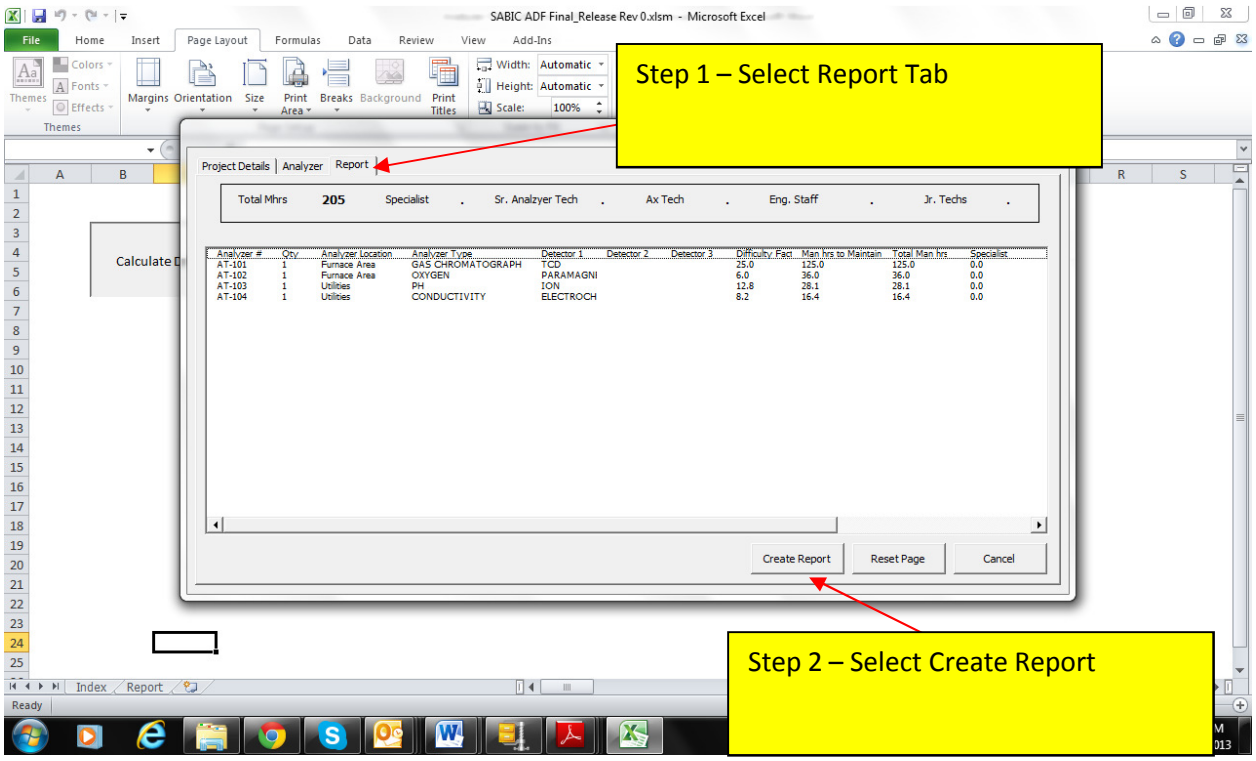

FIGURE 9 – REPORT GENERATATION SCREEN

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c. The “Report” to be printed will appear in the background. Close the dialog box so only the report to be printed can be seen. (Figure 10)
d. Make any format adjustments to the report
e. Then select “File” located on the toolbar
f. Then select “Print” and send the printer or PDF generator you wish to send the report to

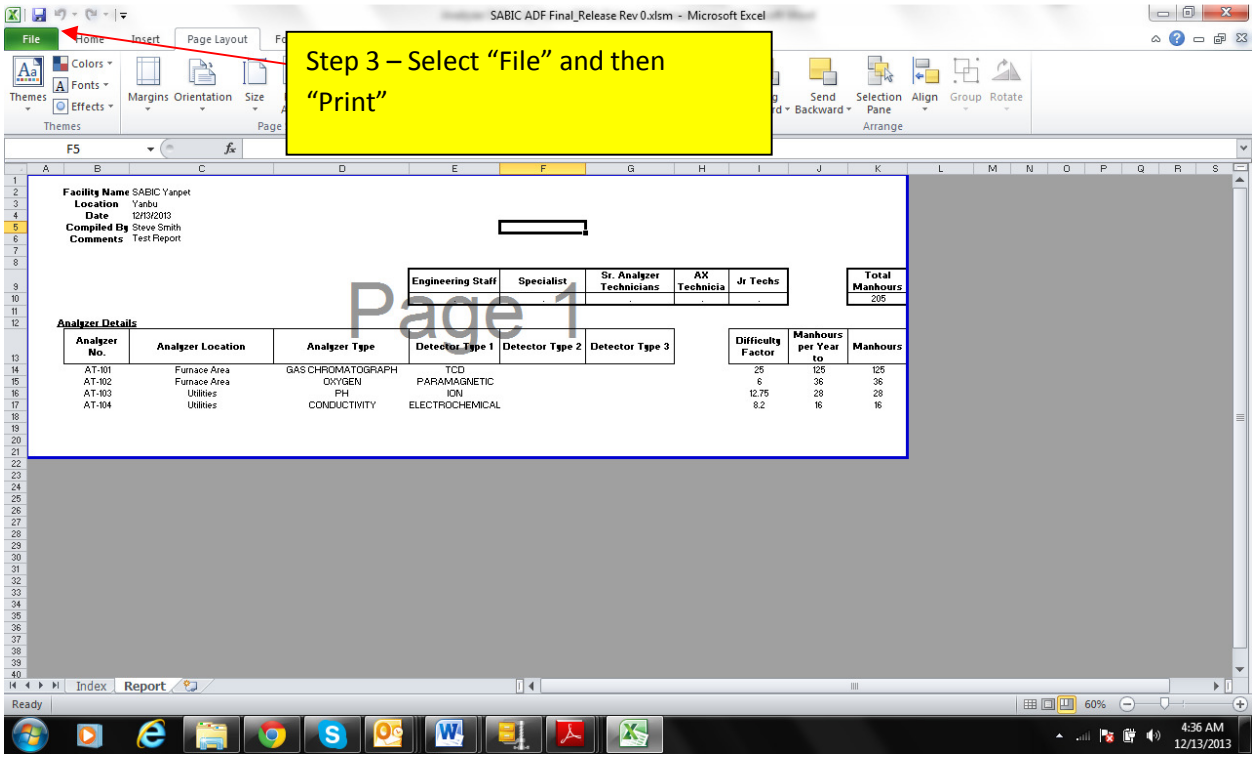

FIGURE 10 – FINAL REPORT