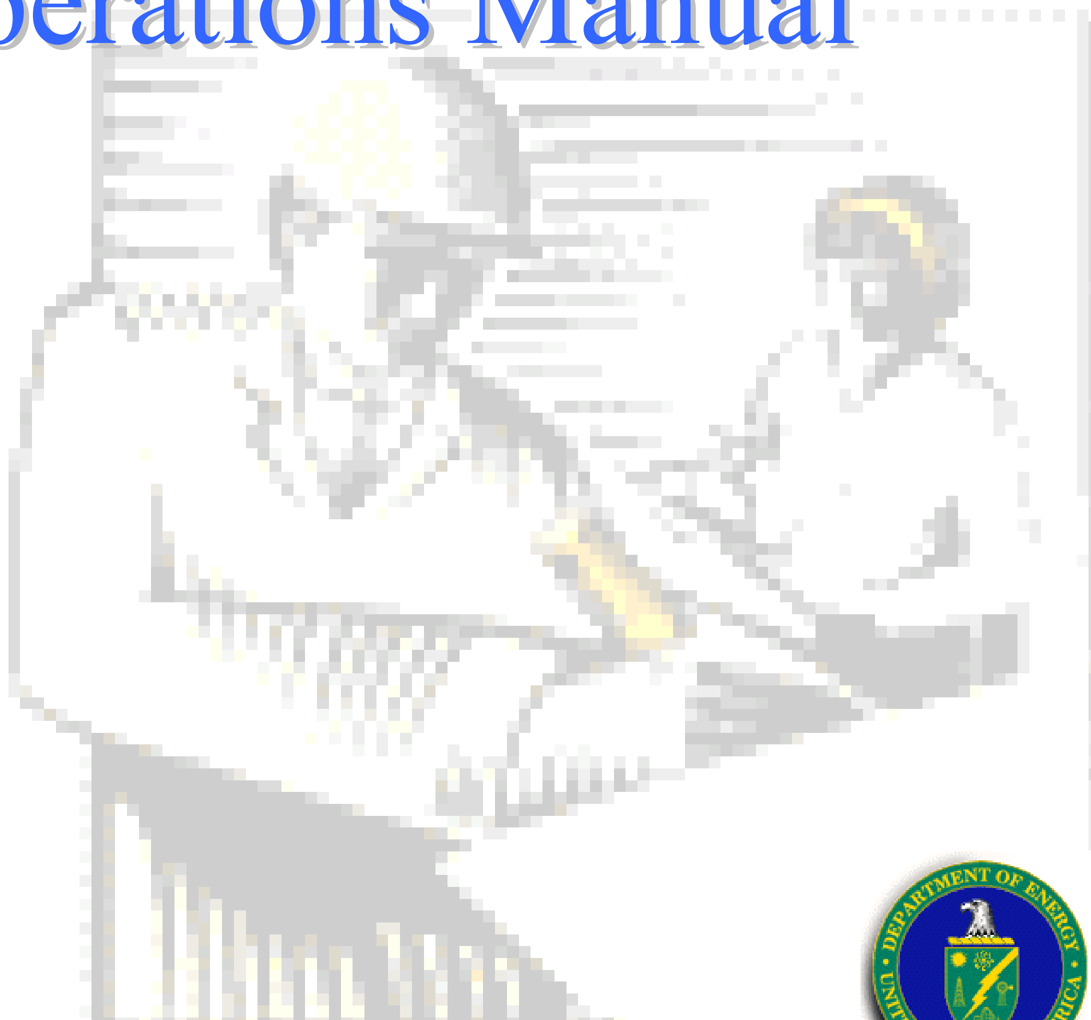
# Syracuse University
# Industrial Assessment Center

# Operations Manual



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# Quick Reference Information

| | |
|---|---|
| Office location | *045 Link hall* |
| Long distance phone code | *See lead student* |
| IAC & Mr. Carranti's mailing address | *151 Link hall*<br>*Syracuse NY 13244* |
| Employee phone numbers | *Located on the bulletin board behind the door* |
| Voice mail phone number | *315-443-1523* |
| Voice Mail Code | |
| Accessing voice mail remotely | |
| Mr. Carranti's office | *051 Link* |
| Mr. Carranti's Phone | *315-443-4346* |
| Mr. Carranti's Email | *carranti@syr.edu* |

New students be sure to register and at leaving students must take the exit interview at

http://eber.ed.ornl.gov:8080/iac/srHome.jsp

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# Table of Contents

# 1.0 Assessments

## *1.1 Client acquisition*

Clients selected for industrial assessments may be obtained by various methods. The most popular method employed by this center is through individual mailings, advertisements in local publications, and through special interest groups. The two major groups used by this center are the Manufacturers' Association of Central New York (MACNY) and the Central New York Business Journal. The guidelines for finding clients are as follows:

- Fewer than 500 employees
- Energy costs between $100,000 and $2,000,000 per year
- Gross sales under $100,000,000 per year
- No in house energy auditing expertise

## *1.2 Dress code*

There is no dress code in the office; however, when on assessment visits personnel should wear hard soled shoes (i.e. boots), a tucked in collared shirt and khaki pants. Jeans should not be worn. Keep in mind that it is possible that assessments will be done in a dirty atmosphere and very expensive clothing should not be worn. However, clothing must be professional.


## *1.3 What to bring on assessments*

When going on an assessment the lead for that assessment should bring any equipment that is necessary for the facility. Also, the lead prepares the day beforehand by charging all batteries when applicable and having the equipment ready to go for the next day. The equipment that is most commonly brought is listed in the table below:

| | | | | |
|---|---|---|---|---|
| Clipboards, Paper & Pens | Combustion analyzer | Digital Camera | Thermometers (Fluke& small gun) | Tool belt |
| Burn kit | First aid kit | Hobos | Report file | Utility graphs |
| Light meter | Measuring tape | Walking measurer | Hydro-anemometer | Air leak gun |

*Table 1, Equipment most commonly brought to assessments*

IAC team members past and present have agreed more often than not only three students are necessary for an assessment. Minimizing the number of students attending the assessment allows other students to complete their work in the office.

### 1.3.1 Safety on assessments

During the plant tour it is important to keep safety in mind in order to prevent any accidents. Remember that you are in a manufacturing plant where materials are hot and forklifts are driving around. When walking around the plant keep the following in mind:

- Stay inside the marked walk way
- Watch out for forklifts
- **Do not touch anything**, unless you ask the plant tour manager
- Where safety glasses at all times
- Do not leave the team for any reason
- Wear hearing/hard hats protection if required

## 1.4 Typical schedule of an assessment day

| | |
|---|---|
| 9:30am | *Arrival at client* |
| 9:30am-10:30am | *Client Briefing*<br>The initial briefing can be rather intricate and lengthy, and can sometimes last an hour or more. |
| 10:30am-12:00pm | *Plant tour*<br>First, data collection equipment should be mounted if necessary. Next, the plant tour should be conducted. This is also the time for the lead student to take notes on the plant background, process description, and best practices. All students should take notes of what is observed, possible AR's and any information needed to complete them. While basic information can be collected during this time be aware that if excessive time must be spent with equipment it can happen in the afternoon. |
| 12:00-1:00pm | *Lunch*<br>This time should be used to make a list of possible AR's and what information needs to be collected in order to write them. |
| 1:00pm-3:00pm | *Collection of data*<br>Collect data either from direct measurement or from questioning plant personnel. Each team member should be sure to write the name of the AR they are researching, what the current situation is, what should be done, and the necessary data to quantify savings. |
| 3:00pm-3:30pm | *De-briefing and conclusion*<br>Primarily the director, client, and lead student use this time to discuss what recommendations should be pursued. Also, |

this time is used to give the client an opportunity to ask questions. During this time the client should also be reminded of their obligations and the timeline for the report.

## 1.5 Assessment checklist

A checklist outlining the steps required to conduct an assessment is given in figure 1, and is also available in the appendix of this report. This checklist should be used on every report and should be kept in the client's permanent file in the filing cabinet.

Note that this checklist will become second nature to more experienced students, but even these students should continue to use the checklist to keep track of the dates on which important events occurred. Some specific important information is, the assessment, the report mailing, the upload, and the critique response.


**Assessment Checklist**

Client Name: __________

Report #: __________

Assessment Date: __________

Report Lead: __________

| Date Completed | Task |
|---|---|
| | Receive Bills & Survey |
| | Schedule assessment |
| | Input bills into spread sheet |
| | Begin ARs for which you have enough information |
| | Begin Report |
| | Confirm with company |
| | Prepare for assessment the day before |
| | Assess Company |
| | Write Report |
| | Follow up with client on any necessary information |
| | Finish draft of report & revise |
| | Prepare final report & mail |
| | File hard copy of report |
| | Upload pdf copy of report |
| | Upload report data shell |
| | Update Assessment Summary spreadsheet |
| | Follow up with client |
| | Respond to critique |
| | Send Client implementation report |
| | Upload implementation report spreadsheet |
| | Update Assessment Summary spreadsheet |

*Figure 1, An Assessment Checklist should be used in every file and stored in the files permanent folder, available in the appendix of this report*

A more detailed description of each step of the assessment checklist follows

1. *Receive Bills and Survey*

   The client will send the bills before the assessment begins. Usually they are addressed to the director but are sometimes addressed to the IAC. Mail sent to the IAC can be found in the IAC mailbox in the MAME office in 151 Link Hall.

   Note that the billing information should also be checked over for completeness. The main bills, such as electricity and natural gas, should be present. Billing information for less expensive utilities such as water, sewer, and trash are helpful but not necessary.

2. *Schedule Assessment*

   The director usually schedules assessment dates. Fridays are the most popular assessment day because many students do not have classes on Fridays.

3. *Input bills into spread sheet*

   The bills should be imputed into one Excel workbook which uses a different tab for each commodity. The workbook should also include a summary sheet that summarizes the annual cost of each commodity, the units used of each commodity, and the unit price of each commodity. An example of how summary page should look is given in figure 2.

   Note that the colors used in the example summary page of figure 2 are not important. Rather, what is important is the pie graph, the highlighting of the total annual utility bill, and the easy to read presentation of the information.

| Utility | Annual Cost | Annual Usage | | Average Cost | |
|---|---|---|---|---|---|
| Electrical Usage- Main Plant | $ 235,283.68 | 4,842,000 kWh | 16,526 MMBTU | $ 0.05 $/kWh | $ 14.24 $/MMBTU |
| Electrical Demand- Main Plant | $ 55,761.57 | 9,360 kW | n/a | $ 5.96 $/kW | n/a |
| Electricity-Outdoor Lighting | $ 4,376.00 | 24,834 kWh | 85 MMBTU | $ 0.18 $/kWh | $ 51.63 $/MMBTU |
| Natural Gas | $ 99,515.08 | 422,013 Therm | 4,220,127 MMBTU | $ 0.24 $/Therm | $ 0.02 $/MMBTU |
| Water | $ 32,417.70 | 7,539 Gallon | n/a | $ 4.30 $/Gallon | n/a |

Note
1) Average costs include all charges

Total Annual Utility Bill $ 427,354.03

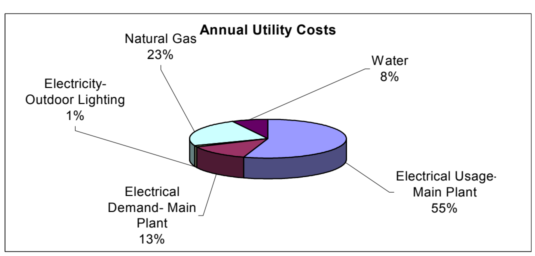
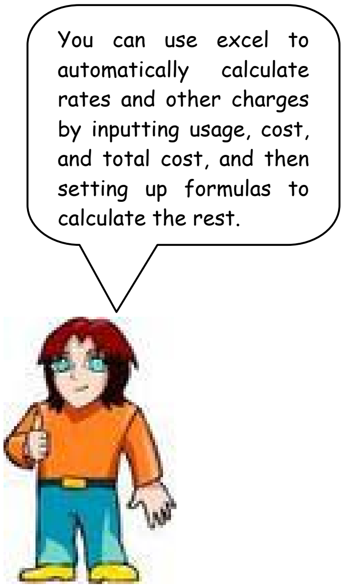



*Figure 2, An example of how a utility summary page should look*




An example of how bills should be entered into spreadsheet form can be seen in the example gas bill of figure 3. While the specifics of clients' electricity bills will change due to service provider, service class, and applicable discounts, some things should always be present in the bills. Those things are: demand usage, demand rate, demand cost, electricity usage, electricity rate, electricity cost, and other charges. If it is possible it is helpful to break these charges down into on peak and off peak segments.

Delivery (via NYSEG)

| Usage | | Transportation Service Rate | Usage (Therms) | | | | | Trasportation Total Cost | Transportation Cost ($/Term) | Other Charges & Credits | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| From | To | | Meter #0001941 | Meter #0001942 | Meter #06304478 | Meter #05590069 | Total | | | | |
| 1/1/2002 | 2/1/2002 | 831246 | 45,036.6 | 19,416.0 | - | - | 64,452.6 | $ 38,220.58 | $ 0.593003 | $ 2,907.99 | $ 41,128.57 |
| 2/1/2002 | 3/1/2002 | 831246 | 42,327.7 | 18,347.4 | - | - | 60,675.1 | $ 35,980.51 | $ 0.593003 | $ 107.93 | $ 36,088.44 |
| 3/1/2002 | 4/1/2002 | 831246 | 41,721.7 | 18,107.3 | - | - | 59,829.0 | $ 35,478.77 | $ 0.593003 | $ - | $ 35,478.77 |
| 4/1/2002 | 5/1/2002 | 831246 | 29,250.7 | 9,093.7 | - | - | 38,344.4 | $ 22,738.34 | $ 0.593003 | $ (49.94) | $ 22,688.40 |
| 5/1/2002 | 6/1/2002 | 831246 | 20,895.1 | 4,566.8 | - | - | 25,461.9 | $ 15,098.98 | $ 0.593003 | $ (341.47) | $ 14,757.51 |
| 6/1/2002 | 7/1/2002 | 831246 | 2,411.6 | 0.0 | - | - | 2,411.6 | $ 1,430.08 | $ 0.593000 | $ - | $ 1,430.08 |
| 7/1/2002 | 8/1/2002 | 831246 | 2,306.0 | 0.0 | - | - | 2,306.0 | $ 1,367.46 | $ 0.593001 | $ (17.59) | $ 1,349.87 |
| 8/1/2002 | 9/1/2002 | 831246 | 2,467.1 | 0.0 | - | - | 2,467.1 | $ 1,462.99 | $ 0.593000 | $ - | $ 1,462.99 |
| 9/1/2002 | 10/1/2002 | 0830160A | - | - | 2,460.8 | 10.1 | 2,470.9 | $ 624.05 | $ 0.252560 | $ - | $ 624.05 |
| 10/1/2002 | 11/1/2002 | 0830160A | - | - | 26,034.1 | 8,475.5 | 34,509.6 | $ 3,992.38 | $ 0.115689 | $ - | $ 3,992.38 |
| 11/1/2002 | 12/1/2002 | 0830160A | - | - | 40,000.4 | 12,067.4 | 52,067.8 | $ 5,658.56 | $ 0.108677 | $ - | $ 5,658.56 |
| 12/1/2002 | 1/1/2003 | 0830160A | - | - | 56,419.3 | 20,597.4 | 77,016.7 | $ 7,323.89 | $ 0.095095 | $ - | $ 7,323.89 |
| *Averages* | | | *23,302.1* | *8,691.4* | *31,228.7* | *10,287.6* | *35,167.7* | *$ 14,114.72* | *$ 0.44* | *$ 217.24* | *$ 14,331.96* |
| *Totals* | | | *186,416.5* | *69,531.2* | *124,914.6* | *41,150.4* | *422,012.7* | *$ 169,376.59* | | *$ 2,606.92* | *$ 171,983.51* |

Supply (via AllEnergy)

| Usage | | Usage (Therms) | Supply Cost ($/Term) | Total Supply Cost |
|---|---|---|---|---|
| From | To | | | |
| 9/1/2002 | 9/30/2002 | 2,495.9 | $ 0.49 | $ 1,217.98 |
| 9/30/2002 | 10/31/2002 | 32,158.2 | $ 0.53 | $ 17,010.79 |
| 10/31/2002 | 11/30/2002 | 52,641.6 | $ 0.49 | $ 25,689.10 |
| 11/30/2002 | 12/31/2002 | 77,865.4 | $ 0.49 | $ 37,998.33 |
| *Averages* | | *41,290.3* | *$ 0.50* | *$ 20,479.05* |
| *Totals* | | *165,161.1* | | *$ 81,916.20* |

Estimated Total Gas Charges

| Usage Period | Supply Cost | Delivery Cost | Estimated Cost | | Estimated Total Gas Cost |
|---|---|---|---|---|---|
| | | | ($/therm) | ($/MMBTU) [1] | |
| Sep-02 | $ 1,217.98 | $ 624.05 | $ 0.74 | $ 7.38 | $ 1,842.03 |
| Oct-02 | $ 17,010.79 | $ 3,992.38 | $ 0.65 | $ 6.53 | $ 21,003.17 |
| Nov-02 | $ 25,689.10 | $ 5,658.56 | $ 0.60 | $ 5.95 | $ 31,347.66 |
| Dec-02 | $ 37,998.33 | $ 7,323.89 | $ 0.58 | $ 5.82 | $ 45,322.22 |
| *Averages* | *$ 20,479.05* | *$ 4,399.72* | *$ 0.64* | *$ 6.42* | *$ 24,878.77* |
| *Totals* | *$ 81,916.20* | *$ 17,598.88* | | | *$ 99,515.08* |

Notes:

1) 1 MMBTU = 10 Therms

2) Based on average gas price under new transportation service rate and supply from AllEnergy and total annual usage

| | | |
|---|---|---|
| Estimated Annual Total Gas Cost | $ | 270,000 |
| Annual Gas Usage | 422,013 | Therms |
| | 4,220,127 | MMBTU |
| Estimated Average Gas Cost | $ 0.64 | $/Therm |
| | $ 6.42 | $/MMBTU |

*Figure 3, Example gas bill*

For each utility the following graphs should be inserted into the report.

| Commodity | Graphs |
|---|---|
| *Electricity* | *Electrical costs, electrical usage, electrical cost pie graph* |
| *Demand* | *Demand Costs, demand usage* |
| *Natural Gas* | *Gas costs, gas usage* |
| *Water* | *Water costs, Water usage* |

Note that for the cost graphs the X-axis should be labeled as Usage Period and the Y-axis should be labeled as Cost. For the electrical usage graphs the X-axis should be labeled as usage period and the Y-axis should be labeled in the applicable commodity units. Finally, the electrical cost pie graph should include four percentages: demand, on-peak usage costs, off-peak usage costs, and other costs.

Other bills should be tabulated in the same fashion as the gas bills. Remember that the colors that are used are not as important, but rather it is important that the data be consistent and reliable.

4. *Begin Report*

   At this point it is best to begin the report. A blank report template can be found on the IAC drive at Report Tools\Report Template. This template can be used to fill in as much information as possible. The more that is done now, the less that needs to be done later.

   This time can also be used to search for possible ARs for the company. Possible ARs can be found by using the assessment center library (see the appendix for instructions on how to use the library). It is also sometimes helpful to search the Rutgers database with the clients SIC code found at http://iac.rutgers.edu/database/topten.php.

5. *Confirm with company*

   A few days before the scheduled assessment the company contact should be **called** in order to confirm the date and time of the assessment. During this call the lead should also introduce themselves, explain their roll as the assessment lead, explain what to expect on the assessment day, and ask the client if they have any questions or concerns.

6. *Prepare for the assessment the day before*

   The main equipment used in assessments is located inside the toolbox stored in the equipment cabinet. The key to the equipment cabinet hangs on a nail in the ceiling tile in front of the equipment cabinet. It is the responsibility of the lead to ensure that there is no equipment missing from the toolbox and that all battery powered equipment has either a fully charged battery or back up batteries available for the assessment.

   The lead should also ensure that a timeline has been established for the morning. The timeline should include a meeting place for IAC employees (usually Brueggers on Erie Blvd), and a meeting time.

7. *Assess Company*

   See section 1.4 for a typical schedule of an assessment day. Remember that on an assessment you are representing the IAC so look and act professional. Most importantly make sure client's information remains confidential. While it may not seem like a big deal to us we have learned the hard way that many clients are very secretive with their information. If we do not convince them that we will protect their secrets they will not trust us.

8. *Write Report*

When writing the report remember that time is very critical to the program overseers at Rutgers. They compare each center on average report production time. So make sure that your reports are on time. Also, be sure to leave time for others to review your report before sending it to the client. Typically it is helpful to leave drafts of the report in the "to be reviewed" box even if the report is not completely finished. This way others can catch any mistakes early. As a rule of thumb allow at least two weeks for report reviews. Also, be sure that the director reviews the report before it is sent to the client. It is helpful to print out two copies of the report for review, one copy for the director and the other for the IAC staff. This will speed up the review process.

When writing reports do not be afraid to **ASSUMPTIONS**. Remember that our role at the IAC is not as designers, but as idea generators. We only do basic calculations to determine if our idea is basically feasible. Do not get caught up in excessive detail. It will take up all of your time, and accomplish little. If a company likes our recommendations we will encourage them to have a professional feasibility study performed before implementation. The line between adequate and excessive detail is fine and can only be found with experience.

9. *Follow up with client on any necessary information*

Many times after leaving an assessment there will be a verbal agreement for the client to send you additional information. A few days after the assessment is over contact the client in writing with a list of the information you will need. Do not wait too long. The client will most likely make your request a low priority. If the client is not giving you the requested information do not be afraid to repeatedly contact the client. The squeaky wheel gets the grease.

10. *Finish draft of report & revise*

As stated in step 8 it is important that you finish the draft early and have time for revision. Typically it is helpful to leave drafts of the report in the "to be reviewed" box even if the report is not completely finished. This way others can catch any mistakes early. As a rule of thumb allow at least two weeks for report reviews. Also, be sure that the director reviews the report before it is sent to the client. It is helpful to print out two copies of the report for review, one copy for the director and the other for the IAC staff. This will speed up the review process.

11. *Prepare final report & mail*

A copy of the report should be mailed to every person listed on the client's survey. Each copy of this report should include a cover memo thanking the client for participating in the program, reminding the client about the implementation survey, and encouraging the client to call with any questions. A typical cover memo can be found on the IAC drive at Report Tools\Report Templates. This memo should be printed on official IAC letterhead. Along with this memo it is also helpful to include an electronic copy of the report and an electronic copy of the bills on a floppy disk.

*12. File hard copy of report*

A hard, or physical coy of the report should be filed in the clients permanent file in the filing cabinet, see section 3.1 for more information on the filing system. This copy of the report should not include the client's name.

*13. Upload report data shell*

A blank data shell entitled Assess_Upload can be found on the IAC drive at Report Tools\Uploads. Fill it out by following the directions in the DOE Industrial Assessment Database manual (Pink 4 in the library) on page 22. Upload report data shell by going to the *Status Page* in the internal use section of the Rutgers webpage and follow their instructions (click on the upload link for your assessment number). Be sure to save an electronic copy of the report data shell in the client's electronic folder. See section 3.1 for more information on the electronic filing system.

*14. Upload pdf copy of Report*

A pdf copy of the report (a copy of the report in adobe acrobat format) must be uploaded to Rutgers. To convert a word file to a pdf file select print form the file pull down menu in Word and select Acrobat Distiller as the printer then click print and follow the additional prompts. If you have trouble making the conversion make sure that any pictures are inserted into the Word file as a bitmap.

Once the conversion to pdf is complete book marks need to be inserted into at the beginning of each AR, these bookmarks should be titled AR 1, AR 2 ect. Also, a bookmark needs to be inserted after the last page of the last AR, this book mark should be titled END. Clicking on the bookmark tab located on the top left and then selecting insert new bookmark can insert a bookmark.

To upload the pdf copy to Rutgers go to *Status Page* in the internal use section of the Rutgers webpage and follow their instructions (click on the upload link for your assessment number). Be sure to save an electronic copy of the report in pdf in the client's electronic folder.

*15. Update Assessment Summary spreadsheet*

The Assessment Summary spread sheet that is located in the clients folder should be updated with all of the appropriate information. Note that columns with estimated dates, and the "report on time?" column contain formulas that should be copied for each new entry. Also be sure to read the notes at the bottom of the page regarding implementation report status.

*16. Follow up with client*

After sending out the report it is helpful to call the client after about a week to make sure they got the report and ask if they have any questions about it. You do not need to actually talk to the client leaving them a message is fine. The purpose of this call is more to ensure that the client does not forget about us, remember the squeaky wheel gets the grease.

*17. Respond to critique*

Finally Rutgers may critique of the report. The critique can be viewed and responded to on the *Status Page* in the internal use section of the Rutgers webpage. The person responsible for that report should respond to that critique. Before sending the response to the critique be sure to print out and file a copy of Rutgers critique and your complete responses to their critique.

*18. Send Client implementation report*

Six to nine months after the client receives the assessment report the implementation report is due. Even though the implementation report is included with the report it should be sent to the client along with a cover letter explaining the purpose of the survey. This redundancy is used because it has traditionally been very difficult to receive implementation reports from clients. A template for implementation reports can be found on the IAC drive at Report Tools\Report Templates.

*19. Upload implementation report spreadsheet*

A blank data shell entitled Imp_Upload can be found on the IAC Drive at Report Tools\Uploads. Fill it out by following the directions in the DOE Industrial Assessment Database manual (Pink 4 in the library) on page 23. Uploaded it to Rutgers on the *Status Page* in the internal use section of the Rutgers webpage. Be sure to save an electronic copy of the implementation report data shell in the client's electronic folder. See section 3.1 for more information on the electronic filing system.

*20. Update assessment summary spreadsheet*

The Assessment Summary spread sheet that is located in the clients folder should be updated with all of the appropriate information. Note that columns with estimated dates, and the "report on time?" column contain formulas that should be copied for each new entry. Also be sure to read the notes at the bottom of the page regarding implementation report status.

## *1.6 Report Template*

A report template is used to minimize the work required during a collaborative effort. Without a report template it is difficult to produce a quality report when multiple people are working on the report all with there own individual styles. A sample report written in standard format can be found in the appendix of this report.

The report template is located on the IAC Drive at Report Tools\Report Templates. This is a read–only copy. To use this template, copy and paste it into the clients report folder and rename it. Note that all text in the report is justified, 12 point, times new roman. Titles are centered, 14 point, times new roman.

### *1.6.1 Cover page*

A typical cover page appears in figure 4. Note that the client name only appears on the copy of the report that is sent to the client. On all other copies a dash (-) should appear in the space with the client name. Also, note that at least one copy of the report with original signatures should be sent to the client.

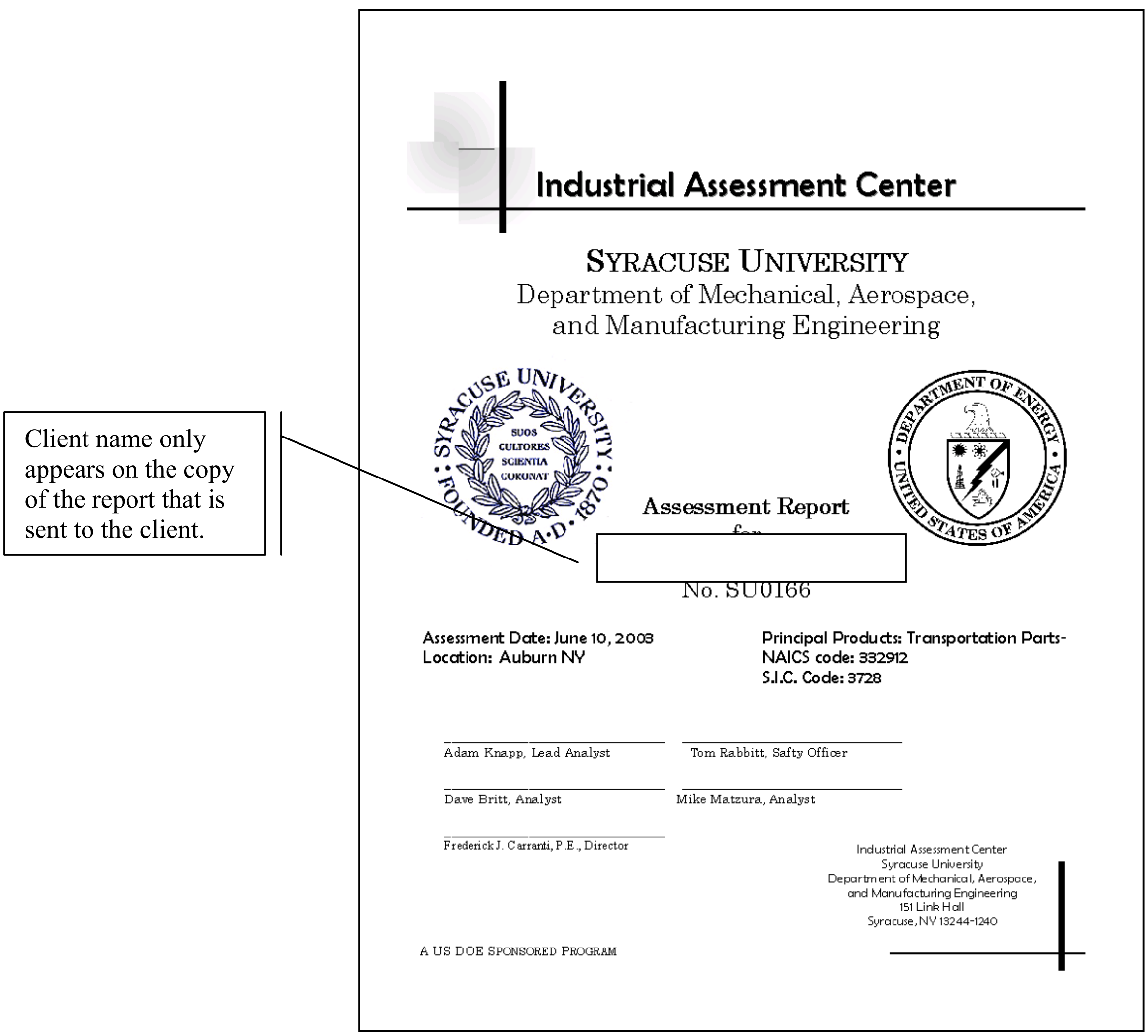
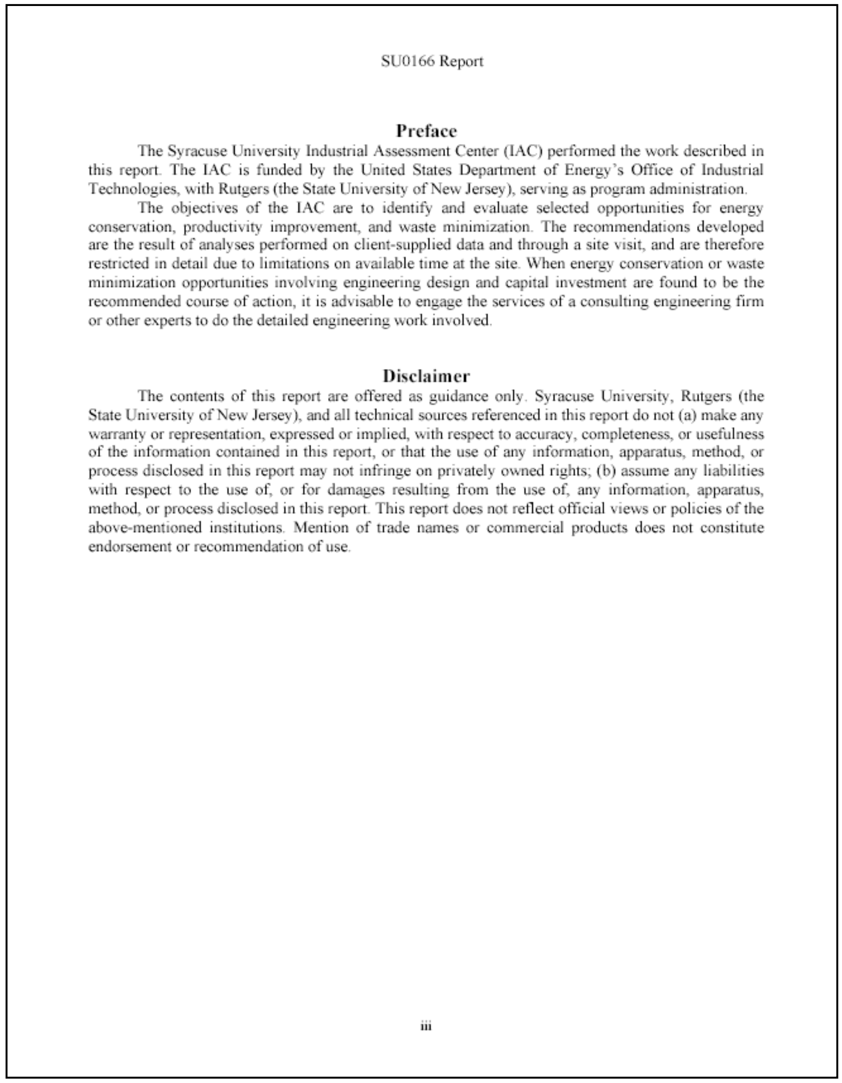



*Figure 4, typical report cover page*

### *1.6.2 Preface and disclaimer*

A typical preface and disclaimer page is pictured in figure 5. This section is standard for all reports and can be found in the report template.



SU0166 Report

**Preface**

The Syracuse University Industrial Assessment Center (IAC) performed the work described in this report. The IAC is funded by the United States Department of Energy's Office of Industrial Technologies, with Rutgers (the State University of New Jersey), serving as program administration.

The objectives of the IAC are to identify and evaluate selected opportunities for energy conservation, productivity improvement, and waste minimization. The recommendations developed are the result of analyses performed on client-supplied data and through a site visit, and are therefore restricted in detail due to limitations on available time at the site. When energy conservation or waste minimization opportunities involving engineering design and capital investment are found to be the recommended course of action, it is advisable to engage the services of a consulting engineering firm or other experts to do the detailed engineering work involved.

**Disclaimer**

The contents of this report are offered as guidance only. Syracuse University, Rutgers (the State University of New Jersey), and all technical sources referenced in this report do not (a) make any warranty or representation, expressed or implied, with respect to accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe on privately owned rights; (b) assume any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this report. This report does not reflect official views or policies of the above-mentioned institutions. Mention of trade names or commercial products does not constitute endorsement or recommendation of use.

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*Figure 5, Typical Preface and disclaimer page*

### *1.6.3 Executive summary*

A typical executive summary is shown in figure 6. Note that the summary does not exceed one page. Also, note that the left hand columns of the tables are left aligned.

SU0166 Report

**Executive Summary**

**Resource Consumption**

| Commodity | Annual Cost | Annual Usage | Average Cost |
|---|---|---|---|
| *Electricity Usage* | *$235,283.68* | *4,842,000 kWh* | *0.05 $/kWh* |
| *Electric Demand* | *$55,761.57* | *9,360 kW* | *5.95 $/kW* |
| *Outdoor Lighting* | *$4,376.00* | *24,834 kWh* | *0.18 $/kWh* |
| *Natural Gas* | *$99,515.08* | *422,013 Therm* | *0.24 $/Therm* |
| *Water* | *$32,417.70* | *7,539 Gal* | *4.30 $/gallon* |
| | **Total Annual Utility Costs** | | **$427,354** |

These values were taken from the utilities from January 2002 to December 2002. Note that the average cost values presented in the above table were calculated by dividing total cost by total usage.

**Summary of Assessment Recommendations**

| Assessment Recommendation (AR) | Total Annual Savings | Capital Cost | Installation Cost | Payback Period (years) |
|---|---|---|---|---|
| *Duct Outside Air to Compressors* | *$4,255* | *$40* | *$192* | *0.05* |
| *Repair Air Leaks* | *$5,389* | *$0* | *$480* | *0.09* |
| *Reduce Redundant Inspection in proof loading area* | *$28,125* | *$2,000* | *$8,016* | *0.36* |
| *Install Parking lot* | *$24,000* | *$16,726* | *$3,186* | *0.83* |
| *Install More Efficient Lighting* | *$24,270* | *$26,724* | *$13,162* | *1.5* |
| *Install Hydropower* | *$23,945* | *$112,200* | *$19,800* | *5.5* |
| *Install Forced Air heat* | *$12,000* | *$44,060* | *$24,500* | *5.8* |
| Totals | $123,957 | $191,640 | $64,357 | n/a |

So that we might determine the success of our energy conservation, productivity improvement, and waste minimization efforts, in approximately six to nine months we will be contacting you. At that time we would like to discuss your opinion of this report and how many of our recommendations have actually been implemented. You will be asked to complete an implementation survey, a copy of which can be found in the appendix of this report.

We also ask that you respond to phone calls from the program administrators at Rutgers University or the U.S Department of Energy, if they decide to contact you. In the meantime, please feel free to contact us if we can answer any questions regarding the program, this report, or our assessment recommendations.

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*Figure 6, Typical executive summary*

### *1.6.4 Table of contents*

A typical table of contents is shown in figure 7. Microsoft word automatically creates this table. This can be done by selecting *indexes and tables* from the *insert* pull down menu. Once this is done click on the *table of contents* tab and click *ok*.

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**TABLE OF CONTENTS**



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*Figure 7, Typical table of contents*

### *1.6.5 Annual utility summary*

A typical annual utility summary is shown in figure 8. This page is a summary of the client's utility information. It must include the total annual utility cost, a breakdown of those costs in pie chart format, and the unit cost of each commodity. Unit costs should be reported in both billed units (for example dollars per therm) and absolute units (dollars per MMBTU).

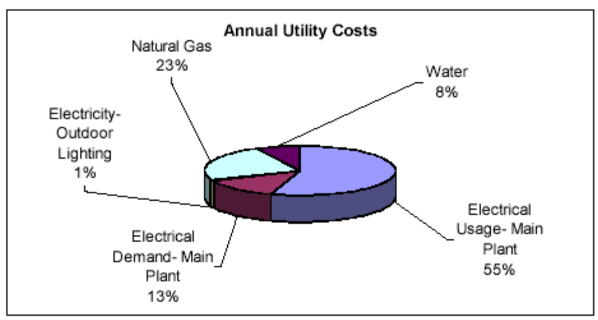
SU0166 Report

**Annual Utility Summary**

The following graphs, and their corresponding data have been included on an attached floppy disk in electronic format.

| Commodity | Annual Cost | Annual Usage | | Average Cost | |
|---|---|---|---|---|---|
| | | Billed Units | MMBTU | Billed Units | $/MMBTU |
| *Electricity Usage -Main plant* | *$235,283.68* | *4,842,000 kWh* | *16,526* | *0.05 $/kWh* | *14.24* |
| *Electric Demand –Main Plant* | *$5,5761.57* | *9,360 kW* | *n/a* | *5.95 $/kW* | *n/a* |
| *Electricity-Outdoor Lighting* | *$4,376.00* | *24,834 kWh* | *85* | *0.18 $/kWh* | *51.63* |
| *Natural Gas* | *$99,515.08* | *422,013 Therm* | *4,220,127* | *0.24 $/Therm* | *0.02* |
| *Water* | *$32,417.70* | *7,539 Gal* | *n/a* | *4.30 $/gallon* | *n/a* |
| | | | | Total Annual Utility Bill | $427,354.03 |

These values were taken from the utilities from January 2002 to December 2002. Note that the average cost values presented in the above table were calculated by dividing total cost by total usage. This cost data is summarized in the chart below.



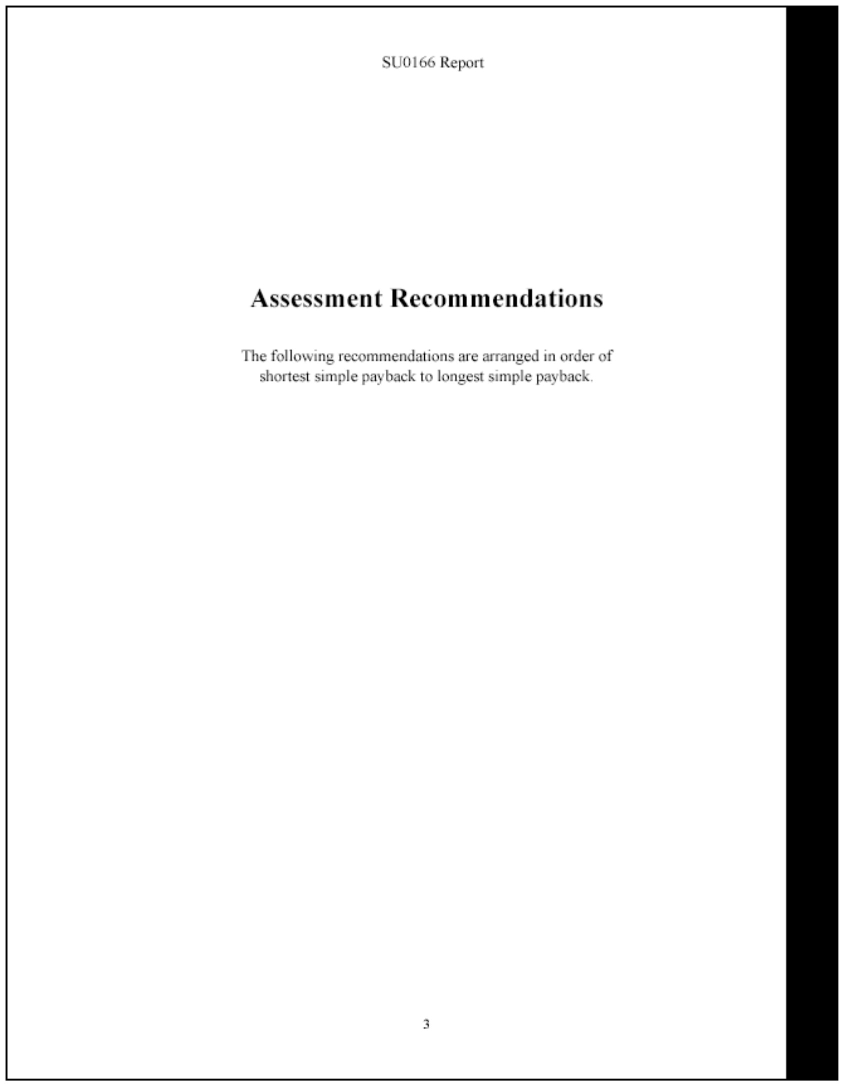

1

*Figure 8, Typical annual utility summary*

### *1.6.6 Assessment Recommendations cover page*

A typical assessment recommendations cover page is shown in figure 9. This page is inserted into the report to help the reader notice the beginning of the assessment recommendations. This page also alerts the reader that the recommendations will appear in the report from smallest to largest payback period.

Note that the black bar on the right hand side appears throughout the Assessment Recommendations section. This is there to help the reader find the section easily.



SU0166 Report

**Assessment Recommendations**

The following recommendations are arranged in order of shortest simple payback to longest simple payback.

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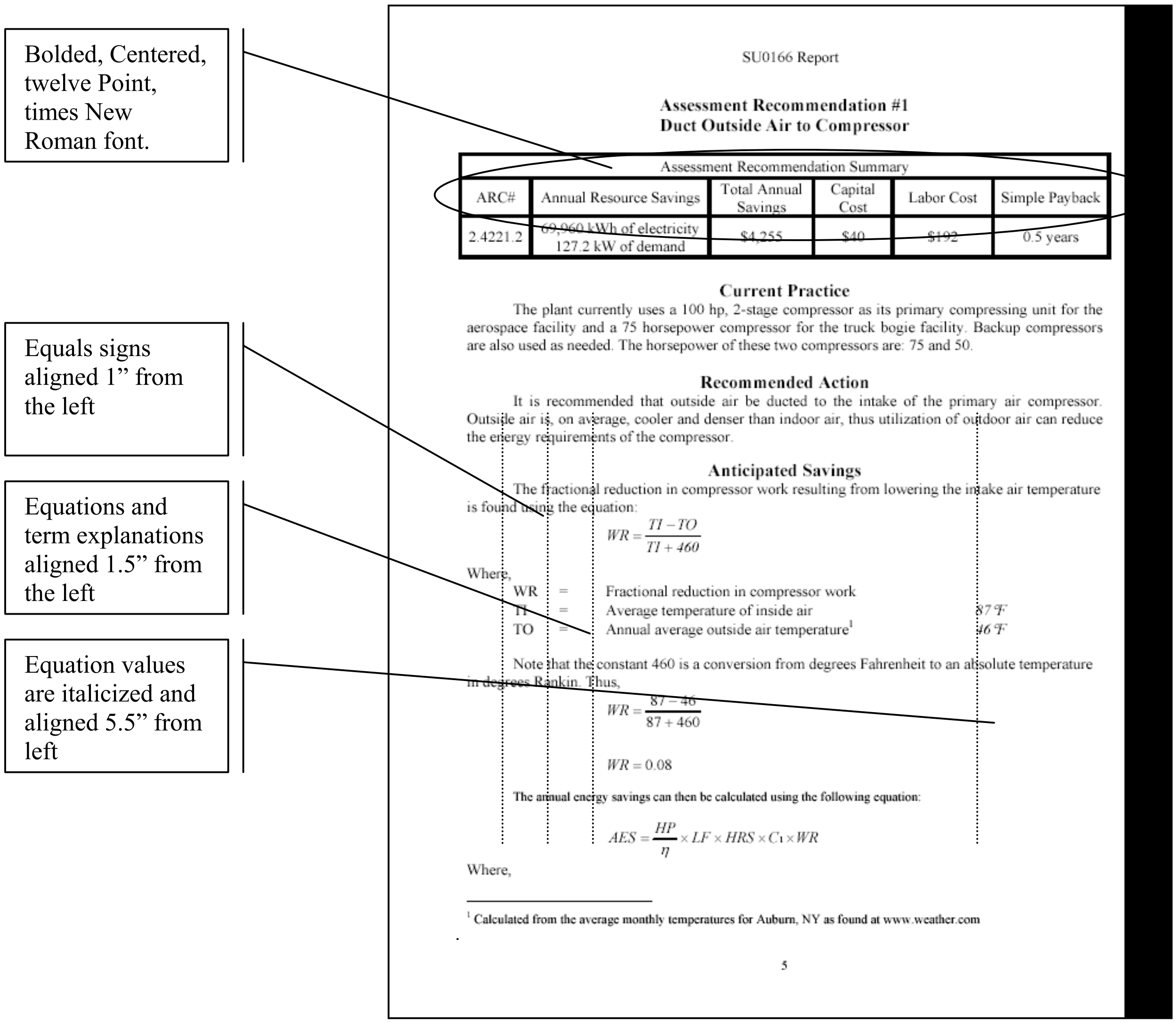
*Figure 9, Typical assessment recommendations cover page*

### *1.6.7 Assessment recommendations*

A typical assessment recommendation is shown in figure 10. Note that the file name appears centered in the header and the page number appears centered in the footer. All text is in a Justified, twelve point, Times New Roman font. Headings such as "Current Practice" are in a Centered, fourteen point, Times New Roman font.

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**Assessment Recommendation #1**
**Duct Outside Air to Compressor**

| Assessment Recommendation Summary | | | | | |
|---|---|---|---|---|---|
| ARC# | Annual Resource Savings | Total Annual Savings | Capital Cost | Labor Cost | Simple Payback |
| 2.4221.2 | 69,960 kWh of electricity<br>127.2 kW of demand | $4,255 | $40 | $192 | 0.5 years |

**Current Practice**

The plant currently uses a 100 hp, 2-stage compressor as its primary compressing unit for the aerospace facility and a 75 horsepower compressor for the truck bogie facility. Backup compressors are also used as needed. The horsepower of these two compressors are: 75 and 50.

**Recommended Action**

It is recommended that outside air be ducted to the intake of the primary air compressor. Outside air is, on average, cooler and denser than indoor air, thus utilization of outdoor air can reduce the energy requirements of the compressor.

**Anticipated Savings**

The fractional reduction in compressor work resulting from lowering the intake air temperature is found using the equation:

$$WR = \frac{TI - TO}{TI + 460}$$

Where,

| | | | |
|---|---|---|---|
| WR | = | Fractional reduction in compressor work | |
| TI | = | Average temperature of inside air | *87°F* |
| TO | = | Annual average outside air temperature[1] | *46°F* |

Note that the constant 460 is a conversion from degrees Fahrenheit to an absolute temperature in degrees Rankin. Thus,

$$WR = \frac{87 - 46}{87 + 460}$$

$$WR = 0.08$$

The annual energy savings can then be calculated using the following equation:

$$AES = \frac{HP}{\eta} \times LF \times HRS \times C_1 \times WR$$

Where,

[1] Calculated from the average monthly temperatures for Auburn, NY as found at www.weather.com

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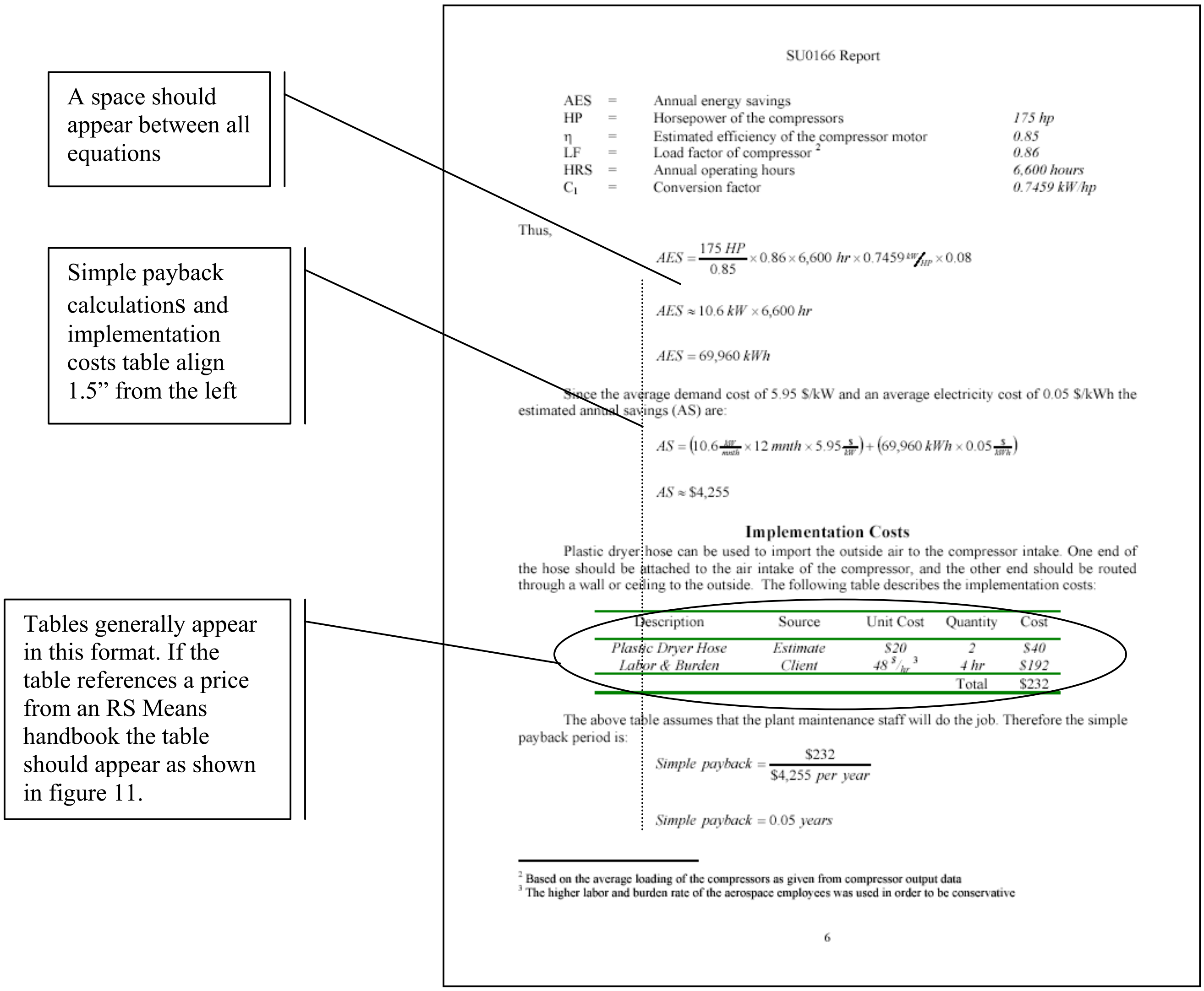
*Figure 10, Typical assessment recommendation*

Equations are inserted using Microsoft equation editor. All tables are Microsoft word tables in the *simple one* format. Tables can be converted to the simple one format by highlighting the table and selecting *Table AutoFormat* from the *Table* pull down menu. In the screen that appears click *Simple One* in the *Formats* column. Then click *ok*.

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| | | | |
|---|---|---|---|
| AES | = | Annual energy savings | |
| HP | = | Horsepower of the compressors | *175 hp* |
| $\eta$ | = | Estimated efficiency of the compressor motor | *0.85* |
| LF | = | Load factor of compressor [2] | *0.86* |
| HRS | = | Annual operating hours | *6,600 hours* |
| $C_1$ | = | Conversion factor | *0.7459 kW/hp* |

Thus,

$$AES = \frac{175\ HP}{0.85} \times 0.86 \times 6{,}600\ hr \times 0.7459\,{}^{kW}\!/_{HP} \times 0.08$$

$$AES \approx 10.6\ kW \times 6{,}600\ hr$$

$$AES = 69{,}960\ kWh$$

Since the average demand cost of 5.95 \$/kW and an average electricity cost of 0.05 \$/kWh the estimated annual savings (AS) are:

$$AS = \left(10.6\frac{kW}{mnth} \times 12\ mnth \times 5.95\frac{\$}{kW}\right) + \left(69{,}960\ kWh \times 0.05\frac{\$}{kWh}\right)$$

$$AS \approx \$4{,}255$$

**Implementation Costs**

Plastic dryer hose can be used to import the outside air to the compressor intake. One end of the hose should be attached to the air intake of the compressor, and the other end should be routed through a wall or ceiling to the outside. The following table describes the implementation costs:

| Description | Source | Unit Cost | Quantity | Cost |
|---|---|---|---|---|
| *Plastic Dryer Hose* | *Estimate* | *\$20* | *2* | *\$40* |
| *Labor & Burden* | *Client* | *48 \$/hr* [3] | *4 hr* | *\$192* |
| | | | Total | \$232 |

The above table assumes that the plant maintenance staff will do the job. Therefore the simple payback period is:

$$Simple\ payback = \frac{\$232}{\$4{,}255\ per\ year}$$

$$Simple\ payback = 0.05\ years$$

[2] Based on the average loading of the compressors as given from compressor output data
[3] The higher labor and burden rate of the aerospace employees was used in order to be conservative

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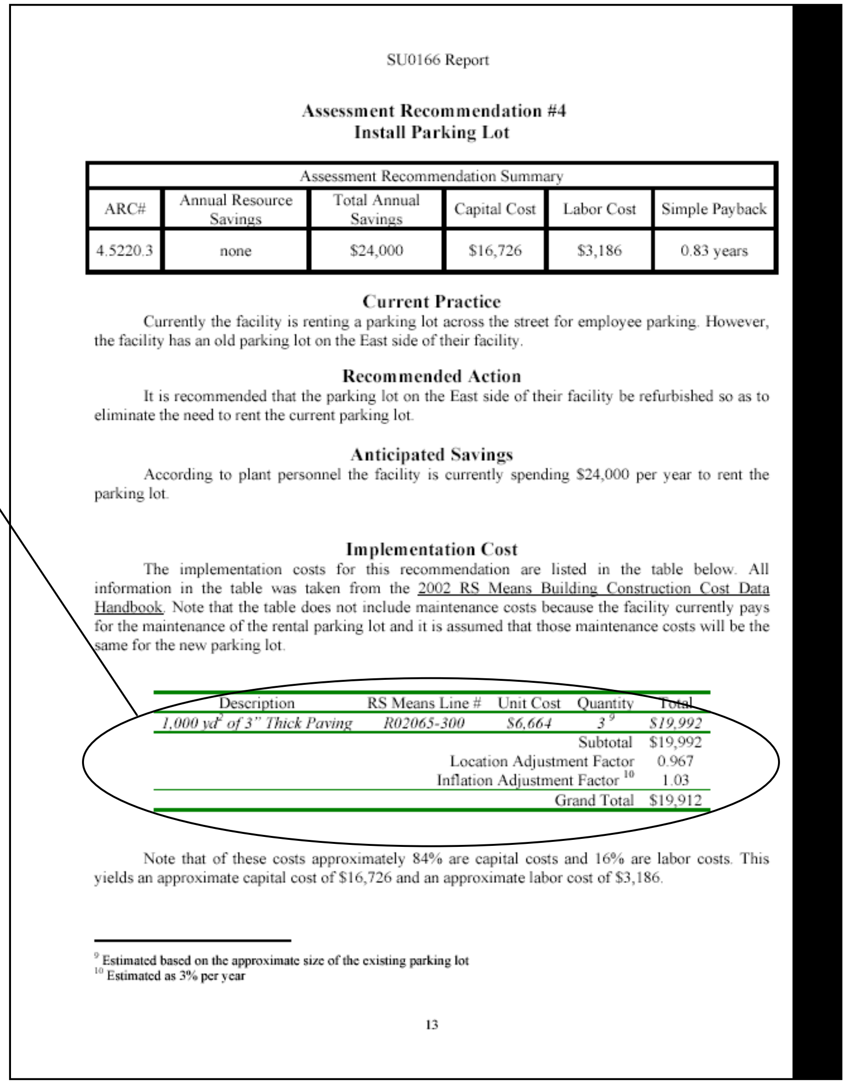
*Figure 11, Typical Implementation costs section of an AR*

Figure 11 shows the implementation costs section of a typical assessment recommendation. Note that the implementation costs table would change slightly, as shown in figure 12, if the implementation costs were to be taken from an RS Means cost handbook.

Notice that this table has an additional column for the complete RS Means line number after the description column. This table also has extra rows for location adjustment factor and inflation adjustment factor. The inflation adjustment factor should increase the total implementation cost by 3% for every year that the book is out of date.

The source column is now reads RS Means Line #, also there are additional rows for location adjustment factor and inflation adjustment factor.



SU0166 Report

**Assessment Recommendation #4**
**Install Parking Lot**

| Assessment Recommendation Summary | | | | | |
|---|---|---|---|---|---|
| ARC# | Annual Resource Savings | Total Annual Savings | Capital Cost | Labor Cost | Simple Payback |
| 4.5220.3 | none | $24,000 | $16,726 | $3,186 | 0.83 years |

**Current Practice**

Currently the facility is renting a parking lot across the street for employee parking. However, the facility has an old parking lot on the East side of their facility.

**Recommended Action**

It is recommended that the parking lot on the East side of their facility be refurbished so as to eliminate the need to rent the current parking lot.

**Anticipated Savings**

According to plant personnel the facility is currently spending $24,000 per year to rent the parking lot.

**Implementation Cost**

The implementation costs for this recommendation are listed in the table below. All information in the table was taken from the 2002 RS Means Building Construction Cost Data Handbook. Note that the table does not include maintenance costs because the facility currently pays for the maintenance of the rental parking lot and it is assumed that those maintenance costs will be the same for the new parking lot.

| Description | RS Means Line # | Unit Cost | Quantity | Total |
|---|---|---|---|---|
| *1,000 yd² of 3" Thick Paving* | *R02065-300* | *$6,664* | *3* [9] | *$19,992* |
| | | | Subtotal | $19,992 |
| | | | Location Adjustment Factor | 0.967 |
| | | | Inflation Adjustment Factor [10] | 1.03 |
| | | | Grand Total | $19,912 |

Note that of these costs approximately 84% are capital costs and 16% are labor costs. This yields an approximate capital cost of $16,726 and an approximate labor cost of $3,186.

[9] Estimated based on the approximate size of the existing parking lot
[10] Estimated as 3% per year

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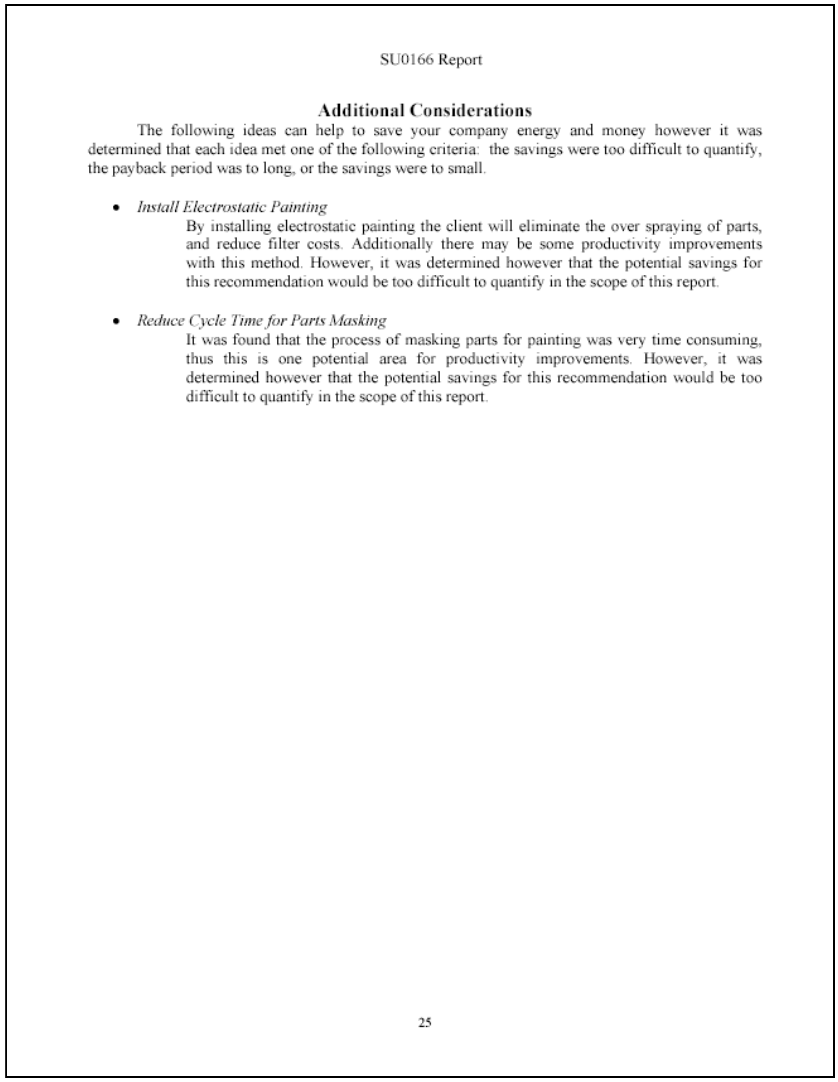
*Figure 12, Typical Implementation Costs table using an RS Means Handbook*

### *1.6.8 Additional Considerations*

The additional considerations section is used for recommendations that may be good ideas from an energy standpoint bit are either to difficult to quantify, have excessive payback periods, or have very small annual savings. A typical additional considerations section can be seen in figure 13.



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**Additional Considerations**

The following ideas can help to save your company energy and money however it was determined that each idea met one of the following criteria: the savings were too difficult to quantify, the payback period was to long, or the savings were to small.

- *Install Electrostatic Painting*
  By installing electrostatic painting the client will eliminate the over spraying of parts, and reduce filter costs. Additionally there may be some productivity improvements with this method. However, it was determined however that the potential savings for this recommendation would be too difficult to quantify in the scope of this report.

- *Reduce Cycle Time for Parts Masking*
  It was found that the process of masking parts for painting was very time consuming, thus this is one potential area for productivity improvements. However, it was determined however that the potential savings for this recommendation would be too difficult to quantify in the scope of this report.

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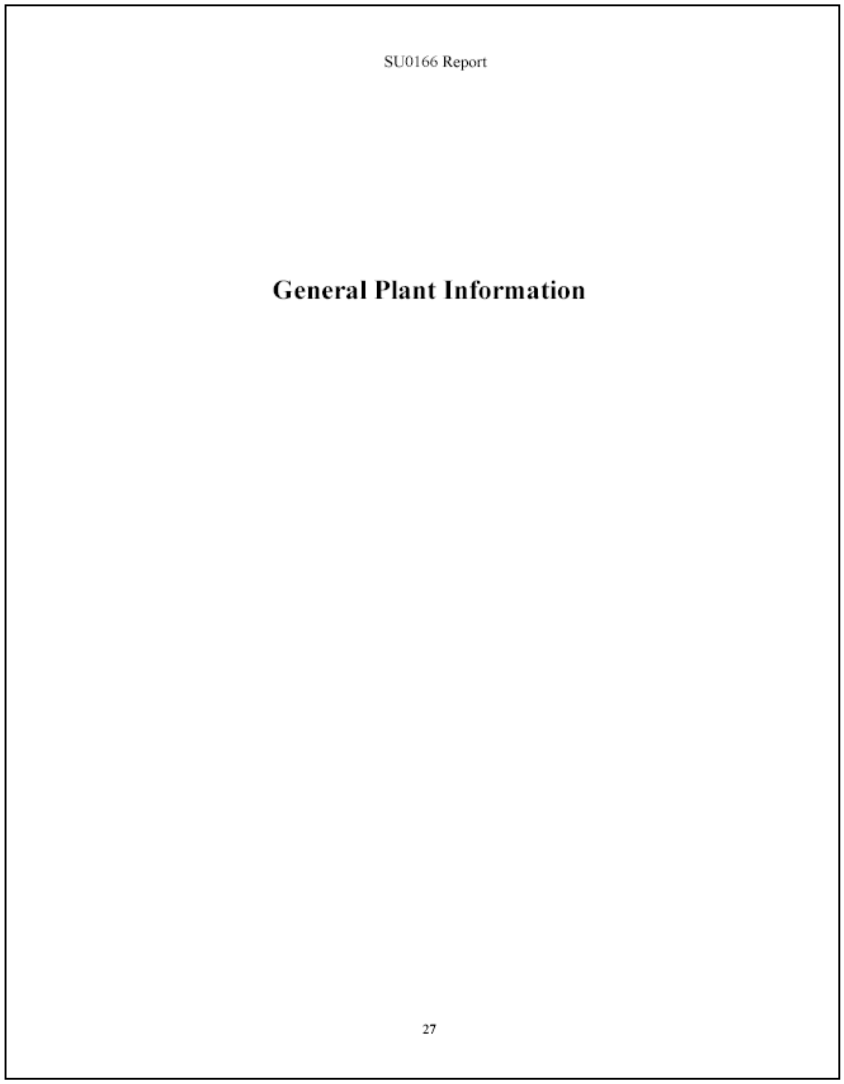
*Figure 13, typical Additional Considerations section*

### *1.6.9 General Plant Information cover page*

A typical General Plant Information cover page is shown in figure 14. This page is inserted into the report to help the reader notice the beginning of the section.


SU0166 Report

**General Plant Information**

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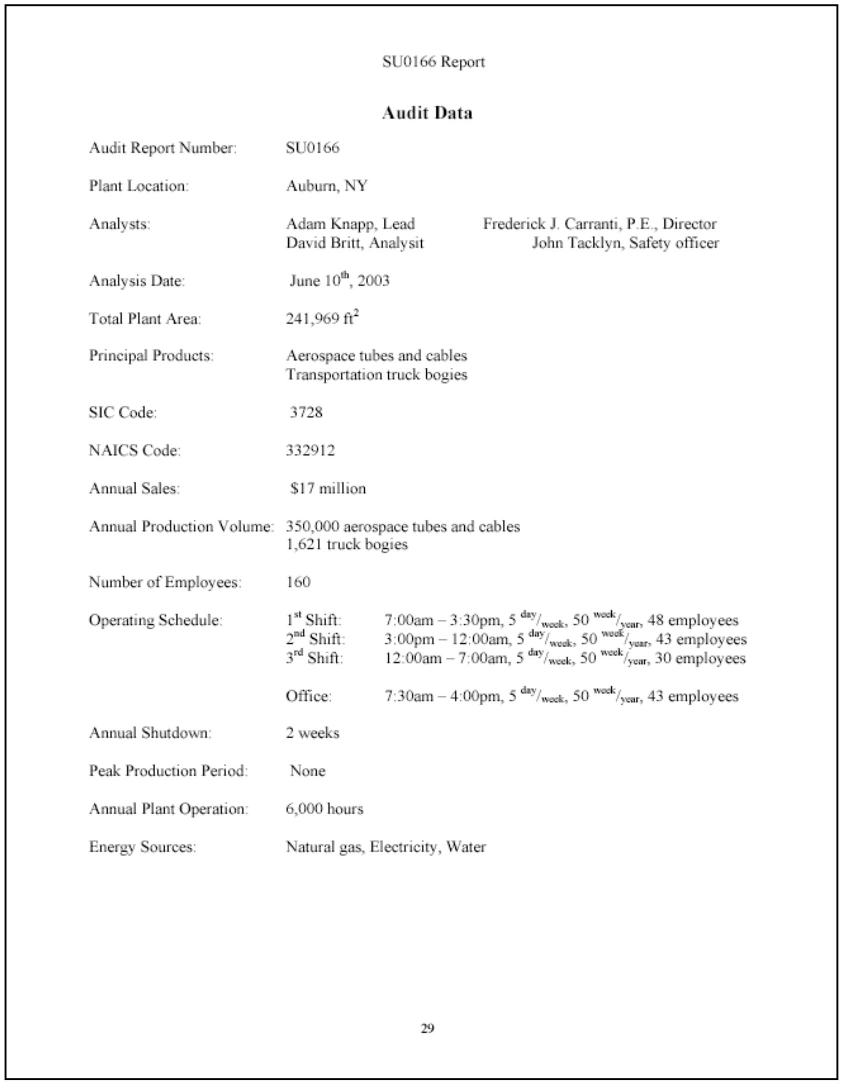
*Figure 14, Typical General Plant Information cover page*

### *1.6.10 Audit Data*

This section of the report summarizes the statistical information of the plant. We collect this information at Rutgers request. A typical Audit Data section can be seen in figure 15.



SU0166 Report

**Audit Data**

| | | |
|---|---|---|
| Audit Report Number: | SU0166 | |
| Plant Location: | Auburn, NY | |
| Analysts: | Adam Knapp, Lead<br>David Britt, Analysit | Frederick J. Carranti, P.E., Director<br>John Tacklyn, Safety officer |
| Analysis Date: | June $10^{th}$, 2003 | |
| Total Plant Area: | 241,969 $ft^2$ | |
| Principal Products: | Aerospace tubes and cables<br>Transportation truck bogies | |
| SIC Code: | 3728 | |
| NAICS Code: | 332912 | |
| Annual Sales: | $17 million | |
| Annual Production Volume: | 350,000 aerospace tubes and cables<br>1,621 truck bogies | |
| Number of Employees: | 160 | |
| Operating Schedule: | $1^{st}$ Shift:<br>$2^{nd}$ Shift:<br>$3^{rd}$ Shift:<br><br>Office: | 7:00am – 3:30pm, 5 $^{day}/_{week}$, 50 $^{week}/_{year}$, 48 employees<br>3:00pm – 12:00am, 5 $^{day}/_{week}$, 50 $^{week}/_{year}$, 43 employees<br>12:00am – 7:00am, 5 $^{day}/_{week}$, 50 $^{week}/_{year}$, 30 employees<br><br>7:30am – 4:00pm, 5 $^{day}/_{week}$, 50 $^{week}/_{year}$, 43 employees |
| Annual Shutdown: | 2 weeks | |
| Peak Production Period: | None | |
| Annual Plant Operation: | 6,000 hours | |
| Energy Sources: | Natural gas, Electricity, Water | |

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*Figure 15, Typical Audit Data section*

### *1.6.11 Plant description and process description*

A typical plant and process description page is shown in figure 16. Note that the first paragraph is used to describe the plant, while the table summarizes the various buildings, there sizes, build dates, and use. The process description summarizes the plant process in a verbal format. The titles of each step in this section should mirror the tiles of the steps in the process flowchart.

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**Plant Description**

The plant consists of a number of buildings that have been joined together over the years to form a total area of 241,669 square feet. Building 30 currently is used for the production of aerospace tubes and cables, while buildings 3, 3A, and 4 are being set up to manufacture truck bogies. Truck bogies production will begin within the next one to two years. A summary of the buildings is available in the table below.

| Building | Size ($ft^2$) | Date Built | Use |
|---|---|---|---|
| *30* | *138,434* | *1943* | *Aerospace* |
| *30A* | *13,700* | *1943* | *Office* |
| *35* | *2,332* | *1943* | *Hazardous storage* |
| *4* | *33,976* | *1920* | *Bogie paint/ Final* |
| *3/3A* | *53,227* | *1897* | *Machining/Open* |

**Process Description**

The aerospace tube and cable manufacturing area builds and tests cables one at a time per customer orders. Different types of cables are constantly being produced; as such there are a multitude of paths through which a piece can flow. The process description given below, and further outlined in the general process flow chart, gives one example of how a tube may be built.

1. *Incoming Inspection*
   All parts are inspected for quality.
2. *Cutting & Deburring*
   Stock tube is taken from storage and cut to length.
3. *Tube Bending*
   Tubes are bent to the necessary dimensions using a variety of manual and electronic tools. During this process referencing a correctly bent tube assists workers.
4. *Welding*
   Welders who possess extensive training with regard to aerospace welding requirements perform welding.
5. *Fittings*
   Fittings are installed on the pipe as prescribed by the customer.
6. *Painting*
   Workers apply a paint that is pre approved by the client, using a spray on process.
7. *Parts ID*
   Each tube is given a bar code ID that contains the complete history of that part. The ID can be used in the event that a part fails to identify the source of the part malfunction.
8. *Outgoing Inspection*
   All parts are inspected for quality.

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*Figure 16, typical plant and process descriptions*

### *1.6.12 General process flow chart*

A typical General Process Flow Chart is shown in figure 17. This chart puts the process description into a visual format. Note the definition of each symbol as listed below.

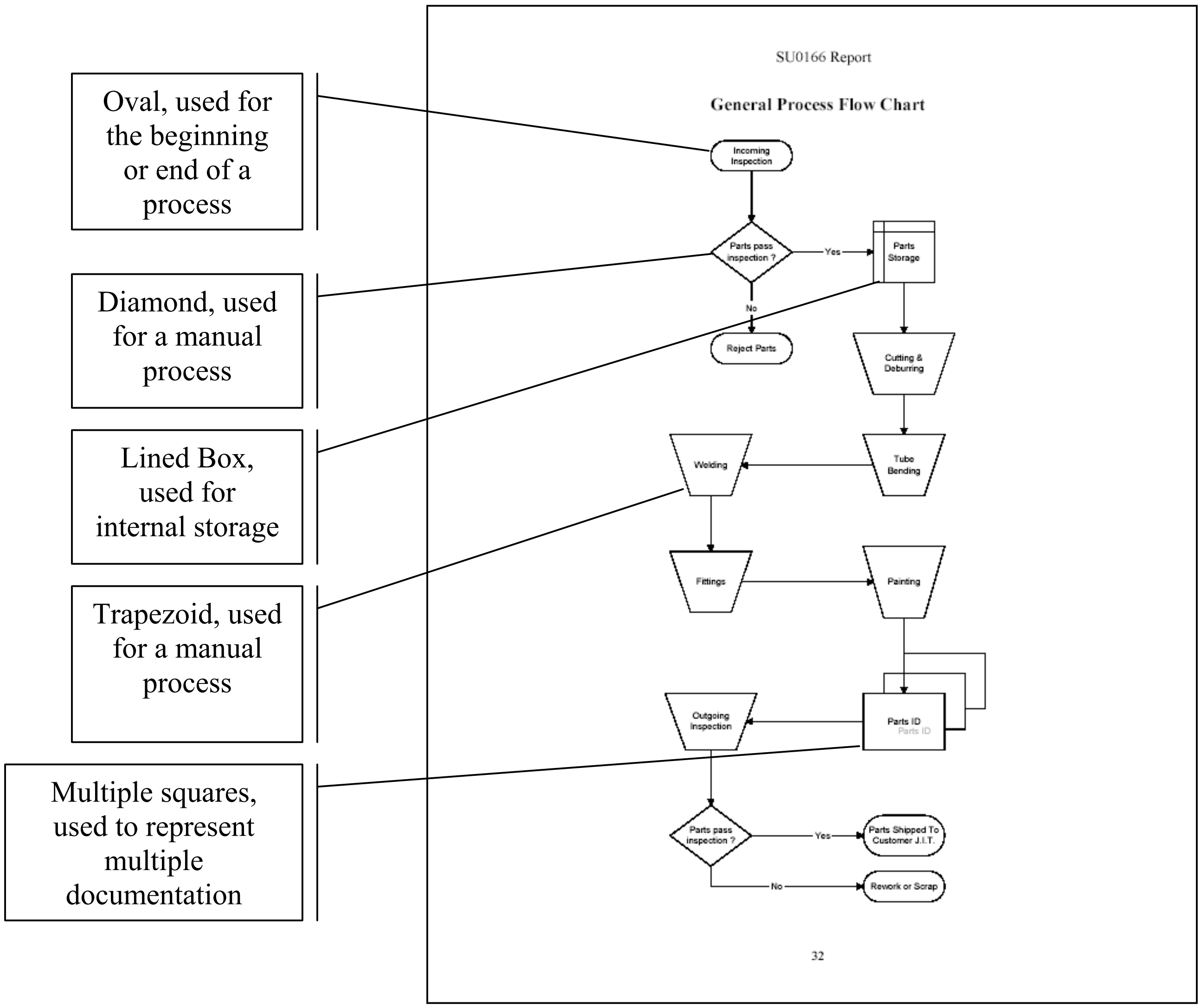
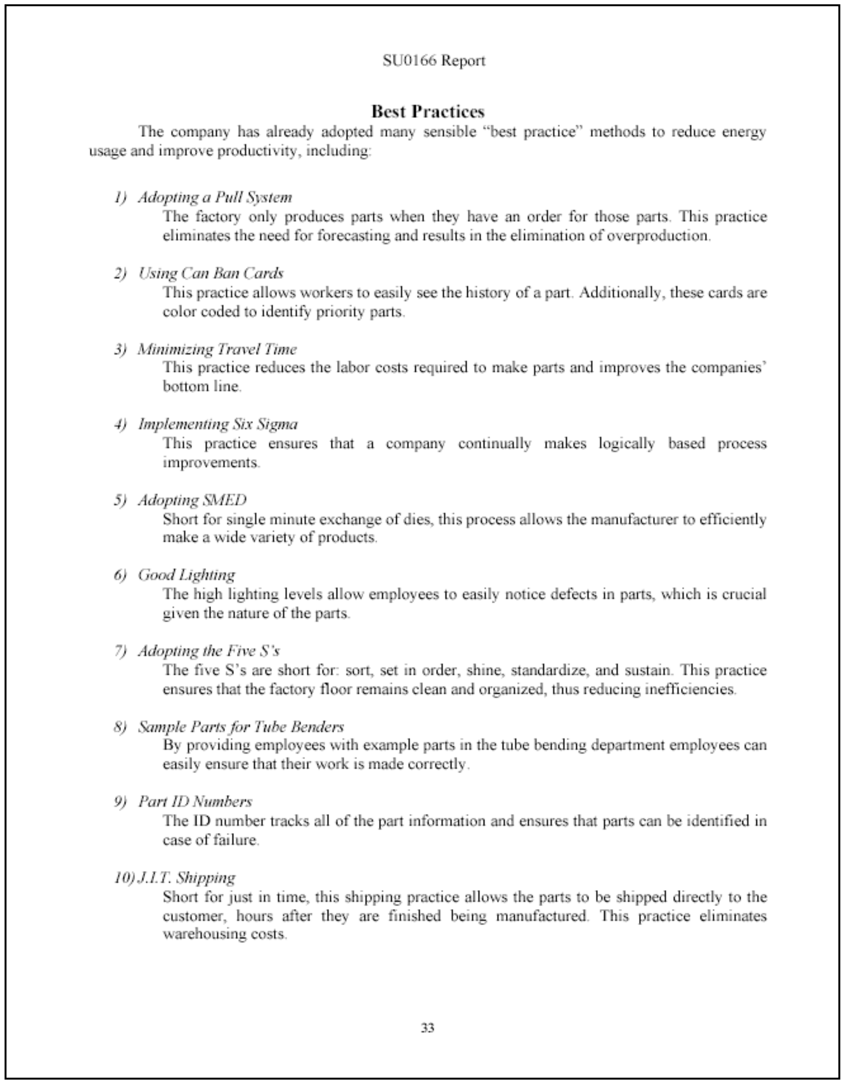



*Figure 17, typical general process flow chart*

### *1.6.13 Best Practices*

A typical Best Practices section can be seen in figure 18. This section is used to outline the positive energy practices currently in place at the client's facility. Note that this section is followed by a standardized reference that outlines DOE software, databases, and publications. While this section is not pictured below the section appears in the report template.



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**Best Practices**

The company has already adopted many sensible "best practice" methods to reduce energy usage and improve productivity, including:

1) *Adopting a Pull System*
   The factory only produces parts when they have an order for those parts. This practice eliminates the need for forecasting and results in the elimination of overproduction.

2) *Using Can Ban Cards*
   This practice allows workers to easily see the history of a part. Additionally, these cards are color coded to identify priority parts.

3) *Minimizing Travel Time*
   This practice reduces the labor costs required to make parts and improves the companies' bottom line.

4) *Implementing Six Sigma*
   This practice ensures that a company continually makes logically based process improvements.

5) *Adopting SMED*
   Short for single minute exchange of dies, this process allows the manufacturer to efficiently make a wide variety of products.

6) *Good Lighting*
   The high lighting levels allow employees to easily notice defects in parts, which is crucial given the nature of the parts.

7) *Adopting the Five S's*
   The five S's are short for: sort, set in order, shine, standardize, and sustain. This practice ensures that the factory floor remains clean and organized, thus reducing inefficiencies.

8) *Sample Parts for Tube Benders*
   By providing employees with example parts in the tube bending department employees can easily ensure that their work is made correctly.

9) *Part ID Numbers*
   The ID number tracks all of the part information and ensures that parts can be identified in case of failure.

10) *J.I.T. Shipping*
   Short for just in time, this shipping practice allows the parts to be shipped directly to the customer, hours after they are finished being manufactured. This practice eliminates warehousing costs.

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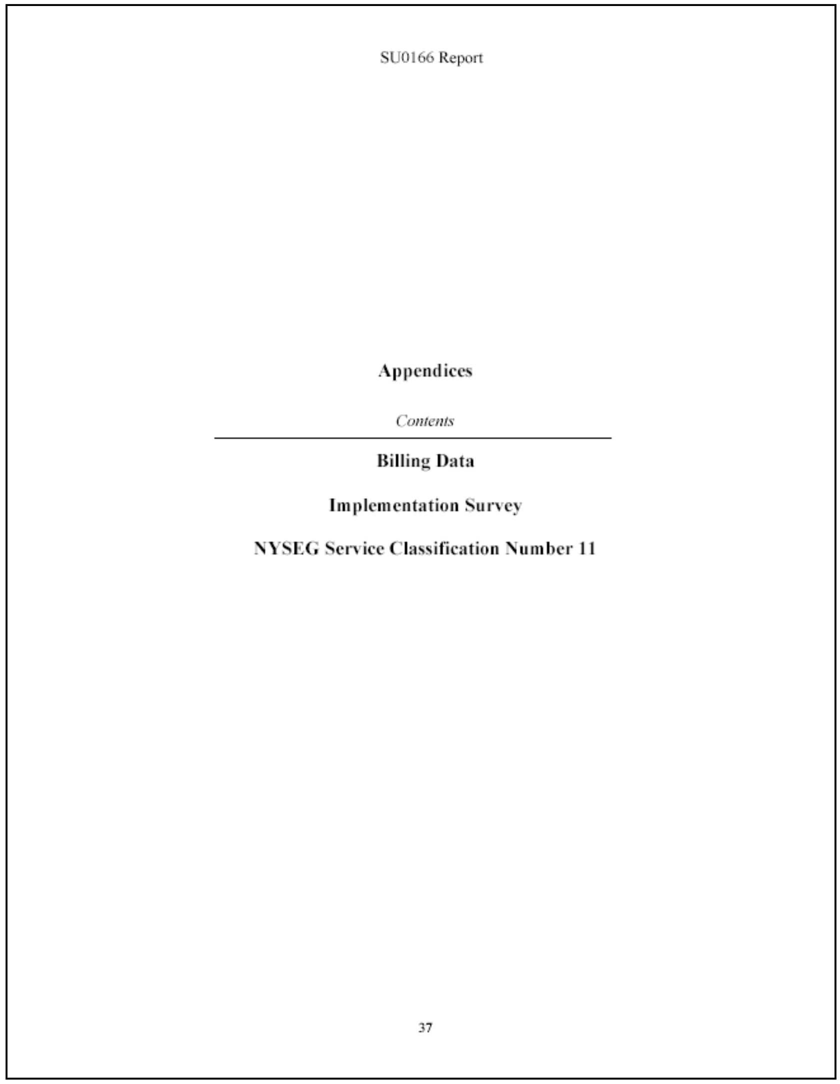
*Figure 18, typical Best Practices section*

### *1.6.14 Appendices cover page*

A typical Appendices cover page is shown in figure 19. This page is inserted into the report to help the reader notice the beginning of the section.


SU0166 Report

**Appendices**

*Contents*

**Billing Data**

**Implementation Survey**

**NYSEG Service Classification Number 11**

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*Figure 19, Typical Appendices cover page*

### *1.6.15 Billing Data*

This page is very much standardized. The only thing that changes on this page is the Major Energy Consumers table. A typical Billing Data section can be seen in figure 20.

This page is followed by the graphs that were produced from the billing data. See section 1.5, step 3 for more information on what graphs need to be inserted into the report. Be sure to note at the top of the graphs which bills those graphs pertain to and include the phrase "The following graphs, and their corresponding data have been included on an attached floppy disk in electronic format."

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**Billing Data**

**Comparing Energy Costs**

As energy costs rise, companies that want to survive must become more aware of their energy usage and must develop ways to analyze and control the associated costs. The best way to keep track of energy usage is to keep up-to-date spreadsheets and bar graphs of monthly consumption and costs. As utility bills are received each month, it is recommended that the billing data be immediately entered into a spreadsheet and plotted on a bar graph; each type of energy used requires its own set of graphs. From these graphs, it is much easier to track trends in energy usage and to evaluate the effects of conservation efforts.

Comparing data from different energy sources is best done by converting all energy used to a common energy unit, such as the British thermal unit (BTU). The conversion factors required for this are as follows:

**Conversion Factors**

| Energy Unit | BTU Equivalent |
|---|---|
| *1 KJ* | *0.94782 BTU* |
| *1 kWh* | *3,413 BTU* |
| *1 Therm* | *100,000 BTU* |
| *1 CCF Natural Gas* | *100,000 BTU** |
| *1 Gallon #2 Fuel Oil* | *140,000 BTU** |
| *1 Gallon #4 Fuel Oil* | *144,000 BTU** |
| *1 Gallon #6 Fuel Oil* | *152,000 BTU** |
| *1 Gallon Propane* | *91,600 BTU** |
| *1 Ton Coal* | *27,800,000 BTU** |
| *1 Ton Refrigeration* | *12,000 BTU/hr* |
| *1 Boiler Horsepower* | *33,475 BTU/hr* |

* Values may vary slightly with supplier

**Major Energy Consumers**

The following table lists the plant's major sources of energy consumption. The information in this table can be used to determine possible target areas for energy improvements.

| Description | Quantity | Power Rating (hp) |
|---|---|---|
| Compressor | 1 | 100 |
| Compressor | 1 | 75 |
| Compressor | 1 | 75 |
| Compressor | 1 | 50 |

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*Figure 20, Typical Billing data section*

### *1.6.16 Implementation survey cover page*

A typical implementation cover page is shown in figure 20. This page is inserted into the report to help the reader notice the beginning of the assessment recommendations. This page also alerts the reader to the purpose of the implementation survey.

Note that this section is followed by the implementation survey. The implementation survey template can be found in the IAC drive at Report Tools\Report Templates.


SU0166 Report

**Implementation Survey**

The following is the implementation survey that your company will be required to fill out six months after the receipt of the report.

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*Figure 20, typical implementation survey cover page*

# 2.0 Equipment

Instruction manuals for all of the equipment shown are located on the left hand side of the lateral filing cabinets top drawer.

## *2.1 Equipment usually taken on assessments*

**Ultraprobe™ 100**

Primarily used by the IAC to count air leaks and test steam traps. Also can be used for Tone Testing, Electronic Arc, Corona, Tracking Detection, Detecting Bearing Wear, and General Mechanical Trouble Shooting Detection.

**Hygro/Thermo-Anemometer**

Primarily used by the IAC to measure air velocity and temperature. Also, can be used to measure relative humidity using the relative humidity probe.

## Humidity Probe

Used in conjunction with the hygro/Thermo-Anemometer to determine relative humidity.


## Burn Kit

Brought on all assessments, but thankfully this has never needed to be used.

This kit contains examination gloves, scissors, gauze, sterile water, sterile gel-soaked burn dressing, sterile burn sheet, and adhesive tape.


## Combustion Analyzer

Used for determining the efficiency of combustion equipment such as boilers.

This piece of equipment requires that the silica gel in the probe be blue for an accurate test. If the gel is used many times it will turn pink. The gel can be baked to return it to its original condition three to four times, after which it should be replaced. Replacement silica gel (P/N 24-0808) can be ordered from Bacharach.


## First Aid Kit

Mainly used to treat minor injuries. Contains examination gloves, Aspirin, Ammonia Inhalant, Alcohol Prep Pad, Sting Relief Pad, Scissors, Triangular Bandage, Tweezers, Eye Pad, Gauze, Gauze Pad, Burn Cream, Instant Cold Pack, Band-Aids


## Light Meter

Used to measure light levels for lighting changeover recommendations.

## AC Current Transformer

Used in conjunction with the HOBO 4 channel external meter for measuring the power used over time by equipment.


## HOBO 4-Channel External

Used in conjunction with the AC current transformer for measuring the power used over time by equipment. The light blinks when the unit is collecting data.

To trouble shoot hobos see the appendix section entitled "Common Com Port Problems."

This piece of equipment must be used in conjunction with Handcar or Boxcar software to work properly. This software is used to program the data loggers and read the results from the loggers.


## HOBO On/Off Loggers

Used to determine when a piece of equipment is cycling on and off over time. The unit works by measuring the vibration of the equipment to which it is attached. The knob dictates the how sensitive the unit is to vibration. Turn knob clockwise for more sensitive.

To trouble shoot hobos see the appendix section entitled "Common Com Port Problems."


## HOBO Thermocouple

Used to collect temperature measurements over time.

To trouble shoot hobos see the appendix section entitled "Common Com Port Problems."


## Pressure Gauge

Used to measure pressure in a compressed air hose. This gauge can connect to a standard compressed air fitting for a pressure reading at that point.

## Infrared Thermometer

Used to measure the temperature of a surface from a long distance. This thermometer is much more accurate than the Mini Temp Guns over large distances.


## Cole-Parmer Type J Temperature Probe

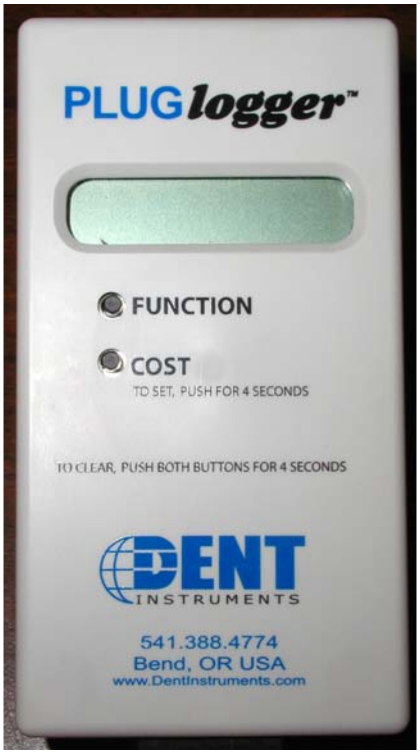
Used in conjunction with the Fluke thermometer to measure the temperature of a fluid. Note that wire probes can also be used and are more convenient to transport.


## Mini Temp Gun

Used to measure the temperature of a surface over a short distance. Not as accurate as the Infrared Thermometer, but adequate over short distances.


## Fluke Thermometer

Used to measure temperature.




**PLUGlogger**

Used to measure the energy consumed by a particular device. It is able to calculate the annual energy consumption and annual cost of operating a particular component.

## *2.2 Equipment not usually taken on an assessment*


**Handheld Laser Tachometer**

Used for RPM, rate, and length measurements.

This piece of equipment has never been used on an assessment.


## Extech Data Logger

Logs data over time from the light meter and the Hygro/Thermo-Anemometer.

This piece of equipment is not user friendly, thus it has never been used on an assessment.


## ELITEpro

Logs power data such as Volts, Amps, kW, KVA, PF, RKVA. Typically connected to the main electric service of a facility to make measurements for a Combined Heat and Power recommendation. But could be used for measurements on single pieces equipment.

## 300/3000A Flex CT

Flexible current transformer used to measure current in large application such as electric services for a facility. To be used with the ELITEpro.


## 200A CT

Current transformer used to measure current in small application such as small electric services for a facility or specific components. To be used with the ELITEpro.

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# 3.0 The Office

## *3.1 The filing system*

The filing system at the IAC is very important because of our high employee turnover rate. It is common for one student to begin working with a client but not be around when it is time for that client to receive an implementation report. Thus, it is very important that students can understand and are able to locate each other's work. One way that this is done is with the filing system.

### *3.1.1 Physical files*

The client's physical file is kept in the horizontal filing cabinet when not in use. When the file is in use, i.e. being actively worked on, the file should be kept in a place where others would logically look for it (the leads desk).

The file consists of four folders: the hanging folder, the permanent folder, the to be condensed folder, and the to be shredded folder.

Hanging folder-

This green hanging file folder is used to hold the other three folders together. This folder should be marked with a tab in the back right hand corner that contains the client's number, for example SU0154.

Permanent folder-


This folder is a red folder that contains all of the information about the client that will be kept indefinably. Specifically this file should contain: a copy of the report, a copy of the survey, a copy of the critique and its repose, the implementation survey, and anything that was condensed from the to be condensed folder after one year. This folder should be labeled with the client number followed by the word permanent, for example "SU0154 Permanent"

To be condensed folder-

This folder is a blue folder that contains any information that will be condensed to the permanent folder after one year. This folder usually contains unfilled out copies of the implementation survey, and bills. After the completed implementation survey is returned all unfilled out copies can be destroyed. After one year a sample of each bill should be placed in the permanent folder and all other bills should be destroyed. This folder should be labeled as "Condense after one year."

To be shredded folder-

This folder is a yellow folder that contains information not included in the other folders. Typical examples of things that may be included in this folder are assessment notes, and copies of communications. The entire contents of this folder should be destroyed after one year. This folder should be labeled as “Shred after one year.”

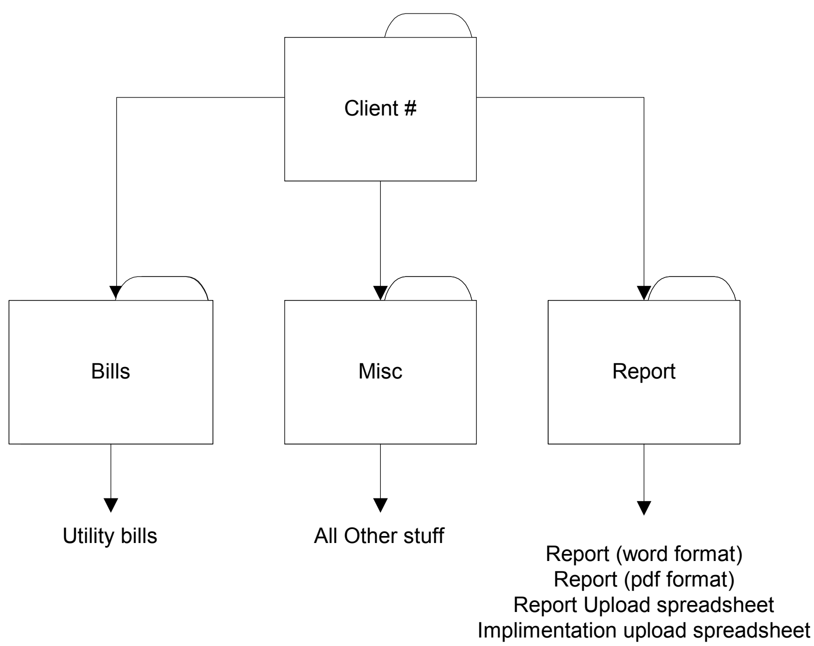
### *3.1.2 Electronic files*

The electronic files are kept on the IAC drive. The drive can be mapped from any computer on the network using the folder name \\Syru212-206\IAC$. To map a drive on the network select *map network drive* from the *tools* pull down menu under *My Computer*. Then select a drive letter (this letter is arbitrary) and then enter the folder name for the drive. The folder name for the drives of each computer in the office is located on the top of the monitor if each computer.

The IAC drive contains nine folders: Clients, Databases, IAC Webpage backup, Misc, Operations Manual, Personal Folders, Potential Clients, Report Tools, Test File. These folders are outlined individually below.

#### *3.1.2.1 The Clients folder*

Electronic client files are kept much in the same fashion as physical files. The most commonly used files are the client files. These are kept on the IAC drive in the *clients* folder. In the *clients* folder there is a different folder for each fiscal year along with the *assessment summary* spreadsheet.



### *3.1.2.2 The Databases folder*

The databases folder contains three separate folders entitled: Library, Rutgers, and SU. The Library folder houses the library database of all the material in the IAC library. Instructions on how to use the database are located in the appendix of this report. Also the library contains a Microsoft Access instruction manual entitled Microsoft Access 2000 Step by step.

The Rutgers folder contains the Rutgers database. This database can be used to search the history of the IAC program for recommendations. Using the query function to cross-reference the tables by SIC code best does this. The resulting list can then be sorted ascending or descending order and then manually browsed for the desired SIC code. Currently a SIC code query is set up in this file.

The SU database is an out of date database that contains the assessment and recommendation information from the SU files. It is more practical however to use the Rutgers database for this.

### *3.1.2.3 The IAC Webpage backup folder*

This folder contains all of the material used on the IAC web page.

### *3.1.2.4 The Misc. folder*

This folder contains all of the miscellaneous material that cannot be classified into another folder. This includes program files, an equipment folder which includes an equipment list, a graphics folder that contains the DOE and SU logos.

### *3.1.2.5 The Operations Manual folder*

This folder contains the operations manual along with a series of folders that contain various tools used in completing the report.

### *3.1.2.6 The Personal Folders*

This folder contains a series of personal folders for any IAC employees who desire extra space to store their work.

### *3.1.2.7 The Potential Clients folder*

This folder contains copies of standardized letters that are sent to clients along with spreadsheets containing the names and contact information of people who have received letters.

### *3.1.2.8 The Report Tools folder*

This folder contains the tools used for writing reports. The ARs folder contains a multitude of subfolders. Each of these subfolders is dedicated to a particular AR, and contains a template of that AR, along with any tools used to write that AR. The Report Tools folder also contains subfolders with report appendices, decision tools software, report templates, site sheets, Surveys, Uploads, and utility spreadsheets.

#### *3.1.2.9 The Test File*

Finally, the test file contains electronic files related to various classes. In the test file is a separate file for each class.

## 3.2 The test file

A test file is located in the bottom shelf of the horizontal filing cabinet in the office. This file contains old tests and papers. Please use this file as needed and be sure to leave your old tests in it.

## 3.3 The phone

To make a local outgoing call dial 9 first, and then the number, to make a long-distance call dial 8, then 1, then the area code and phone number. At this point you will here a few short beeps. Once these beeps are finished, enter the long distance code. This code can be obtained from the director or the lead student.

### *3.3.1 Voicemail*

The office has a voicemail system. When a message is in the voice mail the light on the stationary phone will blink. To check the message dial 3-#### then follow the voice prompts. The password is #####.

To check the voicemail outside of the office dial 315-443-#### then, when prompted, push the # button. Enter the mailbox number, ####, and the password, #####.

## 3.4 The fax machine

A fax machine is located in the copy room of the MAME office in 149 Link Hall. The machine is used much in the same way that the phone is. When using the fax machine press the speakerphone button, enter the number (enter using the same style as a phone number), place the fax into the machine face down, finally press the send button after the fax machine picks up (you will know when it has picked up because it will make a high pitched noise).

After sending a fax the machine will automatically print out a report stating where the fax was sent to, where it was sent from, and if the fax was sent successfully.

## 3.5 The copy machine

A copy machine is located in the MAME office in 149 Link hall. This copy machine can be used to make copies, and transparencies or can be printed to directly. The copy machine can be used to make two sided and stapled copies. For instructions on how to do any of these options, or to receive blank transparencies see the secretaries in the MAME office.

## 3.6 Where things go

In order to facilitate a collaborative environment the office has been set up to store certain things in certain places. By doing this it can be assured that people can find what they are looking for quickly and easily.

### *3.6.1 The equipment cabinet*

The equipment cabinet is located in the back of the office next to the windows. This cabinet contains all of the equipment that is used in assessments. Each shelf in the cabinet contains certain things.

Top Shelf- The top shelf contains things that are used occasionally on assessments.

Middle Shelf- The second shelf contains the original equipment cases. These cases are the combustion analyzer, the temp gun, the hobo case, and the laptop case. This shelf also contains a bin for extra safety glasses.

Bottom Shelf- The third shelf contains all of the equipment that is most commonly used on assessments. This shelf holds an equipment bag, the toolbox, and a fold up handcart. The equipment bag contains the first aid kit, burn kit, tool belt, clipboard, and safety glasses. The toolbox contains hobos, batteries, a mini temp gun, a fluke thermometer, hobo leads, fluke probe, digital camera, combustion analyzer, anemometer, air leak gun, and other equipment commonly taken on assessments.

### *3.6.2 Software*

Software is kept in a portable CD case labeled *software*. The case is located on the bottom shelf of the far wall.

### *3.6.3 Users manuals*

All users manuals are kept in the top drawer of the lateral filing cabinet in a series of hanging folders on the left side. They are not kept in any particular order inside these folders.

### *3.6.4 New toner for HP printer*

Obtain an interdepartmental order form from Linda Vanderhoff in L149 Link Hall. She will need the printer type for this (HP LaserJet 2200DN). Bring completed form to room 104 of Machinery Hall for new cartridge.

## 3.7 Website Upkeep

The IAC website can be reached at http://iac.syr.edu. The website contains information about our process and about our team.

In order to keep the page up to date and relevant it is important that a Webmaster be delegated to facilitate website changes. In order to obtain Webmaster, an e-mail should be sent by Prof. Carranti to Tim Paulman who is the web administrator for ECS. The e-mail should request that your username be given permission to access the "centers" area of the ECS server. A visit to Tim Paulman on the second floor should accompany the official e-mail to clarify that you need to be able to access the ECSwww\Centers area of the server through an explorer based interface.

It would also be extremely helpful to obtain local-admin privileges on our office computers. This can either be obtained from the current local-admin or by having Prof. Carranti send an official e-mail to Neil Jasper, who is in charge of the IT helpdesk.

Once Webmaster status is obtained, the different pages of the website can be found in a folder that can be mapped to through "My computer."

1) Open "My computer."
2) Under the "tools" column at the top, select "Map Network Drive…"
3) Where it says: "folder" type in \\ECSwww\Centers$
4) Check off "reconnect at logon" and click "finish."

The folder that will now appear in "My Computer" contains all the websites in the centers category. The iac website can be found in the centers folder as a folder named "iac." The iac folder contains all the pages as well as all the files contained on our website. The folder will appear just like any other folder, however, it is a live folder. This means that whatever changes are made to the files of this folder are automatically changed on the web. If a page is moved or deleted, it will not appear on the website.

The pages can be edited just like any other file, once changes are saved they will automatically appear on the website. The recommended editor to alter pages is Macromedia Dreamweaver. The IAC does not currently own a copy of Dreamweaver, however, it can be found in the first floor computer labs. Dreamweaver is accompanied by a quick tutorial that once completed will allow you to make simple changes to the website. Additionally, the macromedia website contains a comprehensive support area.

Any file that is added to the website folder can be accessed at http://iac.syr.edu/*filename.extension*. For example, if a file called fred.doc is added to the website folder, it can be reached at http://iac.syr.edu/fred.doc

Any folder that is added to the website folder can be accessed at http://iac.syr.edu/*foldername*. For example, if fred.doc was placed in a folder called director, it can be reached at http://iac.syr.edu/director/fred.doc

## 3.8 Checking website statistics

The IAC website contains an invisible counter in it which allows us to track user statistics through a free online service called stat-counter. The stat-counter website is http://www.statcounter.com. This service allows us to track not just how many hits we get, but it also displays statistics including: where the user is, how many times the user has hit our page, and what time(s) the user hit our page. Stat-counter makes this information available through a login page. It also provides our statistics through a downloadable excel database that can be used for presentation and documentation purposes.

Such that we don't artificially inflate our hit statistics, it is very important that all users login to stat-counter and block their computer from being counted. The procedure for doing so is as follows:

Login: ???
Password: ??????????

1) Go to http://www.statcounter.com
In the upper left column, login using the information above (case sensitive).

2) The page that follows is a capsule statistics page. The row of icons before our information allows us to access the features included in our account. Click on the second icon from the left (pencil and paper). This icon is the "configure" button.

3) The page that follows allows us to edit our account. Click on the 5th link down: "Create Blocking Cookie."

4) Click on the button to turn off logging. This will place a cookie on your computer that will prohibit stat-counter from logging visits to the site from that computer.

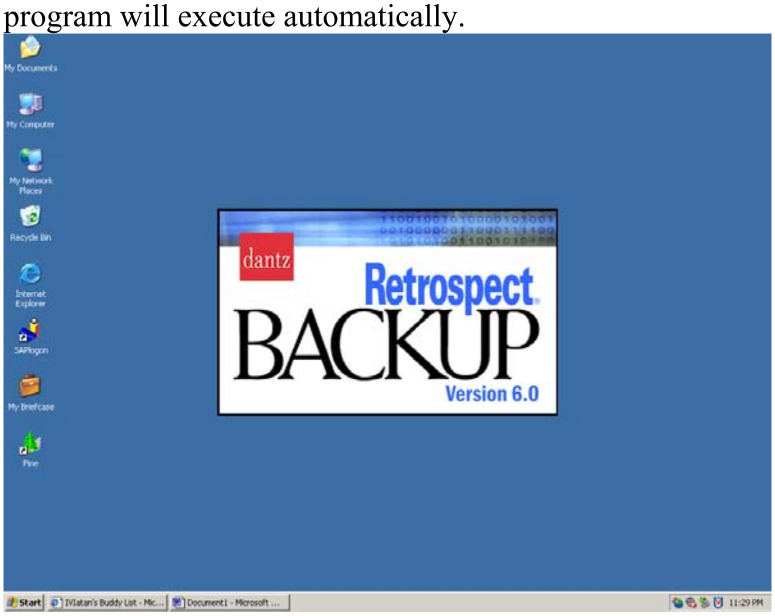
5) In the upper menu, choose "logout."

## 3.9 Backing Up the hard-drive

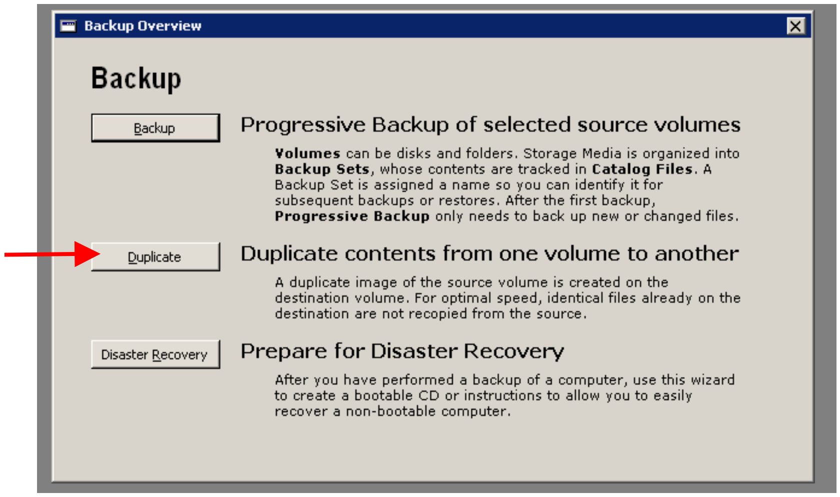
Step1: Obtain local admin privileges from either current local admin or from Neil Jasper.

Step2: Press the blue button located on the front of the external drive.

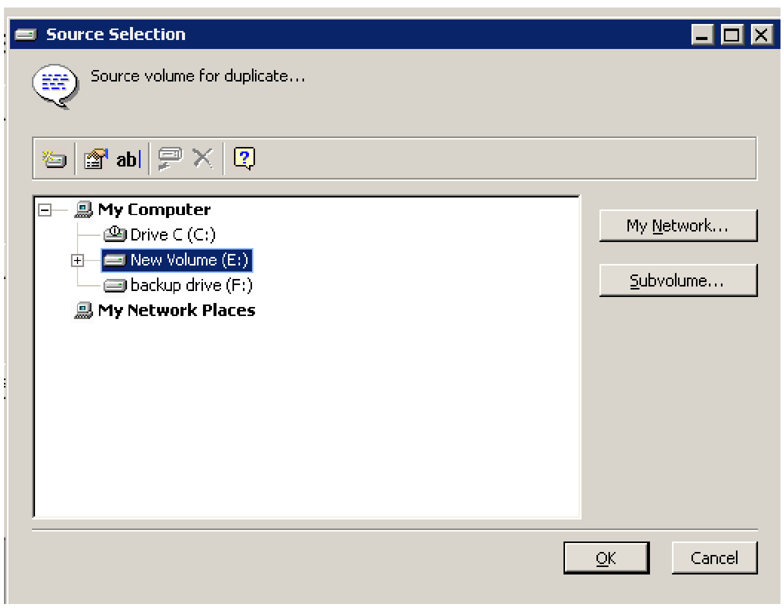
The retrospect program will execute automatically.



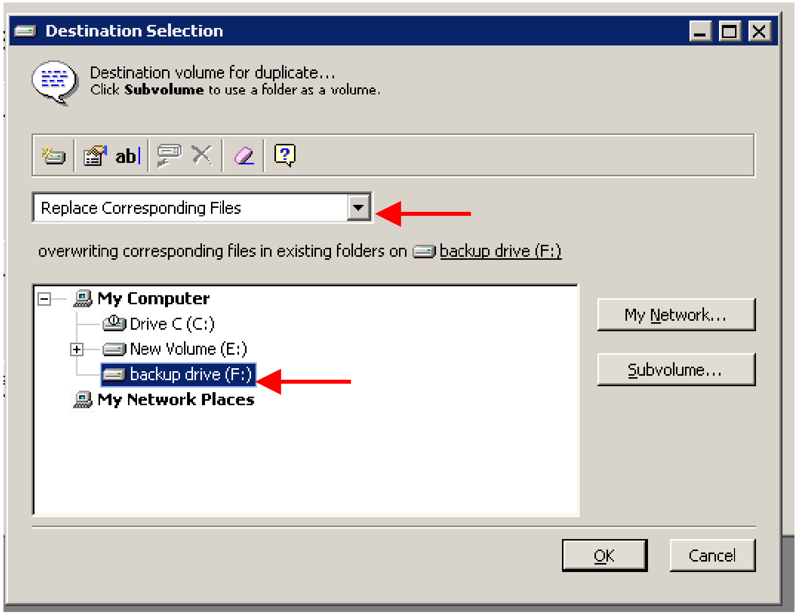
Step3: Select: “Duplicate” from the main menu.



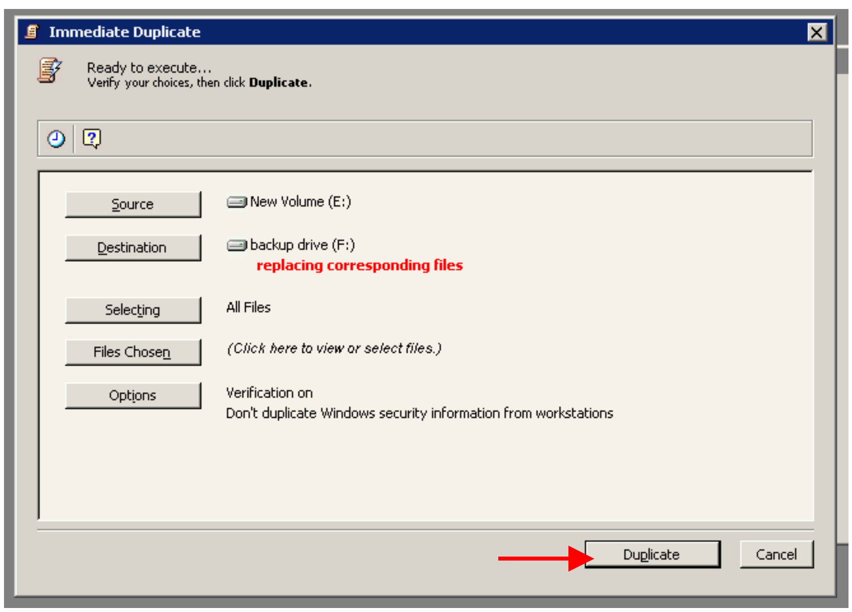

Step4: Click “OK” to select “New Volume (E)” as the source volume for duplicate.



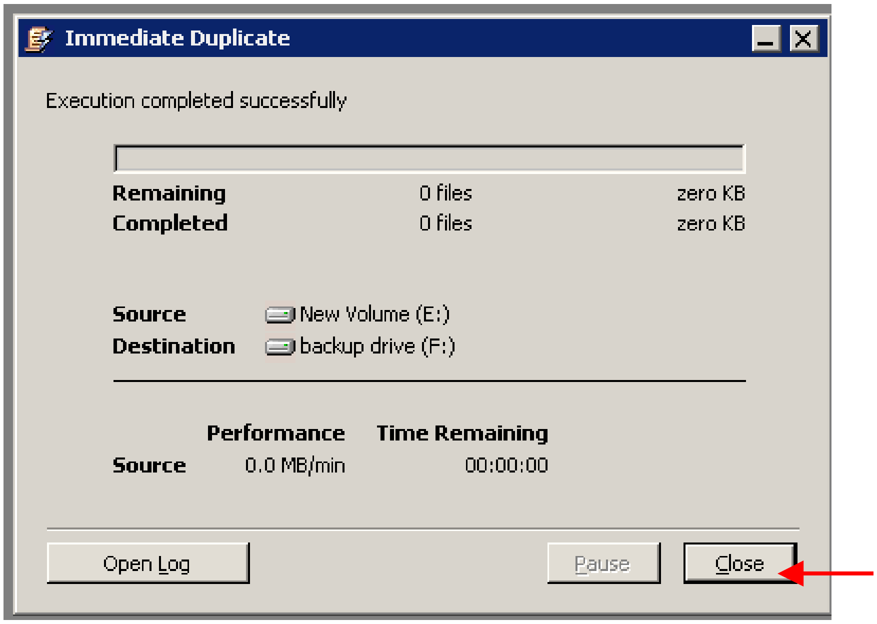

Step5: Select “Replace corresponding files” (as opposed to “entire volume”) from the drop down menu, and select “Backup Drive (F)” as the destination volume for duplicate. Click “OK”.




Step6: Verify that summary screen matches your selections.




Step7: Click "Duplicate". Click "OK" to start the duplication process. The software will automatically scan both volumes (drives) and synchronize only the files that have been changed.




Step8: Click "Close" and exit the program.

# 4.0 The IAC Program

The IAC program was is funded by the Department of Energies Office of Industrial technologies. The program started in the mid 1970's and has survived since then in 25+ universities across the country. Currently, the university of Rutgers, in New Jersey, manages the program.

For more information about Rutgers see the official Student, Client, and Staff guidelines in the appendix of this report

## *4.1 Annual Goals*

Each IAC has a set of goals set for them. Those goals are determined based on the amount of assessments that each center agrees to do. The minimum number of assessments that a center can do is 25. However, some do elect to do more and as such are granted more money by the DOE. Usually, centers do not exceed 30 assessments per year.

For an IAC that performs 25 assessments per year the annual goal is to implement one million dollars for that year. This must be done taking only three exceptions. An exception is an assessment that does not meet the minimum recommended savings of $15,000 or breaks the guidelines set forth for potential clients while not resulting in significant savings (i.e. over $250,000 recommended). For more information on the guidelines for potential clients see section 1.1.

## *4.3 Benchmarking*

In order to gain an understanding of the Syracuse University performance relative to other centers it is critical to track the metrics provided by Rutgers University at http://iac.rutgers.edu/internal/metrics/RCSelection.html. The user name is *iacdirector* and the password is *iaconly.* The following is an outline for obtaining and graphing the metrics.

- Select the "Detailed results for an individual center for a selected year" choice and input the year and center of concern (probably the current year and SU).
- Copy and paste both tables into an Excel spreadsheet.
- Create graphs using Excel in normal fashion for energy, waste, productivity, and total recommendations.
    - Possible graphs include
        - Reports generated & implemented versus center
        - Number of energy AR's versus center
        - Energy AR implementation rate by AR versus center
        - MMBtu's recommended and implemented versus center
        - Energy savings recommended & implemented versus center
        - Energy AR implementation rate by savings versus center
        - Number of waste AR's versus center
        - Waste AR implementation rate by AR versus center
        - Waste savings recommended & implemented versus center

- Waste AR implementation rate by savings versus center
- Number of productivity AR's versus center
- Productivity AR implementation rate by AR versus center
- Productivity savings recommended & implemented versus center
- Productivity AR implementation rate by savings versus center
- Number of total AR's versus center
- Total AR implementation rate by AR versus center
- Total savings recommended & implemented versus center
- Total AR implementation rate by savings versus center

- Import graphs into MS Word and indicate which column is Syracuse University by using a callout or an arrow from the drawing toolbar.
- Post metrics in office for all IAC staff members to view.

## 4.4 IAC websites

In addition to our centers website, which is located at http://iac.syr.edu, there is website for the program as a whole. The website, which is located at www.iacforum.org, contains information on upcoming national meetings, center contact information, a place to post resumes, and a message board to post questions to other IACs. This message board should be checked at least once a week, and any new messages posted should be responded to if possible.

The IAC forum website also has a new student registry and an exit interview. All new students should complete the student registry because registration is necessary to receive national IAC email and become eligible for DOE certification. Also, the exit interview should be completed by leaving students as a way for the program to receive feedback from which it will be able to improve by.

## 4.5 Rutgers/DOE Personnel

The following is a list of program managers for the DOE and Rutgers.

- Sandy Glatt, IAC Program Leader, U.S. Department of Energy

  Located in Golden Colorado, Mrs. Glatt is in charge of the many Doe programs including the entire IAC program.

- Dr. Michael R. Muller, IAC Field Manager

  Located at Rutgers University, Dr. Muller oversees the day-to-day operations of the IAC. If a student has any questions for Dr. Muller he can be contacted using the information located on the IAC forum website.

- Don Kasten, IAC Field Manager

  Located at Rutgers University, Mr. Kasten oversees the day-to-day operations of the IAC. If a student has any questions for Mr. Kasten he can be contacted using the information located on the IAC forum website.

- Dr. David Jones, IAC Assistant Field Manager

  Located at Rutgers University, Dr. Jones oversees the day-to-day operations of the IAC. If a student has any questions for Dr. Jones he can be contacted using the information located on the IAC forum website.

- Michaela Martin, Student Activities Advisor

  Located at Oakridge National labs in Tennessee, Mrs. Martin oversees the student activities of the IAC, including the annual student meeting and the IAC forum website. If a student has any questions for Mrs. Martin she can be contacted using the information located on the IAC forum website.

- Scott Hutchins

  Located in Boston, Mr. Hutchins is a regional employee of the DOE.

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# 5.0 Travel

It is common for the lead student of the assessment to drive to the assessment. If that is not possible the lead student should arrange for another team member to drive to the assessment. However, it is economical and often more reliable to rent a vehicle to travel to clients farther than 85 miles. At 85 miles or greater it is less expensive to pay for a rental car and gas than it is to reimburse a team member for driving their personal vehicle.

Syracuse University has an agreement with Enterprise Rent-A-Car that provides the IAC with a discount. Normally a car is rented in the following fashion. Call Enterprise a few days in advance to reserve a vehicle commensurate to the number of students participating in the assessment. Pick up the vehicle the night before the assessment so that you are ready to depart first thing on the morning of the assessment day. Only the person listed to drive on the Enterprise documentation is permitted to drive the rental vehicle. The insurance will not cover others. Return the vehicle within 24 hours of picking it up to avoid additional fees (there is a grace period of two hours). The following is a list of local Enterprise offices and phone numbers.

| | |
|---|---|
| *Syracuse Airport* | *454-8400* |
| *Downtown* | *423-0022* |
| *Dewitt* | *445-2002* |

Once you have traveled with your personal vehicle or a rental it important to complete reimbursement forms as soon as possible. The reimbursement forms can be obtained from Linda Vandehoff in L149. Linda Vandehoff controls travel reimbursement and grant allocations for the department. If you have traveled with your personal vehicle you will need to fill out a “Syracuse University Travel Voucher” to be reimbursed. If you have rented a vehicle you will need to fill a “Syracuse University Travel Voucher” and a “Detail Of Daily Expenditures” along with the original copies of the receipts. Complete the forms and return them to Linda. Be sure to include your email address at the top of the “Syracuse University Travel Voucher” form. You will receive an email in one to three weeks stating your reimbursement check is ready to be picked up in Linda’s office.

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# Index

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# Appendices

*Contents*

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# Assessment Checklist

Client Name: ______________________________

Report #: ______________________________

Assessment Date: ______________________________

Report Lead: ______________________________

| Date Completed | Task |
|---|---|
| | Receive Bills & Survey |
| | Schedule assessment |
| | Input bills into spread sheet |
| | Begin ARs for which you have enough information |
| | Begin Report |
| | Confirm with company |
| | Prepare for assessment the day before |
| | Assess Company |
| | Write Report |
| | Follow up with client on any necessary information |
| | Finish draft of report & revise |
| | Prepare final report & mail |
| | File hard copy of report |
| | Upload pdf copy of report |
| | Upload report data shell |
| | Update Assessment Summary spreadsheet |
| | Follow up with client |
| | Respond to critique |
| | Send Client implementation report |
| | Upload implementation report spreadsheet |
| | Update Assessment Summary spreadsheet |

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# Assessment Data Sheet

**Annual Sales:** ______________________ **Units Produced:** ______________________
**Peak Production:** ______________________ **Annual Shutdown:** ____________________

**Reduce compressed air line pressure:**

| | | | | | |
|---|---|---|---|---|---|
| Compressor horsepower: | | | | | |
| Load factor: | | | | | |
| Hours of operation: | | | | | |
| Current line pressure: | | | | | |
| Proposed line pressure: | | | | | |

**Duct outside air to air compressor:**

| | | | | | |
|---|---|---|---|---|---|
| Compressor horsepower: | | | | | |
| Load factor: | | | | | |
| Hours of operation: | | | | | |
| Average inside temp: | | | | | |
| Distance to outside wall: | | | | | |
| Intake diameter: | | | | | |

**Recover waste heat:**

| | | | | | |
|---|---|---|---|---|---|
| Compressor horsepower: | | | | | |
| Hours of operation: | | | | | |
| Velocity of exhaust: | | | | | |
| Cross sectional area: | | | | | |
| Temperature of exhaust: | | | | | |

**Install VFD on cooling towers:**

| | | | | | |
|---|---|---|---|---|---|
| Motor horsepower: | | | | | |
| Number of motors: | | | | | |
| Hours of operation: | | | | | |

**Insulate building:**

| Room Name | Area | Local Temperature |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**Install more efficient lighting:**

| Room name | Lighting type | Number of fixtures | Bulbs per fixture | Bulb wattage | Average lighting level | Bay Height | Area | AR | Current Hours | Proposed Hours |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
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# How to use the Library Database

## *Using Search Engines*

1) Go into the IAC drive
2) Open *Databases* folder
3) Open *Library* folder
4) Open *Library DB2* Access file
5) In the *Objects* column, on the left of the screen, click on *Queries*
6) Choose the type of search; Search by Author, Search by Content, Search by Location, or Search by Title
   If searching by;
   - Author; Enter the author's name, last name first
   - Content; Type in the keyword for which you are looking. For example, if looking for information about wind power, type in *wind power*.
   - Location; type in the color
   - Title; Type in the first three words of the title
7) Hit enter.
   - Everything in the database from your search will come up on the screen
8) To locate the source you chose, look in the *Location* column and pick out the corresponding color and number.
9) Go to the shelf and look for the color and number from step 8.
   - If your search is a file, look in the filing cabinet for the file specified in the *Location* column.
10) When finished with the search, close the query box in the upper right hand corner before making another query. *When finished with the source, **put it back where it belongs.**

### *Editing/Adding Entries*

1) Go into the IAC drive
2) Open *Databases* folder
3) Open *Library* folder
4) Open *Library DB2* Access file
5) In *Objects* column on the left of the screen, click on *Tables*.
6) Choose *Library*, and then double click
7) To edit, go to the entry that needs to be changed, and change it. **SAVE**.
   To add an entry, go to the bottom of the list. Begin with the second column, titled *Author*. Put in the author, last name first. If there is no author, leave the box blank. If it is a magazine or a folder, and it has multiple authors, type *Multiple Authors*.

8) In the third column, type in the title.
   If the entry is:
      A Book; type in the title of the book
      A Magazine; type in the title and the month and year of the issue
      A Manual; type in the title of the manual
      A File; type in the title on the tab of the folder
9) In the fourth column, the location needs to be specified:
   Red- Any book relating to the topics of thermodynamics or chemistry
   Blue- Any book relating to the topics of air or fluids
   Yellow- Any book relating to the topics of industry, manufacturing, equipment, technology, or miscellaneous
   Green- Any book relating to math
   Orange- Any type of teaching aid, including manuals, dictionaries, writing aids, and computer software
   Pink- Any catalogs, buying guides, or census
   Purple- Any magazines
   Brown- Any book relating to electrical engineering

   Once the color has been decided upon, choose the next number in the sequence. To find out the last number in the sequence, do a *Search by Location* and type in the color. All of the entries with that color will show up. Look at the last one, and choose the next number. *For more detail on how to search by color, follow steps 1-6 in **Using Search Engine**
   - For the location of a file, type in the title of the green folder in which the manila file is housed
10) In the fifth column, type in the content of the entry. Enter all the information in the Table of Contents or Index of the source.
11) **SAVE**

**Creating a Search (Query)**

1) Go into the IAC drive
2) Open *Databases* folder
3) Open *Library* folder
4) Open *Library DB2* Access file
5) In the *Objects* column in the left of the screen, click *Queries*
6) In the toolbar above the objects column, click *New*.
7) When the *New Query* box appears, choose the *Design View* option. Hit enter
8) When the *Show Table* box appears, click close.
9) In the toolbar located at the top left of the screen, click the *SQL* box. The screen will automatically change.
10) Delete the ';' after the word SELECT, and replace it with '*' Return to the next line.
11) Type the word FROM and then type the name of the data table in [ ] from which you want to search. For example, when creating a new search engine for the library, type in FROM [Library]

The first two lines should look like this;
SELECT*
FROM [Library]

12) Return to the next line.
13) Type WHERE and write the name of the column you want your search results to come from. For example, if you want to search from the *Contents* column, type in WHERE Contents
14) On the same line, type the word Like '*'+keyword+'*';
    The last line should look like this;
    WHERE Contents Like '*'+keyword+'*';

There should be three lines that resemble the following;

SELECT*
FROM [Library]
WHERE Contents Like '*'+keyword+'*';

15) **SAVE**
16) Enter the name of your query, and click OK

To use your query, follow steps 1-10 in **Using Search Engine**

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## *Common Com Port Problems*

**Taken from the Onset Computer Corporation website at**
**http://www.onsetcomp.com/Support/faq_h6answers.html#Anchor-My-17304**

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# ***Student, Client, And Staff Guidelines***

**Taken from Rutgers University**

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## ***Sample Report***

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