

Project Plan

Creating the Modern Utility Management Model

2/6/2009

IPRO 497-326

Jennifer Guilfoyle – Team Leader

Timothy Baldwin

Pat Becker

Jeffrey Burke

Fatima Chippo

Alok Kashyap

Nathan Lee

Sam Martin

Juliana Masci

Ryan Murphy

Yomola Shonekan

Nizar Zhani



I. Team Information

a. Team Roster:

i. Jennifer Guilfoyle (Team Leader)

1. jguilfoy@iit.edu

ii. Timothy Baldwin

1. tbaldwin87@gmail.com

iii. Pat Becker

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iv. Jeffrey Burke

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v. Fatima Chippo

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vi. Alok Kashyap

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vii. Nathan Lee

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viii. Sam Martin

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ix. Juliana Masci

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x. Ryan Murphy

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xi. Yomola Shonekan

1. mshoneka@iit.edu

xii. Nizar Zhani

1. zhaninizar@hotmail.com

xiii. Prof. Clair

1. clajos@iit.edu

b. Team Biographies:

i. Jennifer Guilfoyle

1. Jennifer is a third year Chemical Engineering student pursuing her second bachelor's degree. She first attended Elmhurst College and graduated with a Bachelor of Music in Music Business. As the current Regional Conference Coordinator and Dinner Chair of the IIT chapter of the American Institute of Chemical Engineers, she brings her leadership experience to her IPRO group. She hopes to get a better understanding of what it means to be a project manager from this experience but also hopes to learn about sustainable and affordable ways to utilize utilities.

ii. Timothy Baldwin

1. Timothy Baldwin is a fourth year electrical engineering student. His strengths include writing, editing, and a creative mindset. In order to help improve his public speaking skills, he will be part of the presentations team. To gain insight in other fields, he will be working on the gas/water team. He hopes to obtain a better understanding of the workings of utilities and the business model associated with them. Finally, he hopes to be a part of coming up new ideas that could possibly be revolutionary.

iii. Pat Becker

1. Pat Becker is a Senior Electrical Engineering Major who will be graduating in May 2009. He brings a workplace experience to the team as he has worked at the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) as a Process Control Engineer. In that capacity, he is responsible for maintaining Distributed Control Systems for the TARP (Tunnel and Reservoir Plan) system and the Stickney Water Reclamation Plant. He hopes to learn more about

utilities and their distribution networks as well as the feasibility of conservation projects.

iv. Jeffrey Burke

1. Jeffrey Burke currently is a Fourth year Architecture student. Jeffrey transferred to IIT from Wilbur Wright College in the fall of 2005. He has experience with preparing and completing presentations and all supplemental materials. From this course he hopes to gain a deeper understanding of what it truly means to be sustainable. Jeffrey is also always looking for new ways to view everything.

v. Fatima Chipppo

1. Fatima is a fourth year electrical engineering major. While taking many classes, IPRO is a very good opportunity to experience real world. She believes that with enthusiasm, determination to succeed and devotion to serving the community in different ways, she can achieve the objectives and the expected results from any inter-professional project Fatima hopes she will learn more working as a team and improve her communication skills.

vi. Alok Kashyap

1. He is a student of Computer Engineering in his 4th semester at IIT. He feels that he is confident enough to deliver a good presentation and enlighten people more about the topic we are dealing with. He will also help his team collect more data and information required to make the project more effective. From this project, he believes, he will become more familiar with the technicalities and know-how of electricity as a utility. Participating in this project will also help him associate his theoretical knowledge with a realistic model for a utility (electricity) that is going to serve the IIT Community. Alok is very enthusiastic about this application based project.

vii. Nathan Lee

1. Nathanael Lee is a fifth year undergraduate, majoring in computer engineering. He brings, to this IPRO team,

the skill of effectively using the internet as a resource for research and inspiration. He has experience with using software such as JMP (a statistical analysis program) and MS PowerPoint. This is his second IPRO, where he hopes to gain more experience working with a team cohesively and efficiently.

viii. Sam Martin

1. Sam is a member of the Naval Reserve Officer Training Corps here at IIT. He is studying Political Science, will be commissioned as an officer in May, and will be attending Naval Nuclear Propulsion School in the fall. This has sparked his interest in energy; especially steam systems. He looks forward to redesigning the infrastructure of the modern utility for a better America.

ix. Juliana Masci

1. This is Juliana's fourth year at IIT as an architecture major. Even though this is her first experience with the IPRO program she is looking forward to what it has to offer and what she can bring to the table. While interested in learning more about the business aspect of this simulated, real-world experience, her expertise in graphics will aid in creating presentations for the project.

x. Ryan Murphy

1. Ryan is very interested in engineering, and as an electrical engineering minor he brings enough experience to the table to have some understanding of how IIT's power systems work on the campus, which is essential to figuring out how to fix them. He is also willing to put in time to research how utilities have been changed in the real world, in order to gain some insight into how IIT's could be modified to better suit the needs of IIT and the environment. At the same time, Ryan considers himself to be open minded, and is totally willing to try untested methods of reducing energy consumption. As an architecture major, he has a more vague, but just as important, set of skills to bring to the project. This IPRO is not bogged down in the technicalities of power and water, and he believes that creativity will be just as

important as technical knowledge. Also, he brings skills to help make a clear and precise presentation of our project for IPRO day.

xi. Yomola Shonekan

1. Yomola is a junior majoring in Electrical Engineering. This IPRO project presents an interesting area of the electrical engineering field that she would like to explore. She is open to new experience and ready to work alongside the variety of majors represented to move this project forward.
2. Through this experience she hopes to gain further insight into the business aspect of engineering pertaining to utilities and also looks forward to working effectively in a group.

xii. Nizar Zhani

1. Nizar Zhani is a third year computer science student. He is willing to spend time to research how utilities in IIT campus can be improved and modified to efficiently serve the interest of the institute and the environment. He is also interested in learning how to build a business model. He is open- minded and works well in groups. He is also planning on working on his oral presentation skills. He is also looking forward to working with the members of the electricity team in order to get an insight on this new field.

1. Team Purpose and Objectives

a. Purpose

- i. Develop a operational model including pricing, utility integration and consumer involvement that will encourage efficiency and promote sustainability. Consider alternatives to the current centralized utility models, distribution systems and regulatory structures.

b. Objectives

- i. Research the forces that are blocking the large scale implementation of energy efficient practices in the utility markets as well as introductory efforts to promote conservation.

- ii. Develop an understanding of current local and national utility practices by visiting facilities and interacting with professionals in the utility industry.
- iii. Investigate different metered service pricing practices.
- iv. Create a utility operational model which promotes efficiency and sustainability on both supply and demand sides.
- v. Demonstrate a model utility for IIT's campus, keeping in mind existing usage patterns and infrastructure.

2. Background

- a. The customer is Facilities at Illinois Institute of Technology. They currently create all utility needs for the campus heating and cooling. Facilities is seeking a means of promoting efficiency and sustainability while maintaining the existing infrastructure.
- b. Problems of the users: The utility company currently wants to develop a new method of promoting efficiency and sustainability among its customers. Finding a way to make the customers aware of the energy they waste on a daily basis is an obstacle faced in promoting efficiency on campus. The utility company must also find a way to be more efficient within their current infrastructure, while providing the same level of service to their customers.
- c. Present Information available: Many utility companies have begun to explore means of educating and promoting sustainable energy use within their service area. The internet has many articles and sites that list and explain how some of these new business models function. Since many of these models have only been implemented on a small scale, some but not all of their pros and cons are evident. Information will have to be gathered and analyzed on the successes and failures of wide array of business models that are relevant.
- d. Many of the examples that have been implemented by the utility companies have been small scale with mixed levels of success. Lately companies have begun to push for large scale implementation of business models that promote energy sustainability. In recent years companies such as Vermont Energy Investment Corporation and Southern California Gas have begun to implement energy efficiency programs and their methods will be researched.
- e. Ethical issues: Focusing on IIT delivering energy to its community, our research is concerned with how to effectively balance the operation of the utility while creating incentives for the consumer to use less energy. We must be careful not to use the ideas and concepts created by other companies in a way that may be construed as copyright

infringement. Subsequently we must make sure our methods are unique and one of a kind.

- f. Business/Societal Costs: An important issue arises with regards to acquiring the necessary funds to not only maintain but also improve the operation of a brokering utility at little or no additional cost to the consumer. Another cost issue would involve the expense of marketing this improved utility model to other utilities at minimal cost. We must also ensure that maximum efficiency is reached without any change in the standard of living for the customers.
- g. Implementation: This project seeks to explore and merge both the technological and business aspects of operating a modern utility. The results of this project will be analyzed and seamlessly integrated into the existing system at IIT.
- h. Research: For a utility that supplies electricity, natural gas, steam and hot and chilled water for comfort, research will be based on the individual contribution of each and ultimately their effect on each other in the performance of the utility. Research based on how we can integrate the different utilities into each other will also be important. Most research and analysis will be based on previous attempts to obtain sustainable results by outside utility companies.

3. Team Values Statement

- a. Every team member must show up on time to every scheduled class-time. Showing up late, or not showing up at all is inexcusable unless approved by the IPRO team leader prior to the meeting. If a team member violates this rule, his/her team members will decide upon the consequences as a group.

Problems that arise within each sub-group will address that sub-group's leader, if need be, the sub-group leader will take it to the IPRO leader, and in extreme cases onto Prof. Clair. This IPRO has decided to have an open-floor forum for any minor squabbles. Please contact the team leader so that time can be allotted into the agenda for such discussion.

4. Methodology

- a. Energy utility companies have operated largely as monopolies, with some government oversight, in the past century. Society greatly valued the access to energy and strong infrastructure afforded by this model. However, in recent years, governments have started

deregulating utilities due to the demands of people; they wanted the regulation-determined cost of power to be replaced by prices determined by market forces. The companies are still monopolistic but respond to a combination of regulatory prices and market forces. The infrastructure and transmission have largely remained unchanged. The current utility model is to be tested against new models that will be determined through research throughout the project. The model to be compared against will be the current IIT self-generated electricity and steam utilities. Then, the best model will be presented. This model will hopefully allow for a better hold on energy costs while encouraging efficiency and investment in renewable resources and providing reliable infrastructure.

- b. To create a solution to the problem, the team members will be divided into three sub-teams. One sub-team will be responsible for finding a solution specific to the steam utility; one for the water utility; and one for the electric utility. Each sub-team will work parallel to each other.

First, each sub-team will gather knowledge in order to understand the state of the current utility model, and to get an idea of the range of possible solutions. This will be done by touring utility plants, interviewing experts in the field, calculating the benefits and costs of the current model, studying the current infrastructure, and researching market forces and government regulations related to the utility.

Next, research will be conducted to find potential solutions. New technologies and methods for handling the resources will be identified and documented. The costs associated with updating and maintaining infrastructure will be calculated.

After all the research and calculations are done, the best solution will be determined by comparing the costs, benefits, and feasibility of the potential solutions. Barriers, obstacles, market forces, and regulations will all be taken into account.

In order to meet all the IPRO deliverable deadlines, the same team members will again be divided into deliverable sub-teams: Ethics, Reports, Presentation, and Exhibits. For deliverables involving more work, such as the Project Plan, the same team members will once again be divided into sub-teams to efficiently accomplish all the necessary tasks. In addition, a person will be assigned the role of Team Leader. Another person will be assigned the role of Secretary, which involves taking minutes and doing other administrative work.

Within the time frame and with the resources available, it is reasonable for this team to accomplish all the required tasks. The workload will be evenly distributed, and there will be an adequate amount of manpower in each sub-team to get the work done in time. Contacts that are knowledgeable in each utility field will be available to each sub-team to assist with the process.

- c. The potential solutions will be tested through a simulation or a thought modeling process. Taking into account the costs, benefits, barriers, market forces, and regulation, the short-term and long-term effects of the new model will be analyzed.
 - d. The research will be documented by each member of the team keeping a record of websites, books, and articles that they have read and found useful for the project. This list will then be uploaded to the Google group website, and finally placed as an appendix to the final report. The testing will be documented by writing down all potential solutions as well as the expected results obtained from the thought modeling simulation.
 - e. The results of the tests and analysis of the new model will be compared side-by-side to the state of the current utility model. The incentives of the new model will be clearly documented.
 - f. The IPRO deliverables will be generated by four teams: reports, presentation, ethics, and exhibit. The reports, presentation, and exhibit teams each contain one member from each utility subgroup. Therefore, each group will have a member to represent each of the three utility subgroups. The reports team is as follows: Pat, Jeff, and Murphy. The presentation team is as follows: Nathan, Tim, and Alok. The exhibit team is as follows: Julie, Yomola, and Fatima. The ethics portions of the IPRO deliverables will be handled by Sam. All deliverables will be uploaded to the Google group website and approved by all members before finally handing in to the IPRO office.
5. Expected Results
- a. This project will inform IIT on changes it can make to its utility management system that will not only be more energy efficient but also be affordable to implement and maintain.
 - b. To create a new utility system model our team needs to collect data about how utilities operate currently. Details about not only how or where the utilities create or gather their specific product but also the type of infrastructure needed to transmit the final product to the end

users. In making a new model of utility systems, information about the costs of maintaining such infrastructure and installation of new technologies to promote efficiency and sustainability of utilities will be gathered.

- c. From this project we hope to gain a model of a utility system that can maintain the current infrastructure while helping to promote efficient uses of the end product, and that may be implemented at IIT in the near future.
- d. Challenges that we foresee in this project will be the acquisition of data on certain utilities, and the costs associated with maintenance of their infrastructure. Another problem we foresee is resistance to development of a new utility plan. Current utilities have had little reforms over the year and as such it may be hard to create a new plan while trying to incorporate the current infrastructure.
- e. The final model that is generated will be proposed in a paper, and if the model is feasible will be put under review and has the hopes of being tested on the IIT main campus.

6. Project Budget

- a. As part of this project it will be important for our group to bring in guest speakers to our class to help us understand all the issues involved. Proposed guest speakers will be professionals from outside utility companies such as ComEd. The class will be required to meet after working hours, thus it becomes our responsibility to provide dinner and refreshments for our guests. Providing food and refreshments for our guest is important for making a positive impression on them. It will also promote the reputation of IIT to these outside visiting companies, making them more likely to help the school out again in the future.
 - i. \$16 price of a large pizza (national Average) 3 pizza's per guest speaker= \$48
 - ii. \$1.79 price of 2 liter cola (national Average) 3-2liters per guest speaker= \$5.37
 - iii. \$3.99 price of 100 count paper plates (CVS Price), will be used for all guest speakers
 - iv. \$2.79 price of 80 count plastic cups (CVS Price), will be used for all guest speakers

- b. Our project will also require a great deal of research, and thus it will be important from time to time to print and hand out copies of our research to each subgroup. This is imperative to ensure the project is sharing information and is continually on the same page. We may also need to print out information for our guest speakers and mid term jurors to ensure they have all information necessary.
 - i. Estimated Printing cost- \$20.00

- c. Assuming three guest speakers including the midterm review the total cost for the semester should be **\$186.89**.

7. Schedule of Tasks

Please see attached Appendix A (Schedule of Tasks and Milestones)

8. Individual Team Member Assignments

a. Utility Sub Groups

i. Electric

1. **Ryan Murphy**- Leader
2. Alok Kashyap
3. Fatima Chipppo
4. Nizar Zhani

ii. Gas/Water

1. **Juliana Masci** – Leader
2. Pat Becker
3. Tim Baldwin

iii. Steam Team II

1. **Sam Martin** – Leader
2. Jeffrey Burke
3. Nathan Lee

4. Yomola Shonekan

b. Deliverables Sub Groups

i. Reports

1. Pat Becker (Gas/Water rep)
2. Jeffrey Burke (Steam Team II rep)
3. Ryan Murphy (Electricity rep)

ii. Presentation

1. Nathan Lee (Steam Team II rep)
2. Timothy Baldwin (Gas/Water rep)
3. Alok Kashyap (Electricity rep)

iii. Ethics

1. Sam Martin

iv. Exhibit

1. Juliana Masci (Gas/Water rep)
2. Fatima Chipppo (Electricity rep)
3. Yomola Shonekan (Steam Team II rep)

9. Designation of Roles

a. Assign Meeting Roles

i. Minute Taker

1. Juliana Masci

ii. Agenda Maker

1. Jennifer Guilfoyle

iii. Time Keeper

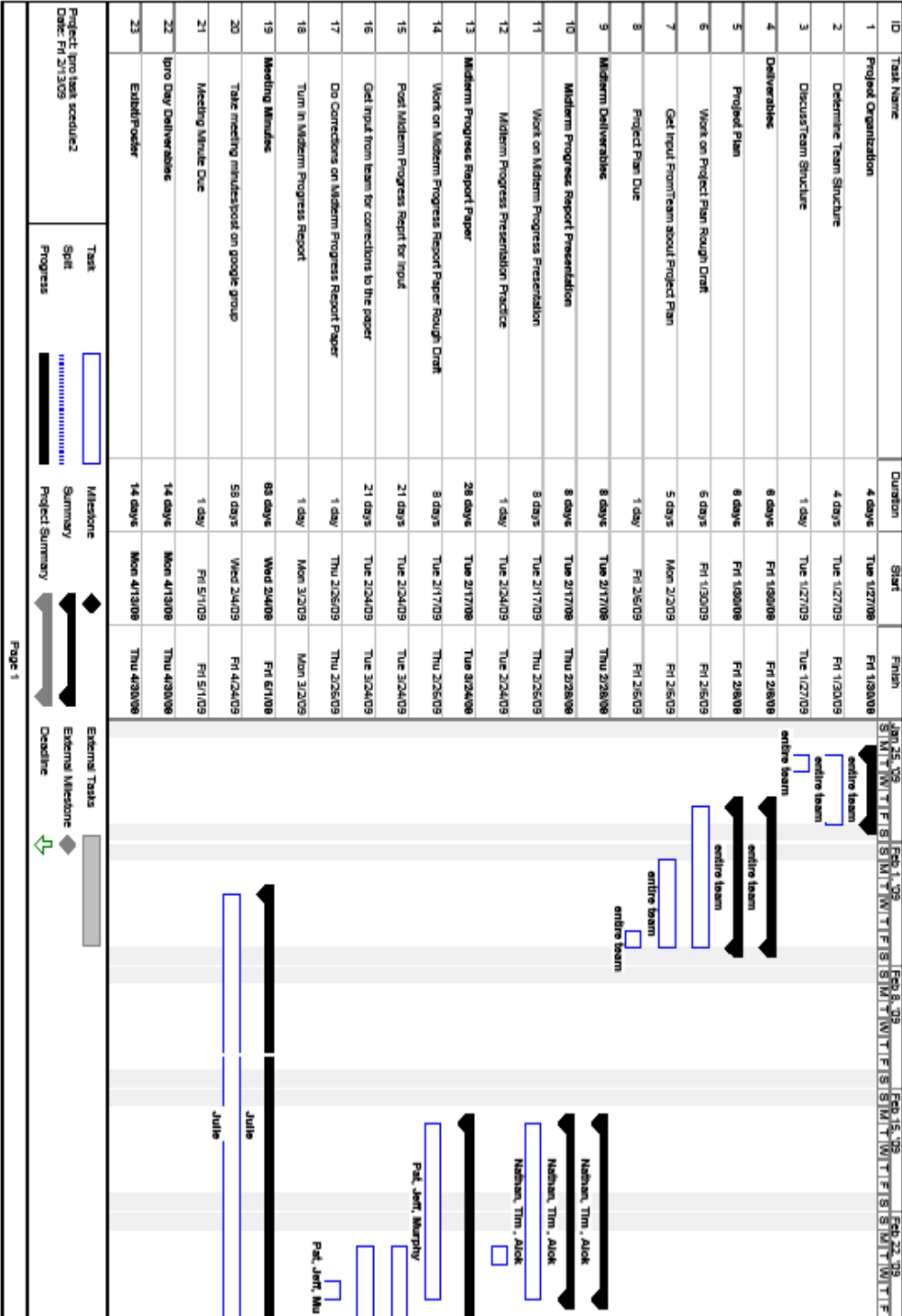
1. Jennifer Guilfoyle

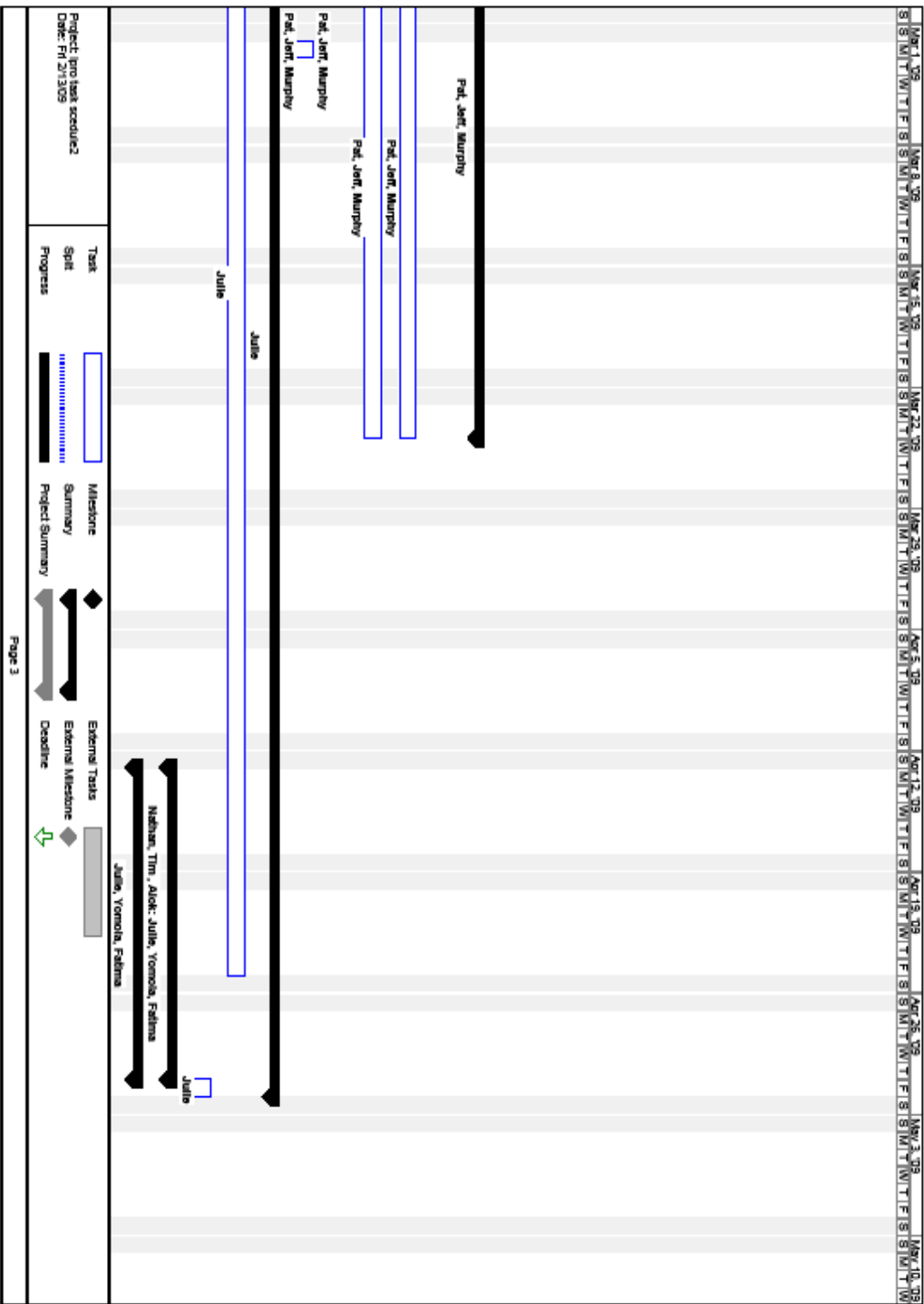
b. Assign Status Roles

i. Weekly Timesheet Collector

1. Jennifer Guilfoyle/ GoogleGroups
- ii. Master Schedule Maker
 1. Juliana Masci/ GoogleGroups
- iii. iGroups/GoogleGroups
 1. Juliana Masci

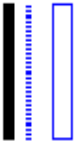
Appendix A





ID	Task Name	Duration	Start	Finish	Jan 25 '09	Feb 1 '09	Feb 8 '09	Feb 15 '09	Feb 22 '09
24	Design Exhibit/Poster Rough Draft	5 days	Mon 4/15/09	Mon 4/20/09	S	M	T	W	T
25	Post design for input	1 day	Fri 4/24/09	Fri 4/24/09					
26	Get input from team for corrections on paper	4 days	Mon 4/27/09	Thu 4/30/09					
27	Exhibit/Poster Due	1 day	Mon 4/27/09	Mon 4/27/09					
28	Abstract/Brochure	8 days	Thu 4/16/08	Mon 4/27/08					
29	Design Abstract/Brochure	6 days	Thu 4/16/09	Thu 4/23/09					
30	Post design for input	1 day	Thu 4/23/09	Thu 4/23/09					
31	Get input from team for corrections on paper	1 day	Thu 4/23/09	Thu 4/23/09					
32	Abstract/Brochure Due	1 day	Mon 4/27/09	Mon 4/27/09					
33	Final Presentation	68 days	Wed 2/4/08	Fri 6/11/08					
34	Make final presentations rough draft	13 days	Wed 2/4/09	Fri 2/20/09					
35	Practice presentations	1 day	Tue 4/21/09	Tue 4/21/09					
36	Make corrections to presentations	4 days	Tue 4/21/09	Sat 4/25/09					
37	Practice presentation 2	1 day	Mon 4/27/09	Mon 4/27/09					
38	Give presentation	1 day	Fri 5/1/09	Fri 5/1/09					
39	Final report with Table of Content	17 days	Thu 4/16/08	Fri 6/6/08					
40	Make final report rough draft	11 days	Thu 4/16/09	Thu 4/30/09					
41	Post final report rough draft for input	1 day	Tue 4/28/09	Tue 4/28/09					
42	Get input from team for corrections on paper	3 days	Tue 4/28/09	Thu 4/30/09					
43	Make corrections on final report	2 days	Thu 4/30/09	Fri 5/1/09					
44	Final report due	1 day	Fri 5/8/09	Fri 5/8/09					
45	Spring Break	5 days	Wed 2/4/09	Tue 2/10/09					

Task Split Progress



Milestone Summary Project Summary



External Tasks External Milestone Deadline



