

Psycho Fox

Sprint 4

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Name	Email Address
Nicholas Johnson	nicholas.johnson769@topper.wku.edu
Cy Dixon	cy.dixon656@topper.wku.edu
Matthew Polak	matthew.polak034@topper.wku.edu
Harsha Suresh	harshavardhan.suresh593@topper.wku.edu

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Project Organization Documentation

Contents

1	Project Team's Organizational Approach	1
2	Schedule Organization	2
2.1	Gantt Chart v1:	2
2.2	Gantt Chart v2:	2
2.3	Gantt Chart v3:	3
2.4	Final Gantt Chart:	3
3	Progress Visibility	3
3.1	Sprint 1 Progress Visibility	3
3.2	Sprint 2 Progress Visibility	4
3.3	Sprint 3 Progress Visibility	4
3.4	Sprint 4 Progress Visibility	4
4	Software Process Model	5
5	Risk Management	5
5.1	Risk Identification	5
5.2	Risk Planning	6
5.3	Risk Monitoring	7

List of Figures

1 Project Team's Organizational Approach

Sprint 1: Project Manager - Cy Dixon

Team Psycho Fox met several times a week throughout sprint 1 to complete all requirements for the sprint. We utilized both in-person meetings as well as online meetings. Our general weekly meeting schedule consists of 1 meeting with our client, Dr. Galloway, every Monday at 11:30 a.m. This meeting usually lasts anywhere from 15 to 30 minutes, and we discuss the progress we made the prior week, the progress we made that week, group meetings we will have that week, goals for the next week, and any questions/concerns we have. The members of Team Psycho Fox also share several classes. Because of this, we all decided to meet multiple times after these classes to keep track of our progress and make sure deliverables were getting done as expected. These meetings usually occur 2-3 times a week after our CS396 which meets Monday, Wednesday, and Friday. We meet after this class for around 1 to 2 hours on average. We also all share this class together, CS360. Since we all have this class, we often meet briefly on Tuesday and Thursday after class to also make sure we are staying on track with the Sprint 1 goals. Regarding our online meetings, we discuss via text the progress we have made through the Discord app and set up calls if we decide to have meetings or if we want to work together to complete tasks at a time when we are unable to meet in person. Through our implementation of these two methods of communication during our first sprint, our team feels like we have figured out a good strategy to follow through the remainder of this project.

Sprint 2: Project Manager - Harsha Suresh

Similar to sprint 1, team Psycho Fox met several times throughout the Sprint 2 timeline to complete all deliverables needed before the due date set by our client, Dr. Galloway. We met in person with and without our client to make sure that we were on track for Sprint 2. The meetings with our client stayed about the same. Our team met for around 15 to 30 minutes every Monday at 11:30 a.m. to make sure we are making progress and can ask any questions we may have. Our meetings without our client happened after the classes that we shared with each other. These meetings usually occurred 2-3 times a week after our CS396 which meets Monday, Wednesday, and Friday. We meet after this class for around 1 to 2 hours on average. We also all share this class together, CS360. Since we all have this class, we often meet briefly on Tuesday and Thursday after class to also make sure we are staying on track with the Sprint 1 goals. Before these deliverables were due, we also had to increase some of these meetings so that we could ensure we would be complete with our work. These meetings usually occurred in the Library or Commons of WKU. In addition to all of these meetings, we also used a Discord channel to keep an open line of communication with everyone. This was useful so that if anyone had a question, it could be answered quickly. Also, Discord allowed us to share files and images quickly through it.

Sprint 3: Project Manager - Nicholas Johnson

In sprint 3, team Psycho Fox had a very similar meeting schedule that we had in sprints 1 and 2. Since the Psycho Fox team members shared several classes with each other, we continued to meet after these classes that all of us would already be attending. The classes that we met after were CS360 and CS396. During these meetings after our classes, we would assign tasks to each other, work towards completing deliverables, or begin implementing required functionality to our Unity game, Psycho Fox. These meetings could be brief meetings where we quickly update each other or we work for several hours to work towards the goal we want to complete. Our team usually meets in empty classrooms or in the Library at the Commons here at WKU. In the case that we can not meet in person, we have a dedicated Discord channel set up so that we can have an open line of communication. We can meet online or chat with each other using Discord. Discord was beneficial this sprint communicating changes we were making to the shared Github repository. We also added a Discord bot to notify when new changes were made to the repository to keep each other updated on changes to the Unity Game. We also still meet with our client, Dr. Galloway every Monday at 11:30 a.m. to update him on our progress for our Unity game. We also ask questions related to our project to make sure we are meeting the requirements set by our client.

Sprint 4: Project Manager - Matthew Polak

In sprint 4, team Psycho Fox had a very similar meeting schedule that we had in sprints 1, 2, and 3. Since the Psycho Fox team members shared several classes with each other, we continued to meet after these classes that all of us would already be attending. The classes that we met after were CS360 and CS396. During these meetings after our classes, we would assign tasks to each other, work towards completing deliverables, or begin implementing required functionality to our Unity game, Psycho Fox. We would meet at least 2 or 3 times a week. These meetings could be brief meetings where we quickly update each other or we work for several hours to work towards the goal we want to complete. Our team usually meets in empty classrooms or in the Library at the Commons here at WKU. We would also meet later in the afternoon on campus when reviews and more testing needed to be completed. In the case that we can not meet in person, we have a dedicated Discord channel set up so that we can have an open line of communication. We can meet online or chat with each other using Discord. Discord was beneficial this sprint communicating changes we were making to the shared Github repository. We also continued using a Discord bot to notify when new changes were made to the repository to keep each other updated on changes to the Unity Game. We also still meet with our client, Dr. Galloway every Monday at 11:30 a.m. to update him on our progress for our Unity game. We also ask questions related to our project to make sure we are meeting the requirements set by our client.

2 Schedule Organization

2.1 Gantt Chart v1:

The location of the Gantt Chart is in the GanttChart folder which is inside of the CS360PsychoFoxSprint1 project folder.

The focus in this sprint was to mainly prepare us for the next 3 sprints so that we do not run into many problems down the road. The first task listed in the Gantt chart was setting up Discord. Setting up a Discord allows us to keep an open line of communication so that if something comes up we can discuss it quickly. We also set up meeting times so that we can keep each other updated and work closely with each other on deliverables that are due this sprint. We also did extensive testing of the game so that we could know all aspects of Psycho Fox. This will allow us to recreate it just how our client wanted us to. Some of the group members also learned latex so that we could learn how to convert our information in our Google doc into well-formatted documentation for the client and us, the developers. Everyone also had to complete CATME evaluations for all of the other group members inside the Psycho Fox team. We also had to create a presentation to show our progress and work to our client about Sprint 1. Lastly, we had to formulate 2 documents, a technical and organizational document. This document not only helps the client track what we have done but also will help us later down the road to track progress and ensure we getting deliverables done correctly.

2.2 Gantt Chart v2:

The location of the Gantt Chart is in the GanttChart folder which is inside of the CS360PsychoFoxSprint2 project folder.

The focus of this sprint was to guide us into sprint 3, which will be when we start making our game. Furthermore, the main focus of this sprint was to design several different types of diagrams that revolve around how our game, Psycho Fox, will function. These diagrams have a wide range of what they show. For example, the deployment diagram shows the main features that Psycho Fox will use like the database and the user's computer machine. Most of the other diagrams revolve around specific parts of the code that we will be creating in our process of recreating the game Psycho Fox. These diagrams that revolve around our code are things like enemy interactions, menu views, and character movement functions. We also spent time this sprint making and presenting a presentation for our client, Dr. Galloway. This will keep him updated and show that we are continuing to make progress until the final deadline of our project by the end of the semester. Everyone also had to complete CATME evaluations to ensure that no group member was not completing the work that needed to be completed for this sprint's deliverables. Lastly, we had to create 2 documents to submit, the technical and organizational documents. These documents further help us and the client to keep on track and make sure we are meeting our deliverable requirements correctly.

2.3 Gantt Chart v3:

The location of the Gantt Chart is in the GanntChart folder which is inside of the CS360PsychoFoxSprint3 project folder.

The focus of sprint 3 was to begin the implementation of functions into the recreation of Psycho Fox in the Unity Game engine. Before we worked on implementing the functions of Psycho Fox, our team set up Github desktop to ensure we could push, pull, and commit changes to our shared Github repository. This allows us to have multiple backup versions of our game just in case there are issues in saving the game. We also ensured we all had the same LTS Unity versions for no future errors. The functions we worked on for this sprint in our project mainly revolved around the UML diagrams we made in sprint 2. Despite us not having complete versions of code for these UML diagrams because we still have sprint 4 to work on this project, we will continue to implement more features that align with our UML diagrams from sprint 2. We also created a storyboard and wireframes to help us visualize what we need to create so that we can implement it into our project. The storyboard and wireframes will also help our client visualize our recreation of Psycho Fox. Our team also worked on performance tests for some of our programs and overall program performance. These tests that we ran will help us modify our system functions to better optimize our game for a better user experience. In addition to this, it will allow us to get a better understanding of what performance requirements are needed to run our game. The specific tests run revolve around utilizing a virtual machine of Linux. Inside the virtual machine, we can run our sysbench benchmarks for different functions inside of the game and better optimize our game. We also have implemented a data dictionary that keeps terms related to our project. We also have prioritized security.

2.4 Final Gantt Chart:

The location of the Gantt Chart is in the GanntChart folder which is inside of the CS360PsychoFoxSprint4 project folder.

The main focus for Sprint 4 was to work towards testing the game we have been making for the CS360 project, Psycho Fox. To work towards this goal and to stay on track, we had several meetings that were held with and without our client, Dr. Galloway. During the meetings with our client, we would discuss issues and our progress toward completing all deliverables for Sprint 4. The meetings without our client were used to work on deliverables or assign tasks among group members. Before running the tests for the game, we wanted to work on completing more functionality of Psycho and trying to meet the requirements set by our client, Dr. Galloway. To complete for functionality of the game, we worked towards fulfilling more of the functional and non-functional game requirements. These additional requirements we wanted to complete were fully implementing login, registration, and logout functions. This would require us to get our database implemented into the Unity game engine. For this, we used SQLite to accomplish this task. With our database, we needed to work on additional game objects like new scenes that contain canvases for these different functions. We also worked on different canvases for death and completion screens which would also interact with our database. Once these main implementations were inside of our game, we then worked towards doing many tests for our game so that the functionality implemented is as we initially intended by us and our client. After doing sufficient testing, we then worked on properly documenting and filling out other sections in our documentation. This is important to us so that we can track our game progress and solve future errors by referencing our own documentation. With our work inside of the document, we then worked on creating a presentation to show our final product to our client. This presentation showed updated requirements, approach, difficulties, and a live demo of our most current version of the game. After completing all of the main deliverables for the game, all team members completed CATME evaluations for each person inside of the Psycho Fox team to evaluate the performance of others.

3 Progress Visibility

3.1 Sprint 1 Progress Visibility

Throughout sprint 1, we split up the work of each major assignment into 4 manageable parts for each group member. For the presentation section of the assignment, each member created 3 to 5 slides that they presented

for that presentation. As for the documentation, we all worked on several of the sections separately in a Google Doc which we then worked on converting into an Overleaf template for both the technical documentation and organizational document. These assignments are usually assigned to each of the members during our in-person meetings but are sometimes also dedicated to members inside our dedicated Discord server for the Psycho Fox game. In addition to completing assigned tasks, we often refer to our Gantt chart to ensure that all deliverables are making sufficient progress to finish by the deadline. The CATME evaluations were also all completed separately by each group member in the Psycho Fox team. To share our progress with our client, we have weekly meetings to discuss any problems or concerns that we are facing as a group so that we can come up with resolutions to solve those problems. We also talk to our client to make sure that we keep in mind the mandatory requirements that the game must have.

3.2 Sprint 2 Progress Visibility

In sprint 2, we all had our own roles and assignments we needed to complete throughout this sprint. Similar to sprint 1, we split each assignment that we had into parts so that it felt like no one person had more work than the other. For the UML diagrams we needed to make, we each created 2-3 diagrams that fulfilled the necessary requirements for the amount of diagrams we needed. For the documentation, each member completed parts of the documentation that was designated to them earlier at the beginning of the sprint. All members then worked together to put it into the Overleaf website where we have been working on the documentation. We also split up the presentation into manageable parts for each member. Each group member made slides for the diagrams they made and we all worked on modifying some of the previous information from our first presentation. Lastly, to make sure that we all knew what we were doing, we all discussed with each other in a Discord server where we could post information, questions, and files. It also allowed us to have reminders set by bots to not forget about meetings. Lastly, our progress is shared with our client during our weekly meeting on Mondays. This information is also shared in the documents we submit and the presentation that we present during our class period.

3.3 Sprint 3 Progress Visibility

In sprint 3, we all had our own assigned tasks again. These tasks that were given to each other were delegated to each other during the several meetings that we have throughout a given week. We tried to give each other tasks that each person could excel at during the time allotted for sprint 3. Nicholas was assigned to make menu functions that directly relate to scenes in the game. Harsha worked on implementing the map in the Unity game engine. The map is a sprite map that includes box colliders which allows enemies and Psycho Fox to travel across. Matthew worked on enemies that our main character, Psycho Fox, will interact with when playing the game. Cy worked on implementing character movement that closely follows Psycho Fox's original movement. The progress made over the previously listed tasks is going well. While we do not have all the required functions and object-oriented design patterns implemented in Unity, we do have basic menu functionality, map implementation, character movement, and enemy interactions. We share our progress during our meetings that occur several times throughout the week or inside our Discord dedicated to this project. To discuss our progress with our client, we mention all tasks that we accomplished, were not accomplished, and what our new tasks for that week are. If we have any potential issues or questions we ask our client, Dr. Galloway. Our team also all worked on the presentation that we presented to our client, Dr. Galloway. Our team also all worked on creating 2 pieces of documentation, an organizational and a technical document. We also delegated time to make sure that our game would be able to perform optimally. To accomplish this, we utilized Sysbench and performance testing metrics inside of our Unity game to make sure nothing would hurt the user experience. Sysbench allowed us to test our target systems so that we would have a better idea of what performance our game needed. We also tested how long our functions inside of our game lasted so that there would be no complications related to performance. Lastly, our team took time to think about how to implement security features inside our game.

3.4 Sprint 4 Progress Visibility

Similar to sprints 1, 2, and 3, we all had our own assigned tasks that we all worked on. Nicholas worked on implementing a new scene. Inside of this scene, there is a new canvas that contains several different panels. Inside these separate panels are different menu pages that allow the user to complete different user-related functions, like

logging in, registering, viewing a scoreboard, and starting the game. Nicholas also worked towards completing the organizational document, technical documentation, running system tests, and the presentation. Cy worked on the content and design of the presentation, running various system tests to test all aspects of our game, the organizational/technical documentation, and implemented audio functionality into the game for game-related events inside of Unity. Harsha worked on the presentation, the documentation, running system tests, and implementing additional game functionality into the game such as the menu scene, and logic that relates to changing scenes related to certain game-related events. Matthew worked on the technical documentation, the presentation, system-related testing, and implementing several game-related functions such as enemy AI, database functionality, better player movement, and scene-related functions. We also all had to complete CATME evaluations to evaluate each other's work. Our group members also all helped each other when it came to implementing game functionality because we ran into issues related to GitHub and Unity scenes. Pushing a version of our Unity game would oftentimes cause conflicts or not save newly implemented game objects. We believe this was due to someone working on the same scene so we worked together on implementing some game functionality. Lastly, when it came to communication when a task was completed, our team would usually post updates of our work inside of our Discord when changes were being made. Our team would also meet in person so we could inform each other directly when progress or a task is completed.

4 Software Process Model

Our team utilized a modified waterfall software process model. This model allowed us to go through the software creation process sequentially while, at the same time, leaving room for some flexibility to go back and make changes we find necessary later on in the process. We first started by creating a feasibility study and identifying our requirements within the first sprint in an attempt to have a solid understanding of what we can expect from our finished project. After this portion was completed, our second sprint was geared around designing the layout of our game through the utilization of different information we gathered from the first sprint. This information was mainly through the creation of several diagrams which will help us later on when we begin creating Psycho Fox inside of Unity. Once this step was completed, we shifted our focus to implementing this design during the programming process of the game to the best of our ability. There were various roadblocks during this process and different parts of our game did not work as intended. These issues were addressed as best as we could during the testing process, which allowed us to check whether our game was performing as intended. If we noticed issues in our game's ability to perform as anticipated, we worked in sprint 4 on the bug-fixing process in order to come up with the necessary solutions for the final product of our game.

5 Risk Management

There are many different risks that come with the creation of a software project. Dealing with these risks most effectively will allow us to not only save time, but increase the quality of the finished product. The risks that are outlined below were placed into a category to most accurately describe how they are affecting the project, then they'll be prioritized and addressed with a practical solution. This connects to how each risk plays a role in the development process, indicating that how we plan to monitor each risk during the development process will be included in each section

5.1 Risk Identification

The below risks are ranked by severity. The risks we feel are most concerning begin with Issue 1. The next most concerning risk would be Issue 2 and so on.

Issue 1: Implementing each of the requirements that have previously been mentioned in this document came with the risk that they might not meet the standards or expectations of the client. Given that meeting these expectations is the primary focus of the project, this risk held a very high importance and deserved a large chunk of our time ensuring that we met the requirements set by our client as closely as we could. This would be categorized as a functional problem and reflects our understanding of what the client wants and what we are able to provide.

Issue 2: Our team was allocated sixteen weeks, or a whole semester, to finish this project. All requirements must be fulfilled as closely as possible, which presents the risk of not being able to meet every requirement within the amount of time that we're given. This risk was of moderate priority since personal schedules are liable to change. Since we met close to all requirements set by our client, we needed to alter some requirements. After we modified the scope of the project, we could then meet all of the requirements.

Issue 3: The risk of teammates separating from the group was something that needed to be considered as well. Not being able to communicate with certain group mates would cost us the quality of our project, in addition to aspects of its functionality. Since we divided the work based on our members' strengths and weaknesses, it was critical that our group stayed together, making this risk a high priority. This issue falls under the category of resource dependence.

Issue 4: Since our team is composed of students still learning many programming mechanics, it was definite that we may run into issues involving our technical know-how. This involved the risk of our project being more technical than we anticipated/understood initially. This mainly affected the amount of time that we had to work and impacted the functionality of the finished product. Since our project is designed to be relatively simple, this risk was of a lower priority since our team is confident in its abilities. This issue would also be categorized as a resource-related problem.

Issue 5: As we headed into sprints 3 and 4, we began to face new issues regarding technical risks. These technical issues revolved around the functional and performance aspects of our game when we began early prototypes. Depending on these issues that we faced, it could have taken a significant amount of time to fix depending on the issue we faced.

Issue 6: Another issue we faced in mainly in sprints 3 and 4 would revolve around combining and saving versions of Psycho Fox that we have created in Unity to our shared GitHub repository. Issues can arise when each person is working separately on their tasks which is when problems can surface. This issue was of high priority because of how we could quickly lose a lot of progress on the game which could cost us a lot of time that could have been used or allocated for other things.

Issue 7: Our group ran into a large problem related to GitHub and Unity. Since our group project is recreating a Unity game, we all needed a way to push and pull versions of the game we are working on. Since this is a group project, we all have our own tasks that have been assigned to each other during our group meetings. So that we can work on the most recent version of our Unity game and keep these versions safely online, we have used GitHub to do this. However, we have run into problems when pushing changes to our shared repository. Similar to issue 6 which relates to GitHub and Unity, sometimes when we save the game (git push) using the GitHub desktop application, all game objects do not save inside of that particular Unity scene while the progress and new scripts that were made are saved. Another issue that can occur is when we try to merge branches that we want to merge with our main branch. After merging, it can sometimes corrupt the project. This caused us to lose quite a bit of time to try and regain our progress or led us to have to redo that work. This issue was also of high priority because it could lose us a lot of progress inside of our game similar to issue 6.

5.2 Risk Planning

The below sections are responses/continuations of the above risks assessed by us.

Solution 1: One of the ways we were able to solve this problem was by frequently discussing the product with the client throughout the development process. This solution ties into both how we planned to handle this risk and how we plan to monitor it over the course of the semester. Frequently meeting with the client and showcasing our scheduled work allowed us to understand minor details that needed to be captured and helped us create a product that was as accurate to the client's vision as possible.

Solution 2: We prevented the length of a semester from impacting us negatively by budgeting our time wisely (see Gantt Chart) and communicating effectively with one another to make sure that work is being completed

correctly and on time. Monitoring the presence of this risk throughout the semester involved our groupmates frequently checking in on each other's progress and holding one another accountable for the fruits of our labor. Tackling smaller schedule issues over the semester was much more manageable than larger ones that built up towards the end and allowed us to create a much better project overall.

Solution 3: One of the ways our group stayed connected was by interacting with each other in class in addition to messaging each other outside of school through a Discord group that we've created. We monitored this risk by paying attention to how active each group member was in our project's progress, as well as seeing how involved they were in class.

Solution 4: One of the ways we prevented our lack of understanding from affecting the project is by allocating time towards familiarizing ourselves with programming mechanics that are present in our project. Analyzing the game play of the finished product / discussing the product with the client allowed us to get an idea of specific technicalities that we needed to prepare for. We monitored the state of this risk by paying attention to how much time we spent implementing certain features. Spending too much time on the implementation of a feature told us whether or not we need to learn more about how a certain mechanic works, or if we should have cleared our understanding of what the client wants.

Solution 5: Our team tried to minimize these risks that we faced by testing features made by our team in the Unity engine as we created them. This constant testing helped us catch issues immediately and fix them on the spot instead of running into more major issues down the road. In addition to testing, we downloaded the Unity Performance Testing Extension which helped us track the performance of the new functions and features that we implemented into our Psycho Fox game.

Solution 6: Our team was constantly utilizing Github to work on new tasks that each member was working on separately. Due to this, there were several commits to our repository with several new branches and merges happening in a given day. With so many things occurring, we needed to be mindful as a team to keep track of the changes we were making. These changes could have caused potential future issues when trying to merge our main project file with our other branches that contain our new content. If this did occur, we had backup versions of our project to revert to. Before we attempted to merge again, we worked on fixing new branches so that a future merge would be successful. A similar error to this has already occurred. Our team tried to merge a branch with the main branch. An issue occurred which did not allow us to merge without changes being made to the main branch. We went ahead and made changes to the branch and merged. After our merge, our whole project was broken so we had to revert to an old version and re-implement our project from there. After a few errors like that, we feel as if we are confident in our GitHub abilities after having that minor hiccup. We are now taking more precautions when merging new files to our main branch so no issues occur.

Solution 7: To resolve this issue with game objects not saving and corrupted game versions, there were a few things that we had to do to try and solve this problem. If there was a merge conflict, which we believe was caused by more than 1 person working on a scene at once, we would manually have to resolve conflicts by trying to find the issues in the changed code inside of the repository of the push that we had just made on the GitHub website. This did sometimes help resolve conflicts. If the git push caused all-new game objects created to be deleted, we would have to redo all of the game objects inside of that scene and reuse the saved scripts from the push. We believe that this issue mainly comes from multiple people changing the main scene, however, we are not exactly sure why this occurs despite our research. In the research we did see online through discussion forums, other teams or solo workers ran into similar problems and tried to follow their solutions. Despite these struggles we faced, we overcame them and it increased our knowledge of the GitHub interface.

5.3 Risk Monitoring

Throughout the CS360 course, our team continued to monitor risks through several implementations that our team had put in place during all phases of our projects before and during the process of making the project.

Discord: We utilized an open line of communication through a Discord channel that was dedicated to just the progress of making the game. In this Discord, we had 2 bots that would update us during certain events. One of these bots was a bot that would remind us before meetings occurred with our client to reduce the chance that someone would miss a meeting. We also had another bot in place that would update any commit that was made to our shared repository. This was very helpful because it allowed all team members to be notified through Discord when someone was making changes to our Unity game.

Version Control: We also utilized a GitHub repository dedicated to keeping the source code, files of our game, and documentation so that it does not get lost or we lose significant progress. This also allowed us access to the most previously uploaded version of the game if any one of the team members wanted to make progress toward completing tasks that were assigned.

Meetings: We also had several planned meetings. These meetings were our regularly scheduled meetings so that we could keep on track and assign tasks accordingly. Some of these meetings were also with our client which helped us stay on track and ensure we are correctly meeting the requirements for deliverables.

LTS Version of Unity: In addition to this, we are using an LTS version of Unity. This version will allow our client and us the longest support possible with that version. This will definitely reduce any bugs that we may face in the future when creating the game and reduce the issues our clients may encounter because it is also tested heavier than other Unity versions.

As sprint 4 and the project is now completed, we encountered several problems and came up with several solutions along the way. Our risk planning definitely helped reduce the number of issues that we may have run into by following our plans as closely as possible.