Engineering Change Proposal (ECP) Origination Instructions and Workflow for ECPs Costing $100,000 – $1,000,000

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Engineering Change Proposal (ECP) Executive Summary

Engineering Change Proposals are the “umbrella” under which all components (ECOs, ACOs, DCRs, Modification Notes, etc.) of a system modification are organized. An approved ECP is required prior to incorporation of the various components into the WSR-88D baseline. This document outlines the procedures to produce, submit, review and adjudicate ECPs with a cost of $100,000 to $1,000,000.

Acronyms

ACO	Artwork Change Order
CCB	Configuration Control Board
CCR	Configuration Change Request
CM	Configuration Management
DCR	Document Change Record
ECO	Engineering Change Order
ECP	Engineering Change Proposal
ROC	Radar Operations Center
TMS	Time Management System
TRC	Technical Review Committee
WPI	Work Practice Instructions

Launching the ECP Process

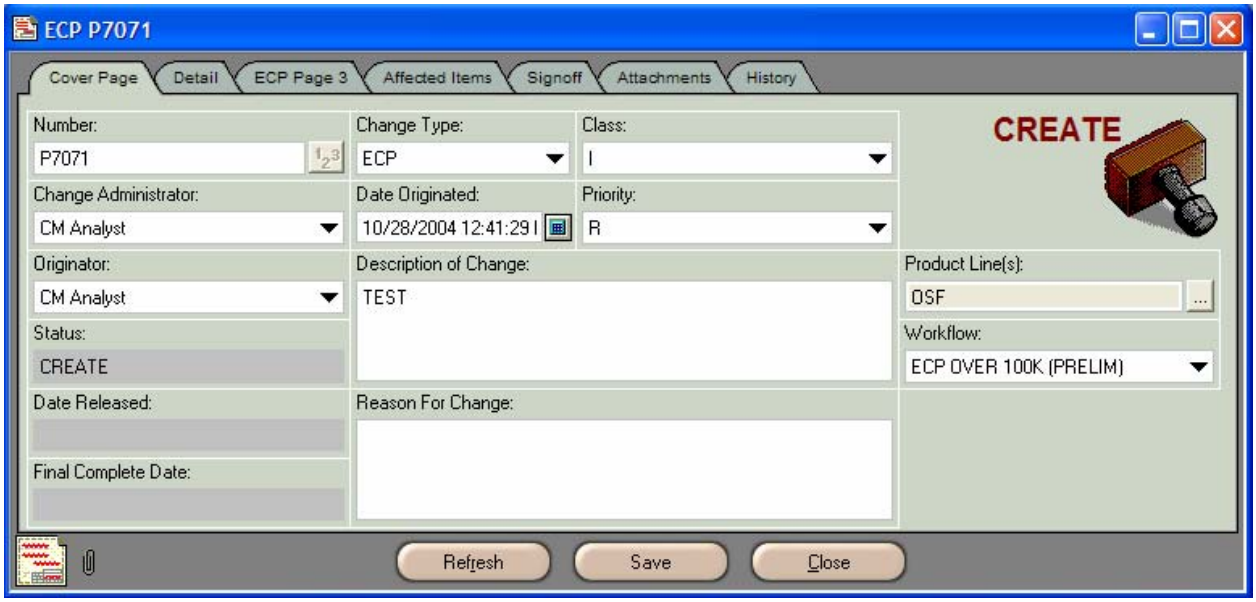
To activate a project, a request is made at a TRC meeting to remove a CCR(s) from the System Project Pool, which will then become an ECP. The TRC will assign the project lead and team members at this time.

Creating the ECP Template

The CM Analyst will create the ECP template and populate the following fields:

On the Cover Page –

Number
Change Type
Class
Change Administrator
Date Originated
Priority
Originator
Title
Product Line
Status
Workflow

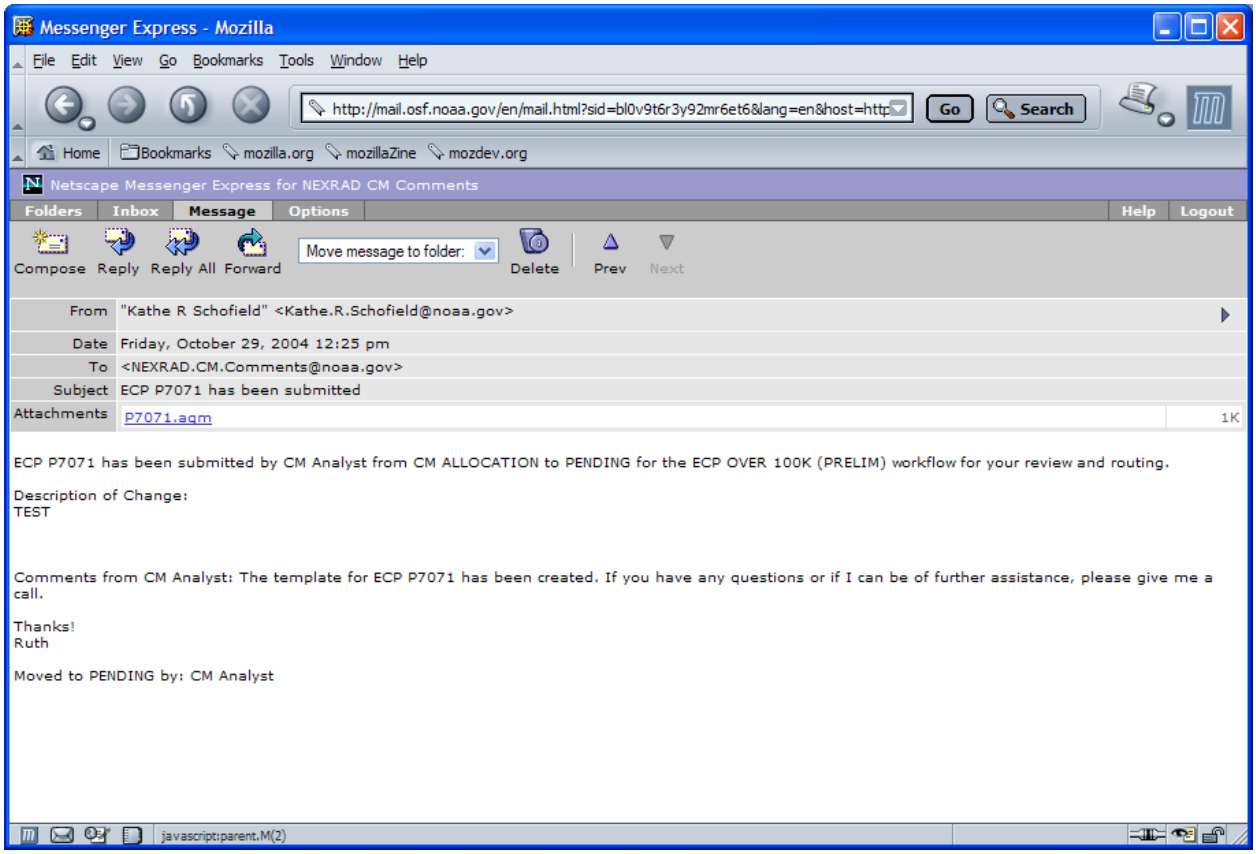


On the Detail Tab –

Type
Engineering Area
Cognizant Engineer
Team Members
ECP Number
Driving CCRs

Upon completing the fields listed above, the CM Analyst will advance the CCR to **CM Allocation** status. At this status the CM Analyst assigns team members and the branch chief as approvers on the Signoff tab.

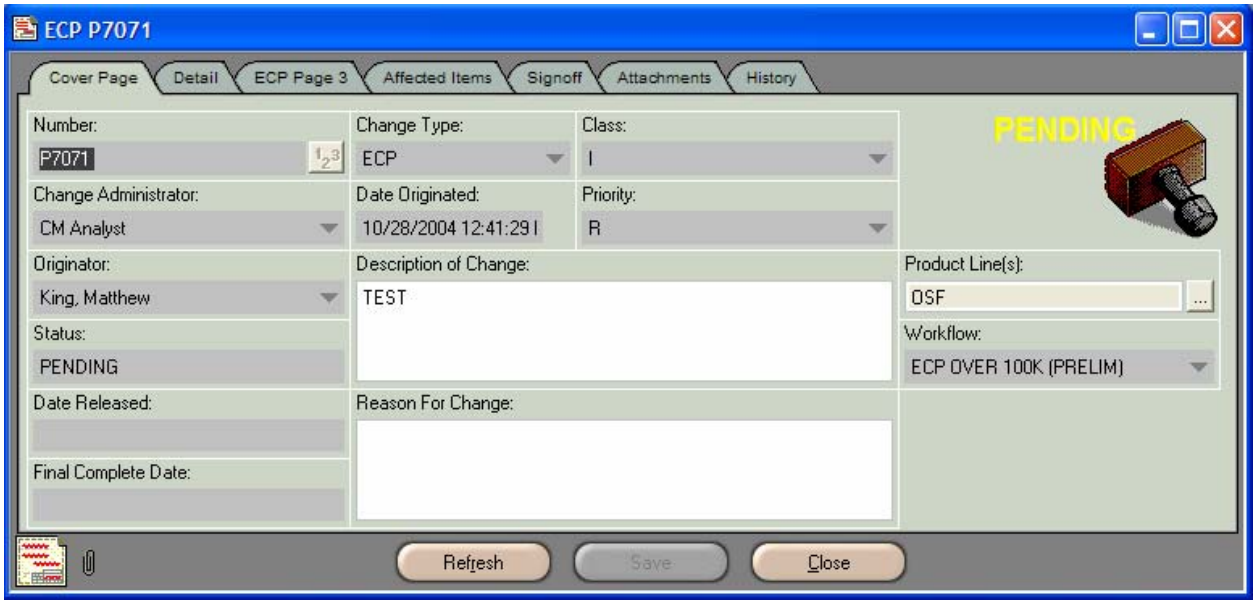
The CM Analyst will advance the ECP to **Pending** status and send an email notification to the originator (project lead) that the ECP has been produced.



The ECP is now available to be worked by the project lead. The project lead can view the ECP clicking on the Agile document link (**P7071.agm**) in the email notification. This will launch Agile.

The Welcome to Agile CM login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

The ECP (**7071**) will be displayed.



ECP Workflow

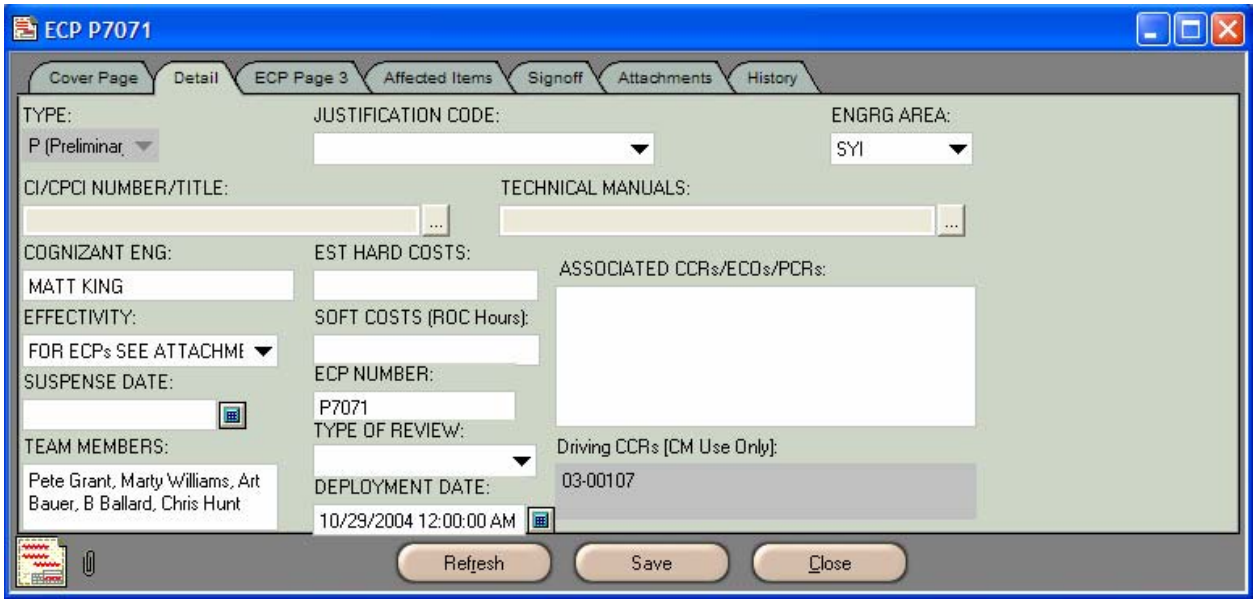
ECPs Over $100,000 (Preliminary)

For projects costing $100,000 - $1,000,000, it is understood that these are large and often complicated projects. Therefore, the ECP process allows for approval of these large projects to take place in a two part format – as Preliminary and Formal ECPs. Preliminary ECPs are to describe the format of the project – a framework of the problem description, proposed solution and implementation of the project. The Preliminary ECP should be a strong, well developed "skeleton" of the plan, with the Formal ECP filling in all the details and "fleshing out" the project.

1. Pending Status

The project lead will receive the Preliminary ECP in Pending status. All preparatory work for the ECP will be performed while the ECP is in this status.

The project lead should begin his ECP process with a **team meeting**. (The project team members will have been listed on the Detail tab of the ECP.) During Pending status, the project lead must conduct at least one team meeting.



During the team meeting, the team members should provide much of the information required to populate the ECP.

Populating the Preliminary ECP

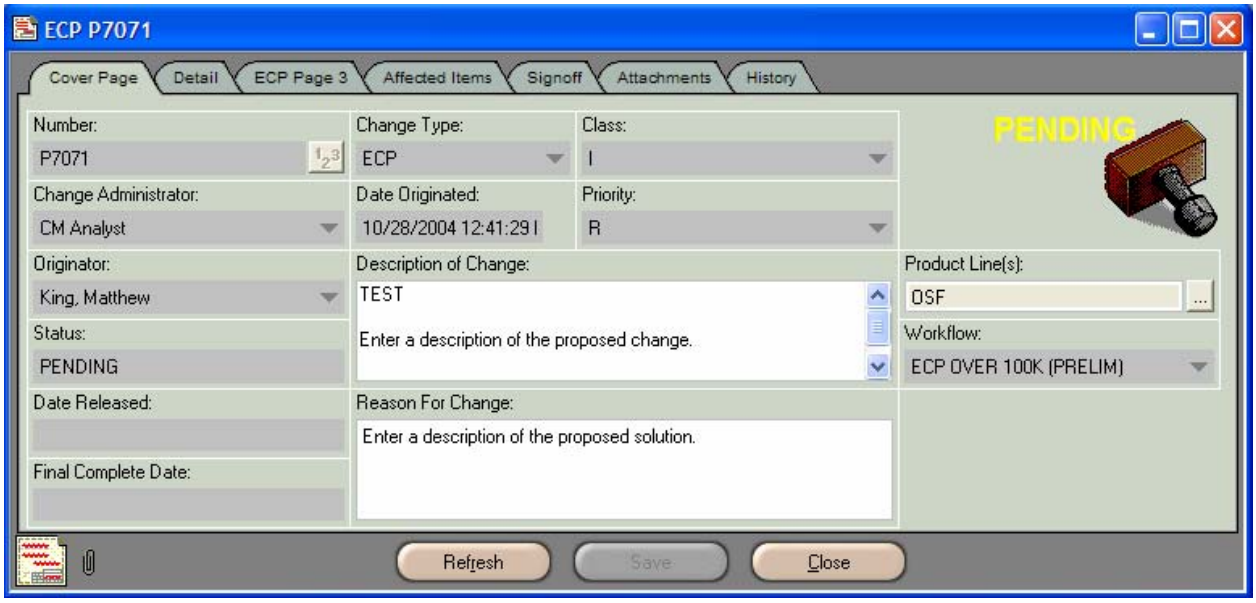
A. Cover Page

Complete the following blocks on the Cover Page of the ECP:

Description of Change:

This field will contain the **title** of the ECP (entered by the CM Analyst). Enter a blank line after the title and then enter a **description** of the proposed change. The description should identify the affected portion of the system and the problem in question.

Note: Many of the blocks on the Agile ECP form have limited character lengths, thus limiting the amount of data that can be entered. Therefore, an attachment must be used to include all necessary information in the ECP. **Attachment A** is used for this purpose. The template for Attachment A can be found on the Attachments tab of this WPI and an example of the template has been included in **Appendix C** of this document.



Reason For Change:

Enter a **proposed solution** in sufficient detail to adequately describe what the project is to accomplish.

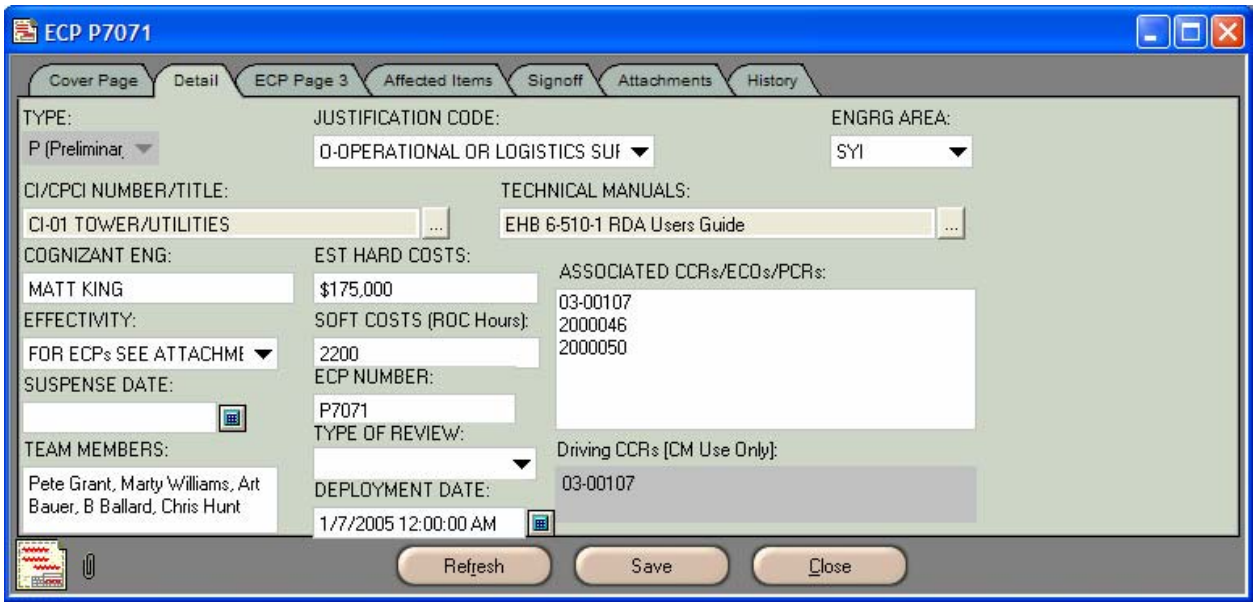
B. Detail Tab

Complete the following blocks on the Detail Tab:

Justification Code:

Select one of the following from the Justification Code drop-down list:

Interface – To eliminate incompatibility between CIs.
Compatibility – Proposed change is necessary to make the system/item work.
Deficiency – Eliminate a deficiency (use if more descriptive code doesn't apply.)
Operational or Logistics Support – Make a significant change in operational capability or logistic support. (Commonly known as an improvement change.)
Production Stoppage – To prevent slippage in an approved production schedule.
Cost Reduction – To provide net total like cycle cost savings to the Government.
Safety – To correct a hazardous condition.
Value Engineering – For a net life cycle cost reduction.



CI/CPCI Number/Title:

Select from the **CI/CPCI Number/Title** drop-down list all known applicable CIs (CPCIs for SW Build Release ECPs) affected by this proposed change. All CIs and CPCIs are listed in **Appendix B** of this document.

Technical Manuals:

Select from the **Technical Manual** drop-down list all known Technical Manuals affected by the proposed change. All Technical Manuals are listed in **Appendix B** of this WPI.

Estimated Hard Costs:

Calculate **estimated hard costs** (procurements, travel, printing, field labor, shipping, media, credit card purchases, etc.) for the project.

Effectivity:

The project lead is not expected to know the full effectivity at this point in a large project. However, a rough indication of effectivity, such as "**Will affect all FAA sites**" or "**Anticipate fleet-wide installation**" should be included on the Attachments tab as **Attachment E**.

Soft Costs (ROC Hours):

Obtain from each team member an estimated number of staff hours he or she will spend on the project. Enter the team's **total hours** in the Soft Costs block on the **Detail tab** of the ECP.

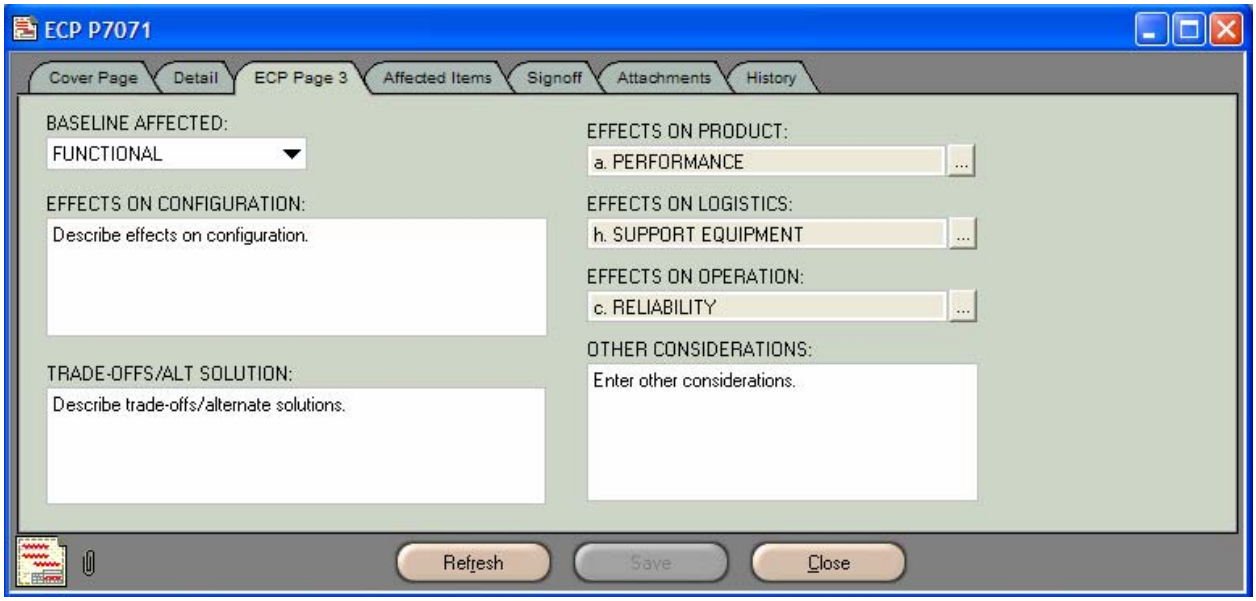
Deployment Date:

At this point, the project lead is not expected to know the deployment date for the project. However, a brief breakdown of a proposed development schedule should be provided and included on the Attachments tab as **Attachment S**.

Please Note: The **Suspense Date** and **Type of Review** blocks will be completed by the CM Analyst when the ECP is routed for review. However, the Suspense Date and Type of Review blocks may be completed by the project lead to reflect the 7-day project team review period, if he so chooses.

C. ECP Page 3

At this point it is not anticipated that the project lead will have much information for Page 3 of the ECP. However, if the project lead has any information for the items on this page, it should be included.



D. Affected Items Tab

No items are to be added to the Affected Items tab!

If ECOs have been produced, they should be listed on the Detail tab in the **Associated CCRs/ECOs/PCRs** block of the ECP. The ECO process is explained in Agile Work Practice Instructions **WPI0010**.

E. Signoff Tab

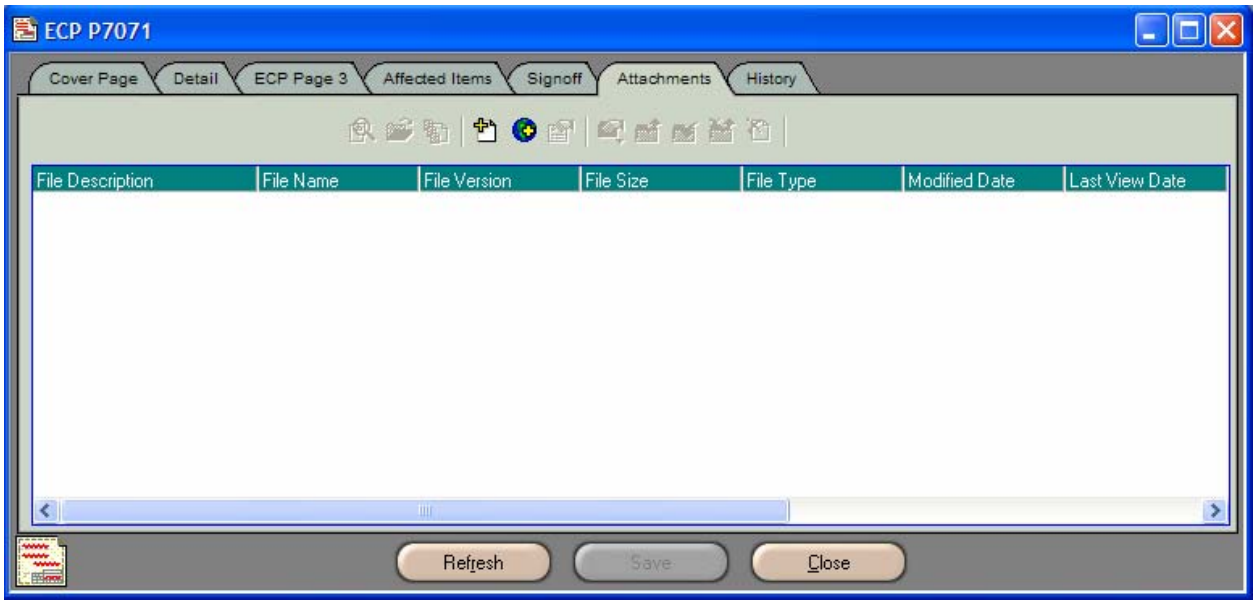
The Signoff tab is populated by the CM Analyst and the Agile workflow.

F. Attachments Tab

ECP attachments will vary from ECP to ECP; however, the Attachments tab of a Preliminary ECP is to contain all documentation needed to gain approval for continued development of the proposed change. Preliminary ECPs must contain a **fully developed business case**, **basic development schedule**, and **rough indication of effectivity** attachments. **Attachment B** is used for the business case. Instructions for producing a business case can be found in **Appendix D** of this document. For

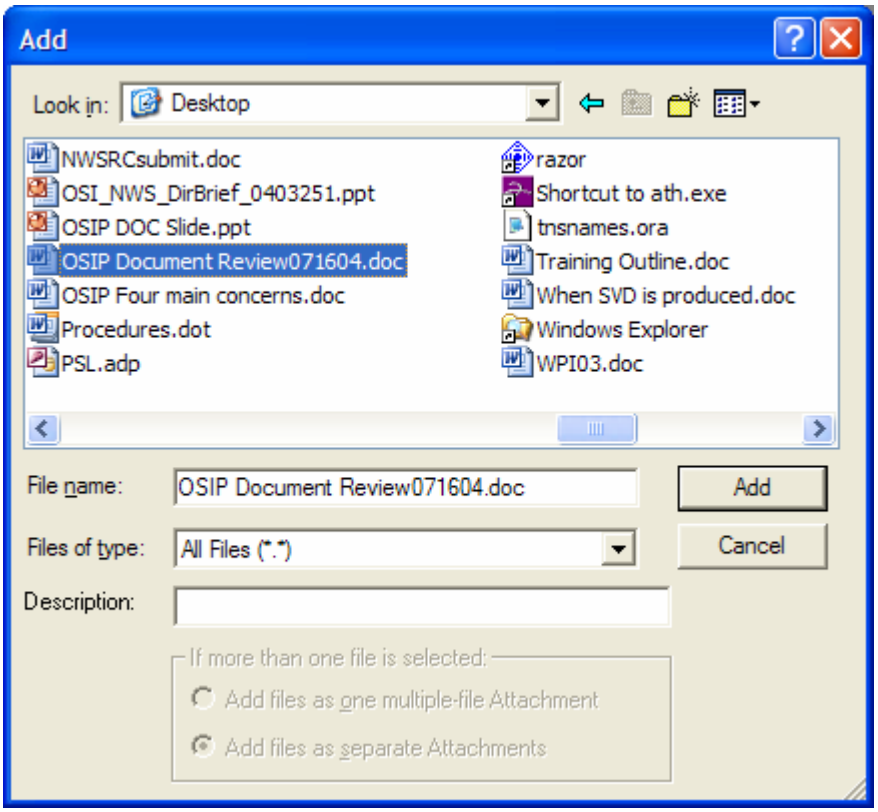
reference, an example business case attachment has also been included in Appendix D.

To add attachments, select the Attachments tab, place the cursor in the white space on the tab and click the mouse button. A thin, blue boarder will be displayed ensuring the tab is activated.



Click the **Add Attachment** button located on the Attachment tab's toolbar. The add dialog box will appear.

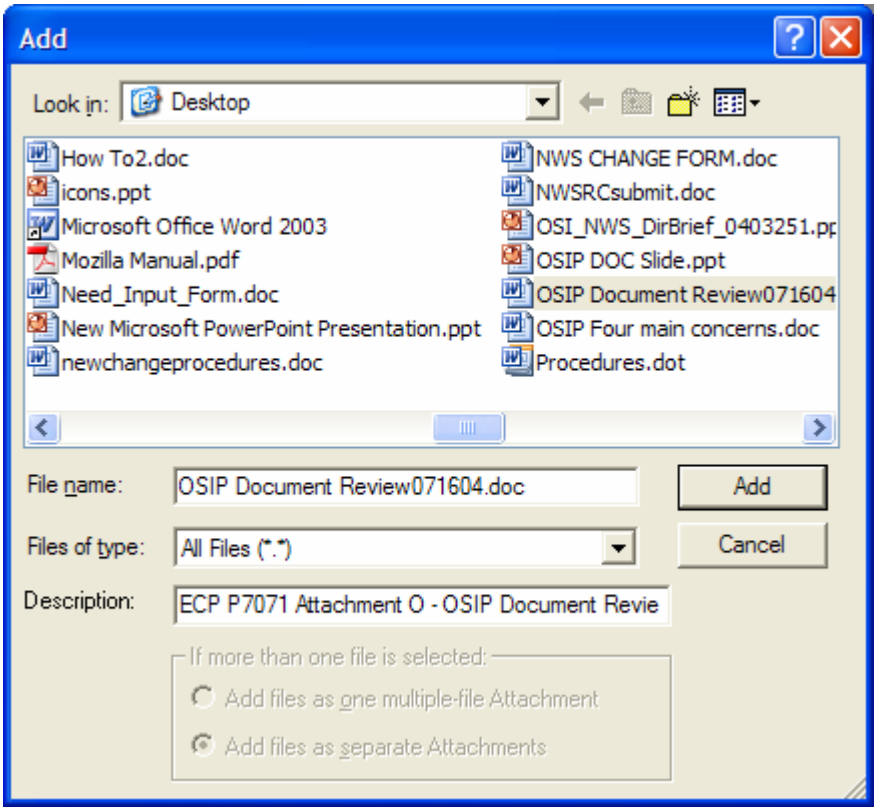
Locate the file to be attached and click on the **file name**. This will highlight the name of the file and enter it in the File name block.



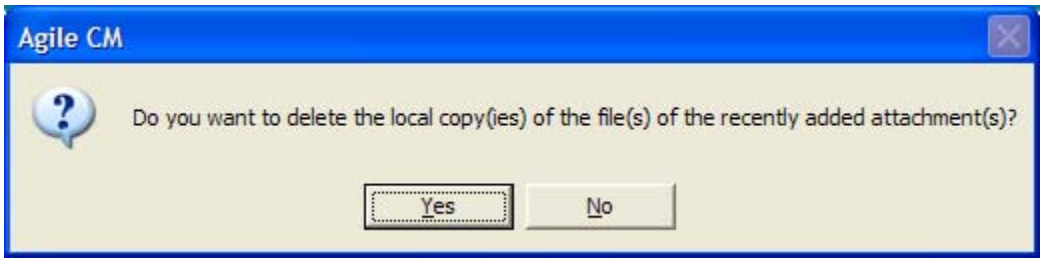
Using the following naming convention, enter a **description of the file** in the Description block on the Add dialog box:

ECP Pxxxx Attachment A – Additional Information
ECP Pxxxx Attachment B – Business Case
ECP Pxxxx Attachment E – Rough Indication of Effectivity
ECP Pxxxx Attachment S – Basic Development Schedule
(Where Pxxxx is the ECP number, e.g., ECP P7071 Attachment A – Additional Information.)

Use this naming convention on any additional attachments, e.g., ECP P7071 Attachment T – Team Meeting Minutes; ECP P7071 Attachment I – Warning Instructions; ECP P7071 Attachment O – Obstruction Light Diagram; etc.



Click the **Add** button on the Add dialog box. The file will be added and Agile will display a prompt offering the option to delete the local copy of the file that was added to the Attachments tab.



To retain the local file, click **No**. To delete the file, click **Yes**.

G. History Tab:

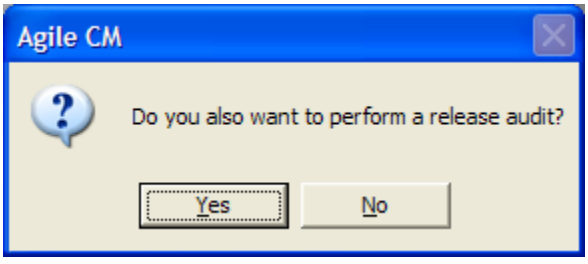
The History tab is automatically populated by Agile and is a permanent record of all Agile activity performed on the ECP.

2. Routing for Project Team Review

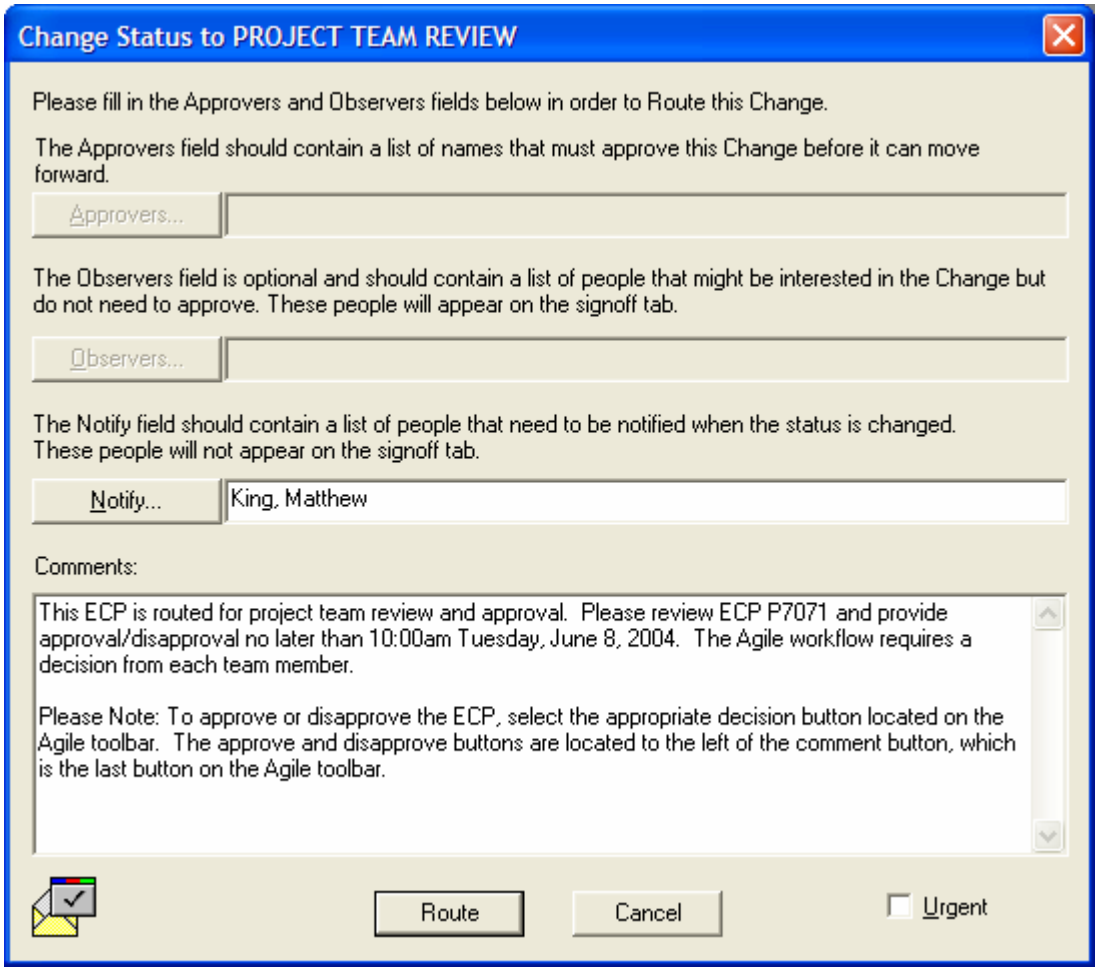
a. Once the ECP is complete, the originator will route the ECP for project team review. The team members will have been assigned by the TRC and added to the ECP by the CM Analyst when the ECP was created.

b. Click the **Next Status** button on the Agile toolbar.

c. Agile will display a prompt offering to perform a release audit. Click **Yes**.



d. The **Change Status to Project Team Review** dialog box will be displayed. Agile will automatically enter the name of the project lead in the Notify box. The approvers' (team members) names will not be displayed in the Approvers box because they were previously assigned on the Signoff tab by the CM Analyst when the ECP was in CM Allocation status.



e. In the Comments box, the project lead will enter **instructions** for the team members reviewing the ECP. These directions must include a **suspense date** by which time the reviewer must have approved/disapproved the ECP. The suspense date will be no later than **7 days** from the date and time the ECP is routed for review.

It may be helpful to also provide instructions concerning how to approve/disapprove. For example:

> **This ECP is routed for project team review and approval. Please review ECP P7071 and provide approval/disapproval no later than 10:00am Tuesday, June 8, 2004. The Agile workflow requires a decision from each team member.**
>
> **Please Note: To approve or disapprove the ECP, select the appropriate decision button located on the Agile toolbar. The approve and disapprove**

buttons are located to the left of the comment button, which is the last button on the Agile toolbar.

f. Click the **Route** button located on the bottom of the Change Status to Project Team Review dialog box.

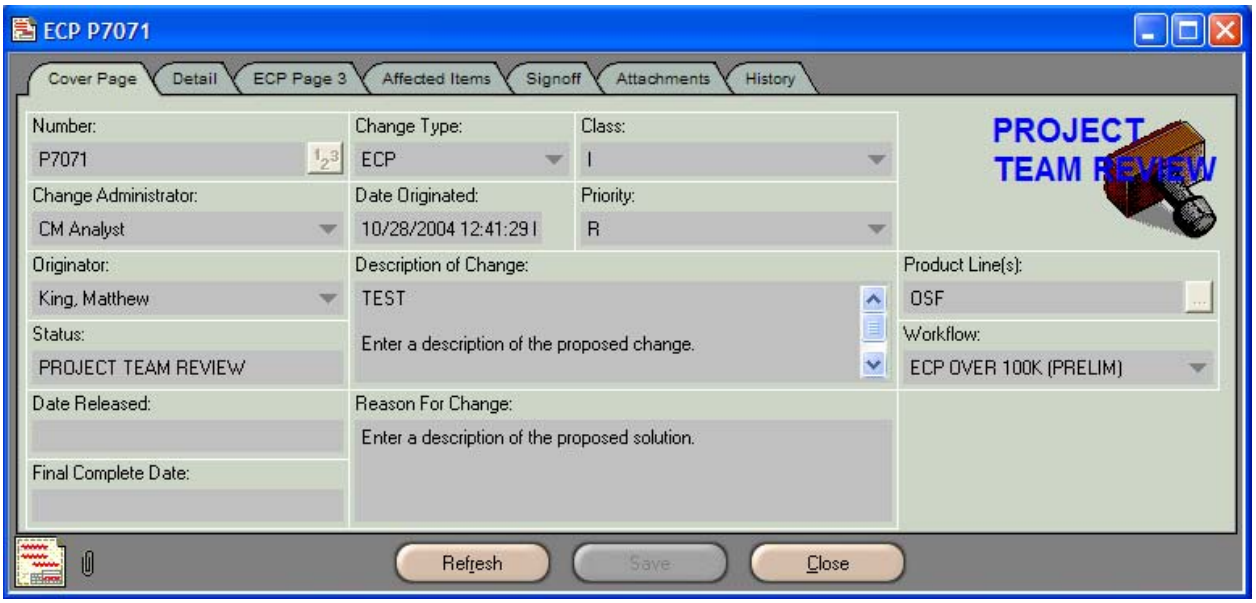
g. A screen will appear describing any required information that is missing from the ECP. Click **OK** and **correct all errors** found during the audit.

h. After correcting errors, click the **Next Status** button on the Agile toolbar. Agile will once again display the prompt offering to perform a release audit. Click **Yes**.

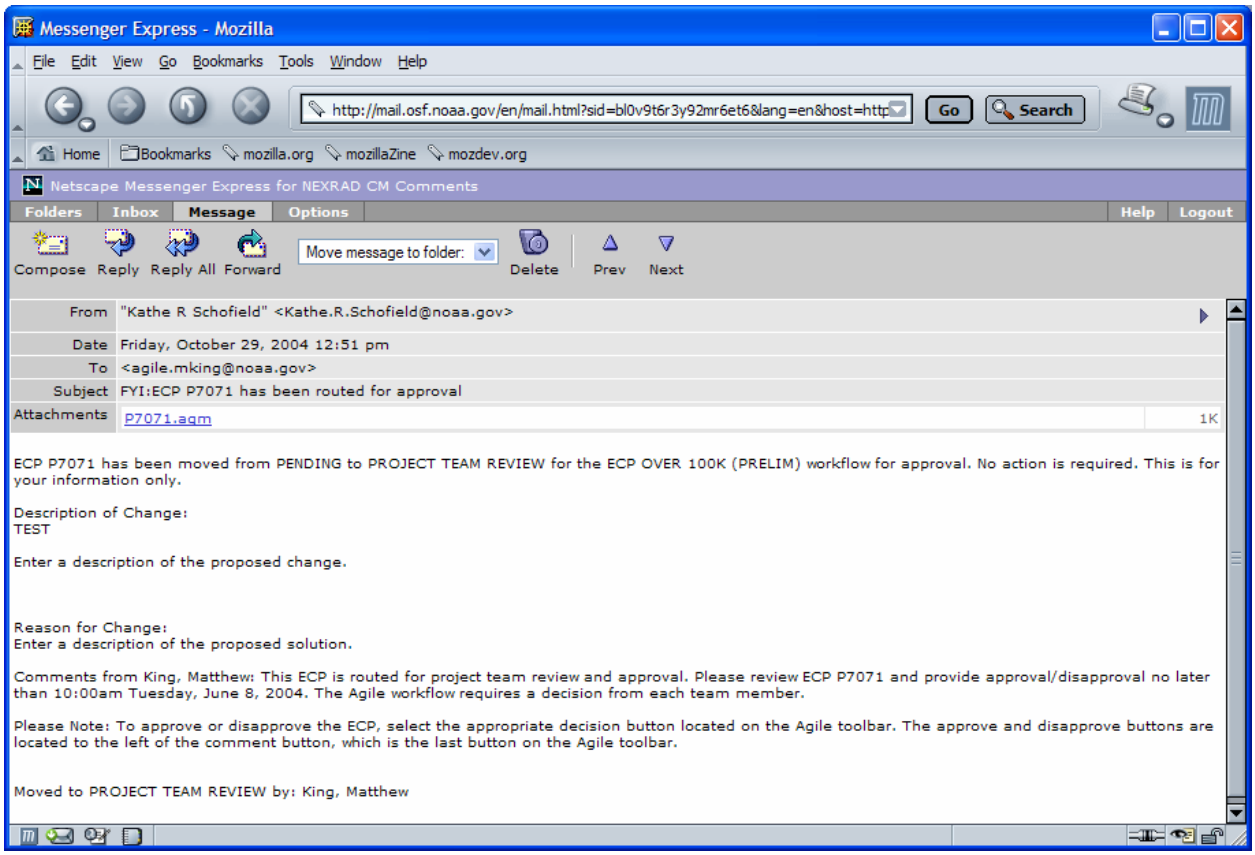
i. The **Change Status to Project Team Review** dialog box will be displayed once again. The name of the project lead will be in the Notify box and the instructions previously entered in the Comments box will also be displayed.

j. Click the **Route** button located on the bottom of the Change Status to Project Team Review dialog box.

k. The status of the ECP will change to **Project Team Review**.



l. Agile will send each team member an **email notification** of the ECP requiring his review and approval. Please note that Agile "canned" comments are always located in the first line of the email message and cannot be edited by the ROC. Any **additional information/instructions** from the sender will be located below in the **Comments section** of the email.



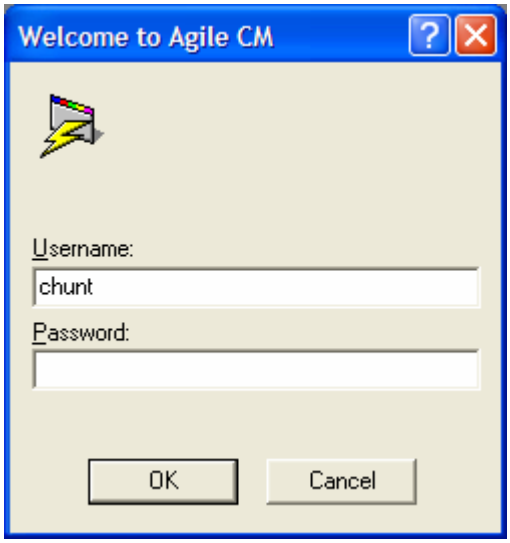
3. Project Team Review

a. When the ECP is routed for review, the project team members will have **7 days** to provide approval or disapproval of the ECP. Agile automatically monitors this process, which requires a response from all team members. Any team members who have not provided a decision within **5 days** will receive an email reminder from Agile.

Please Note: If a decision is not received by the end of the 7-day review cycle, Agile escalates the ECP to the team member's team lead for action.

b. To review the ECP, click on the Agile document link (**P7071.agm**) in the email notification. This will launch Agile.

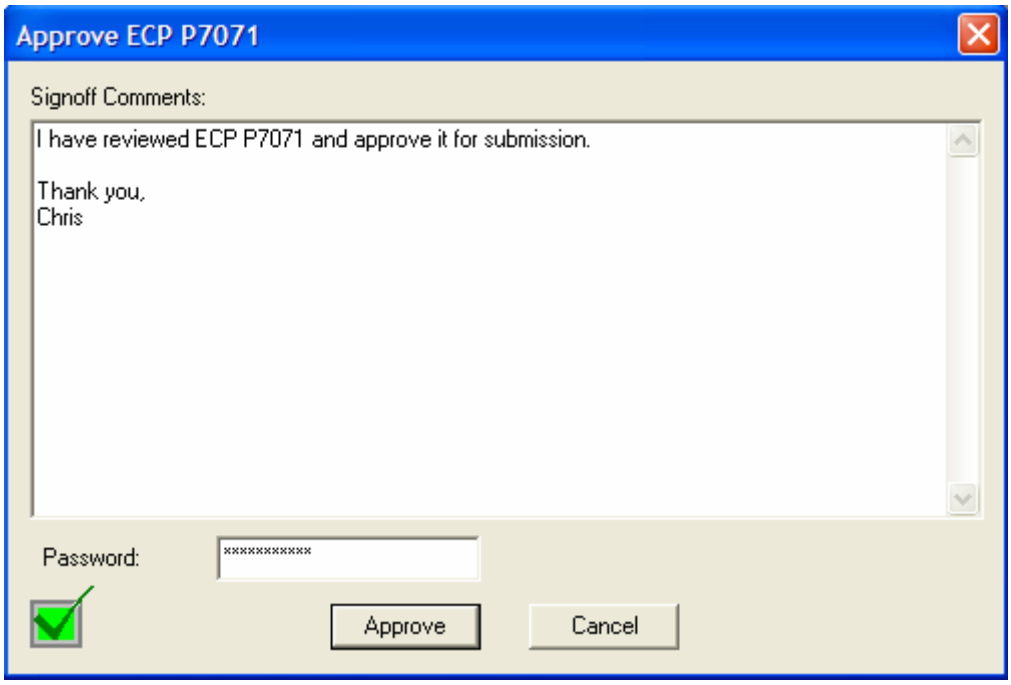
c. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.



d. The ECP to be reviewed (ECP **P7071**) will be displayed.

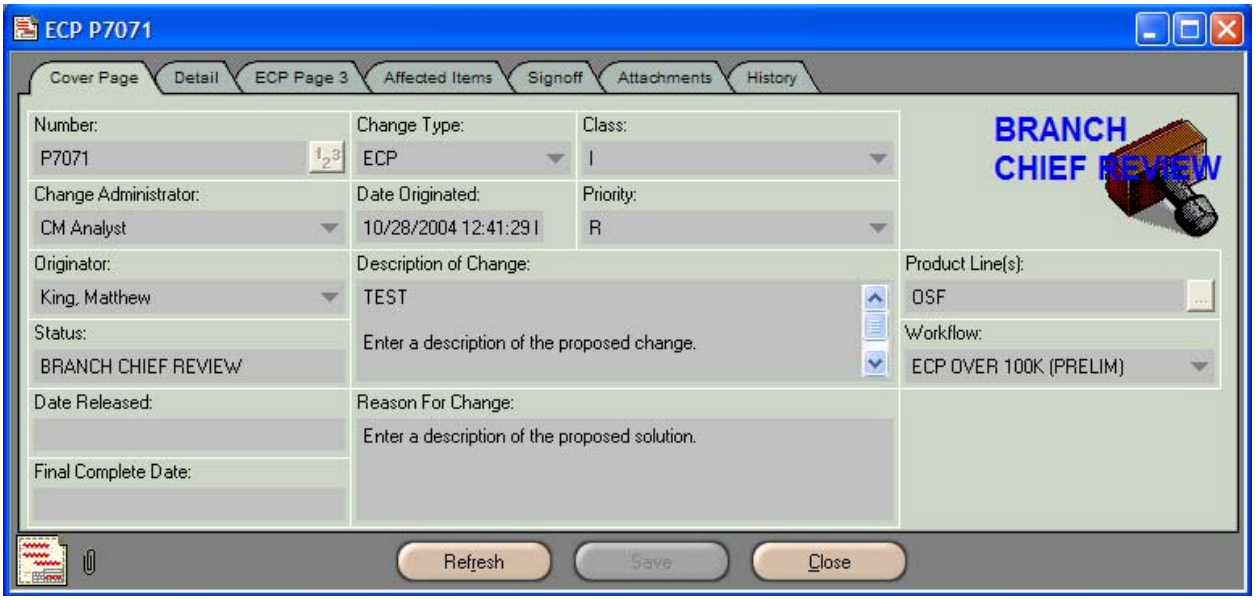
e. The team members are to review the ECP to ensure that it's complete - all information is correct and it contains all required attachments. To approve the ECP for submission, the team member will click the **Approve** button located on the Agile toolbar.

f. The **Approve ECP Pxxxx** (ECP **P7071**) dialog box will be displayed. Enter any review **comments** in the Signoff Comments block, then enter the password in the **Password** block and click **Approve**.



g. The project lead will receive an email notification when all team members have approved the ECP. The email will state, "**ECP P7071 has been moved from PROJECT TEAM REVIEW to BRANCH CHIEF REVIEW for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only.**" This is a canned statement from Agile and cannot be altered by the ROC.

h. Once all team members have provided their approvals, the ECP will automatically move forward to **Branch Chief Review** status. The branch chief review process is described in **ECPs Over $100,000 (Preliminary) Section 5** of this document

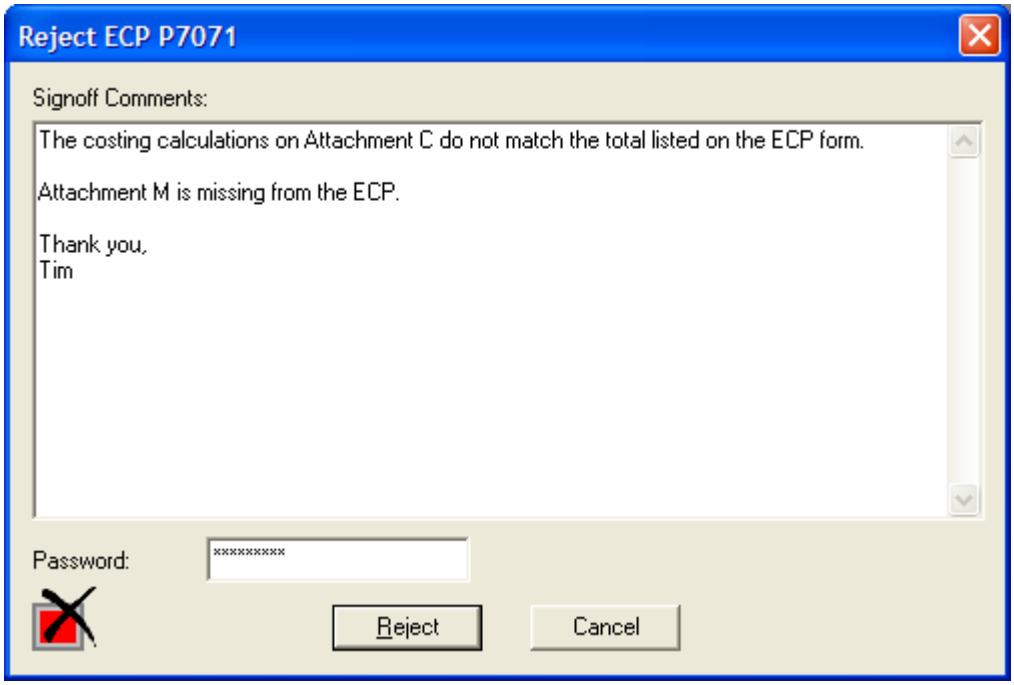


i. If a team member does not agree the ECP is ready for submission, the ECP can be disapproved. Instructions for disapproval and the process for handling rejected ECPs are described in **ECPs Over $100,000 (Preliminary) Section 4** of this document.

4. ECPs Rejected During Project Team Review

a. If a team member does not agree that the ECP is ready for submission, he may reject the ECP by clicking the **Reject** button on the Agile toolbar.

b. The **Reject ECP Pxxxx** (ECP **P7071**) dialog box will appear. In the Signoff Comments block, enter the **reason for disapproval** and list all items in need of attention, e.g., attachments are missing, information is incorrect or incomplete, etc.



c. When all comments have been entered, type the **password** in the Password block and click the **Reject** button.

d. If any team members disapprove the ECP, it will automatically return to **Pending** status.

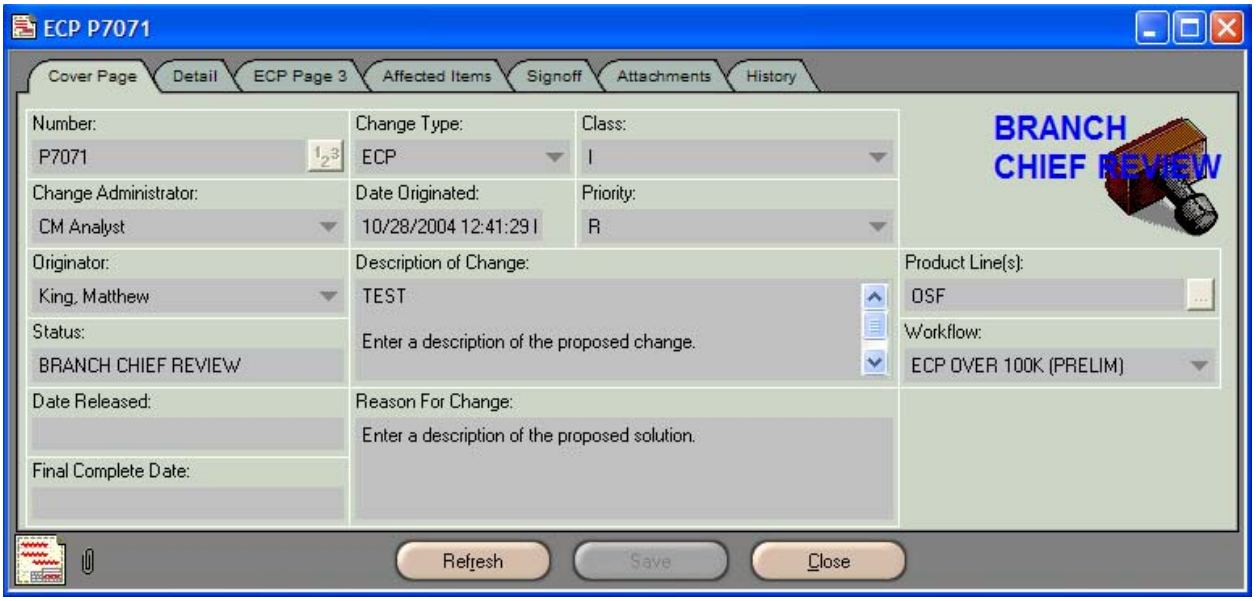
e. The project lead will receive **email notification** from Agile stating the ECP has been returned to Pending status.

f. The project lead should make all necessary adjustments to the ECP. If there is disagreement concerning the suggested changes, a **team meeting** should be held to reconcile the problems.

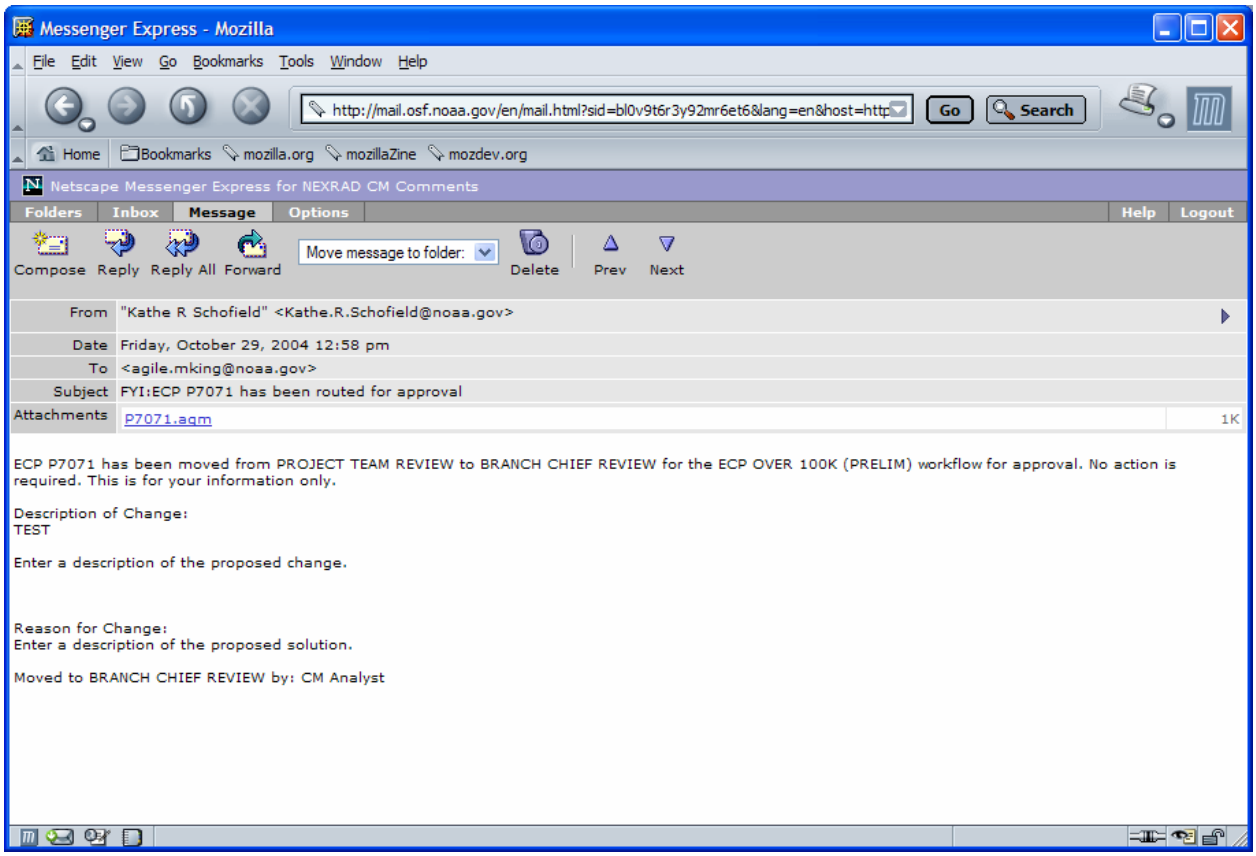
g. Once the ECP has been reconciled and the changes have been made, the project lead will return the ECP to the review cycle. To accomplish this, perform **ECPs Over $100,000 (Preliminary) Routing for Project Team Review steps 2b through 2k** of this WPI.

Please Note: When the ECP was returned to Pending status, Agile automatically re-populated the **Signoff** tab, as shown in the graphic below. Therefore, all team members must once again perform the **ECPs Over $100,000 (Preliminary) Project Team Review steps 3a through 3h** of this WPI and provide a review decision.

h. When all team members provide their approvals, the ECP will automatically move forward to **Branch Chief Review** status.

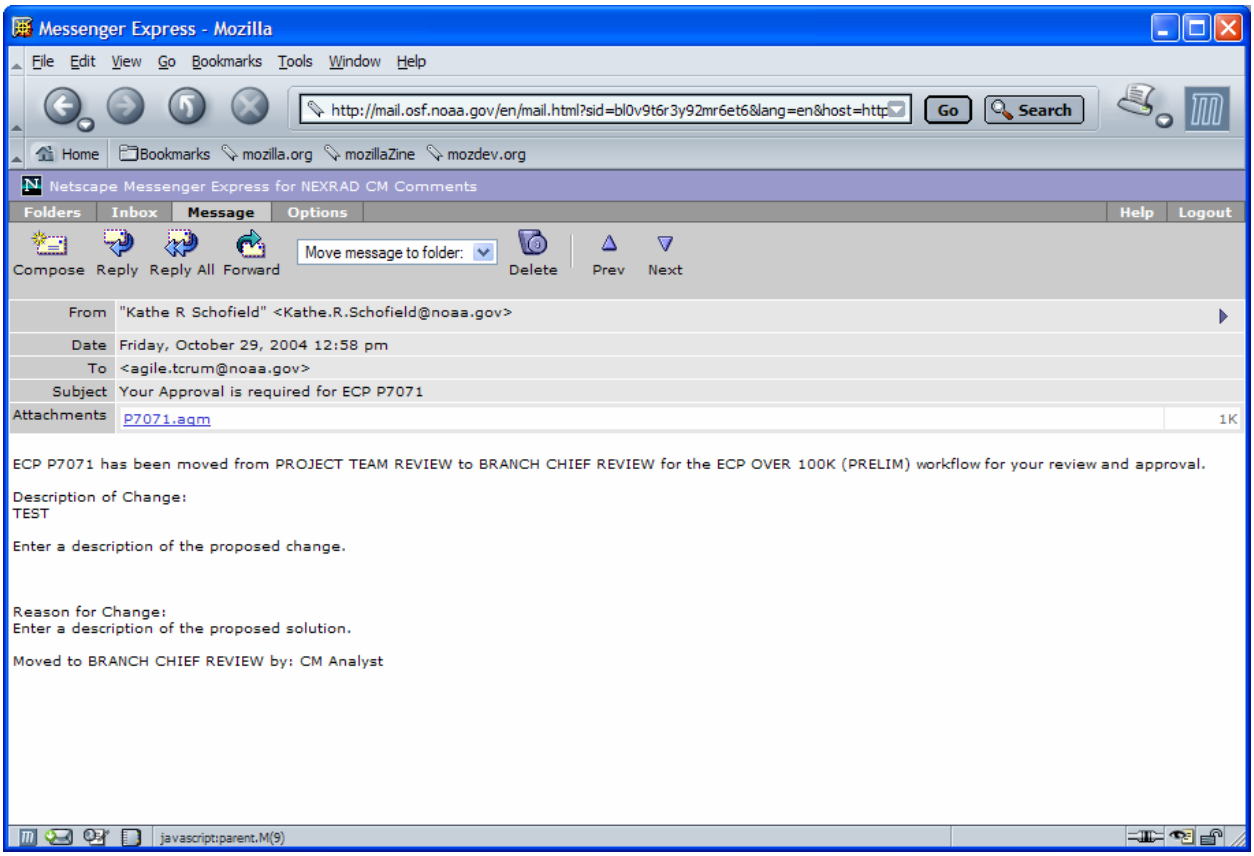


i. Agile will send the project lead an email notification that the status of the ECP has changed to **Branch Chief Review** status.



5. Branch Chief Review

a. When the ECP enters **Branch Chief Review** status, Agile will send the branch chief an email notification of the ECP requiring his review and approval.



b. When the branch chief receives the ECP for review, he will have **7 days** to provide approval or disapproval of the ECP. Agile automatically monitors this process. If the branch chief has not provided a decision within **5 days**, he will receive an email reminder from Agile.

Please Note: If a decision is not received by the end of the 7-day review cycle, Agile escalates the ECP to the CM Team Lead for action.

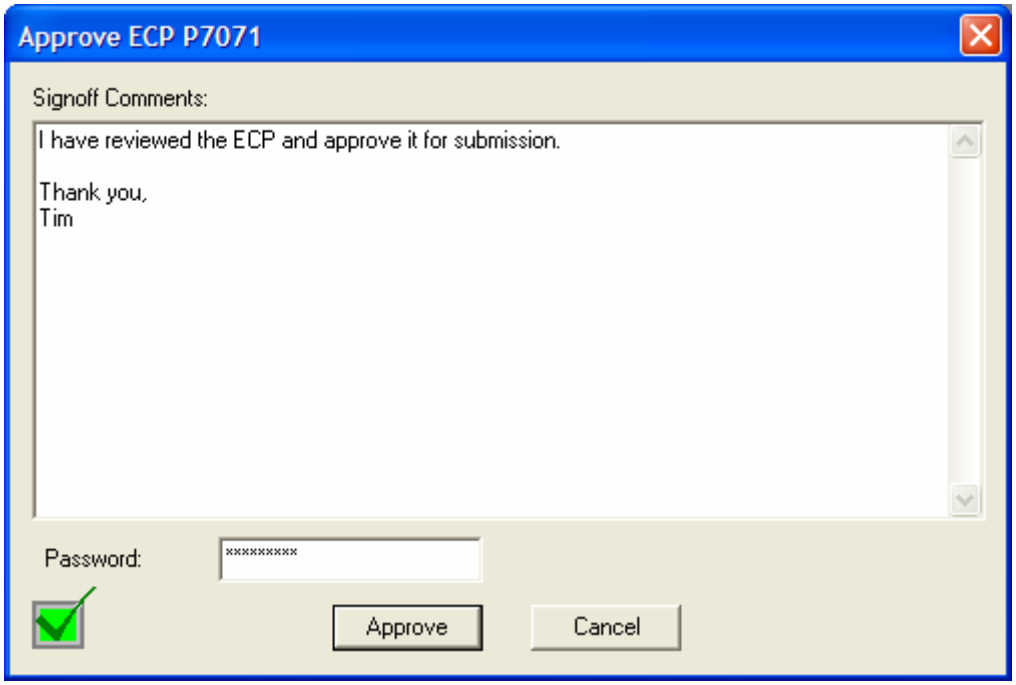
c. To review the ECP, click on the Agile document link (**P7071.agm**) in the email notification. This will launch Agile.

d. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

e. The ECP to be reviewed (ECP **P7071**) will be displayed.

f. The branch chief is to review the ECP to ensure that it's complete - all information is correct and it contains all required attachments. To approve the ECP for submission, the branch chief will click the **Approve** button located on the Agile toolbar.

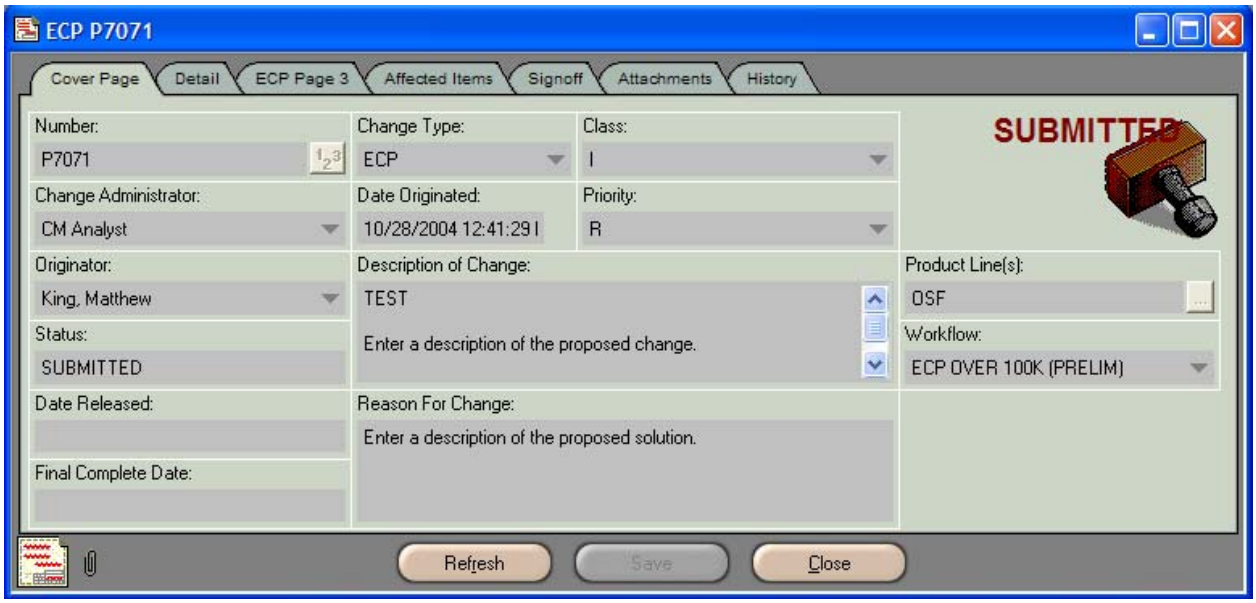
g. The **Approve ECP Pxxxx** (ECP **P7071**) dialog box will be displayed. Enter any review **comments** in the Signoff Comments block, then enter the **password** in the Password block and click **Approve**.



h. The project lead will receive an email notification when the branch chief approves the ECP. The email will state, "**ECP P7071 has been moved from BRANCH CHIEF REVIEW to SUBMITTED for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only**." This is a canned statement from Agile and one the ROC cannot alter.

i. If the branch chief does not agree the ECP is ready for submission, the ECP can be disapproved. Instructions for disapproval and the process for handling rejected ECPs are described in **ECPs Over $100,000 (Preliminary) Section 6** of this document.

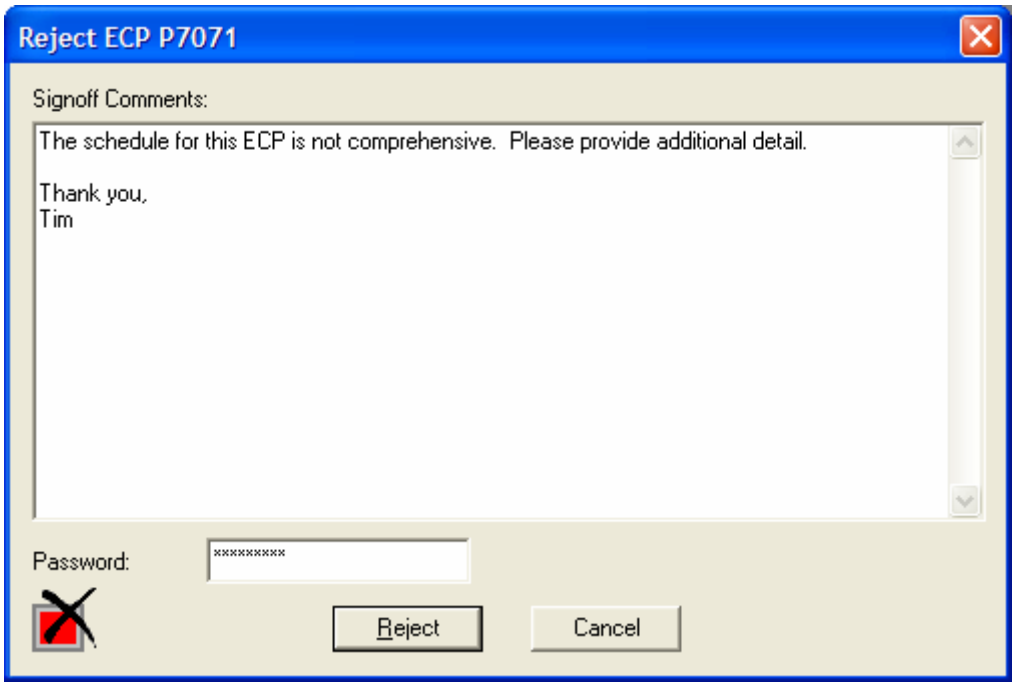
j. Once the branch chief has provided his approval, the ECP will automatically move forward to **Submitted** status. The process for Submitted ECPs is described in **ECPs Over $100,000 (Preliminary) Section 7** of this WPI.



6. ECPs Rejected During Branch Chief Review

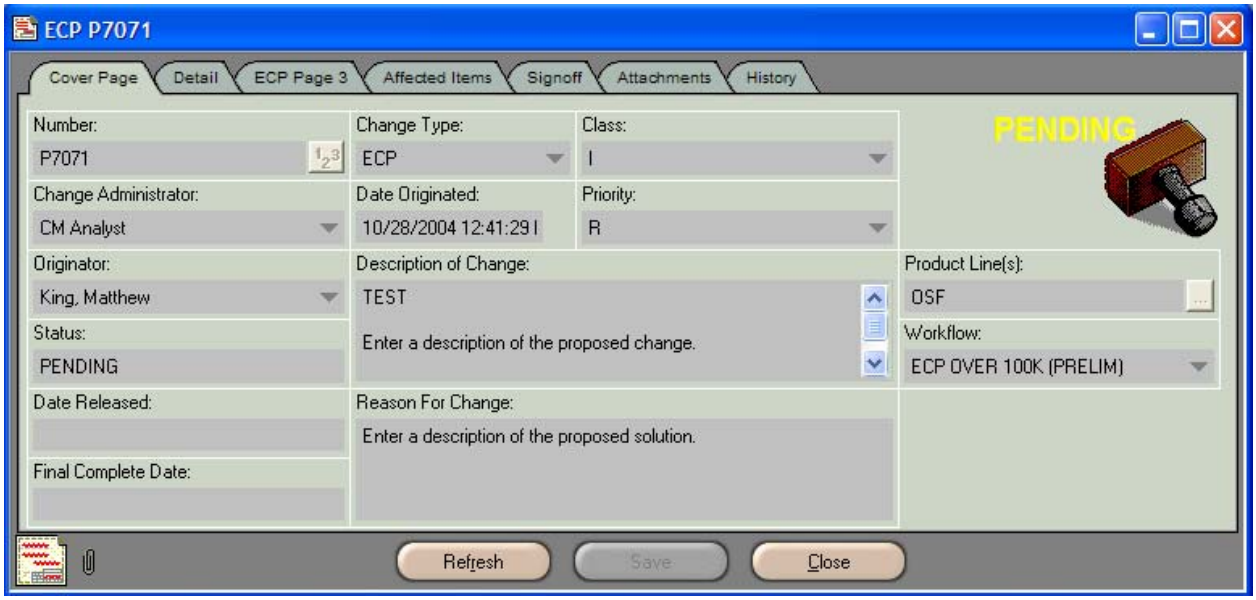
a. If the branch chief does not find the ECP ready for submission, he may reject the ECP by clicking the **Reject** button on the Agile toolbar.

b. The **Reject ECP Pxxxx** (ECP **P7071**) dialog box will appear. Enter the **reason for disapproval** in the Signoff Comments block and list all items in need of attention, e.g., attachments are missing, information is incorrect or incomplete, etc.



c. When all comments have been entered, type the password in the **Password** block and click the **Reject** button.

d. The ECP will automatically return to **Pending** status.



e. The project lead will receive an email notification from Agile stating the ECP has been returned to **Pending** status.

f. The project lead should make all necessary adjustments to the ECP.

g. Once the ECP has been reconciled and the changes have been made, the project lead will return the ECP to the review cycle. To accomplish this, perform **ECPs Over $100,000 (Preliminary) Routing for Project Team Review steps 2b through 2k** of this WPI.

h. When the ECP was returned to **Pending** status, Agile once again re-populated the Signoff tab. Therefore, all team members will be required to once again perform the **ECPs Over $100,000 (Preliminary) Project Team Review steps 3a through 3h** of this WPI and provide a review decision.

i. When all team members provide their approvals, the ECP will automatically move forward to **Branch Chief Review** status.

j. Since Agile re-populated the Signoff tab, the branch chief will be required to once again perform the **ECPs Over $100,000 (Preliminary) Branch Chief Review steps 5a through 5h** of this WPI and provide a review decision.

k. When the branch chief approves the ECP, it will automatically move forward to **Submitted** status.

l. Agile will send the project lead an email notification that the status of the ECP has been changed to **Submitted**.

7. Submitted ECPs

a. Agile will send an email notification to the CM Analyst that the ECP has been submitted.

b. The CM Analyst will review the ECP to ensure, as much as possible, the completeness and accuracy of the information provided.

c. If the ECP is complete (contains information in all required fields and all attachments have been included), the CM Analyst will advance the ECP to **ROC Review** status.

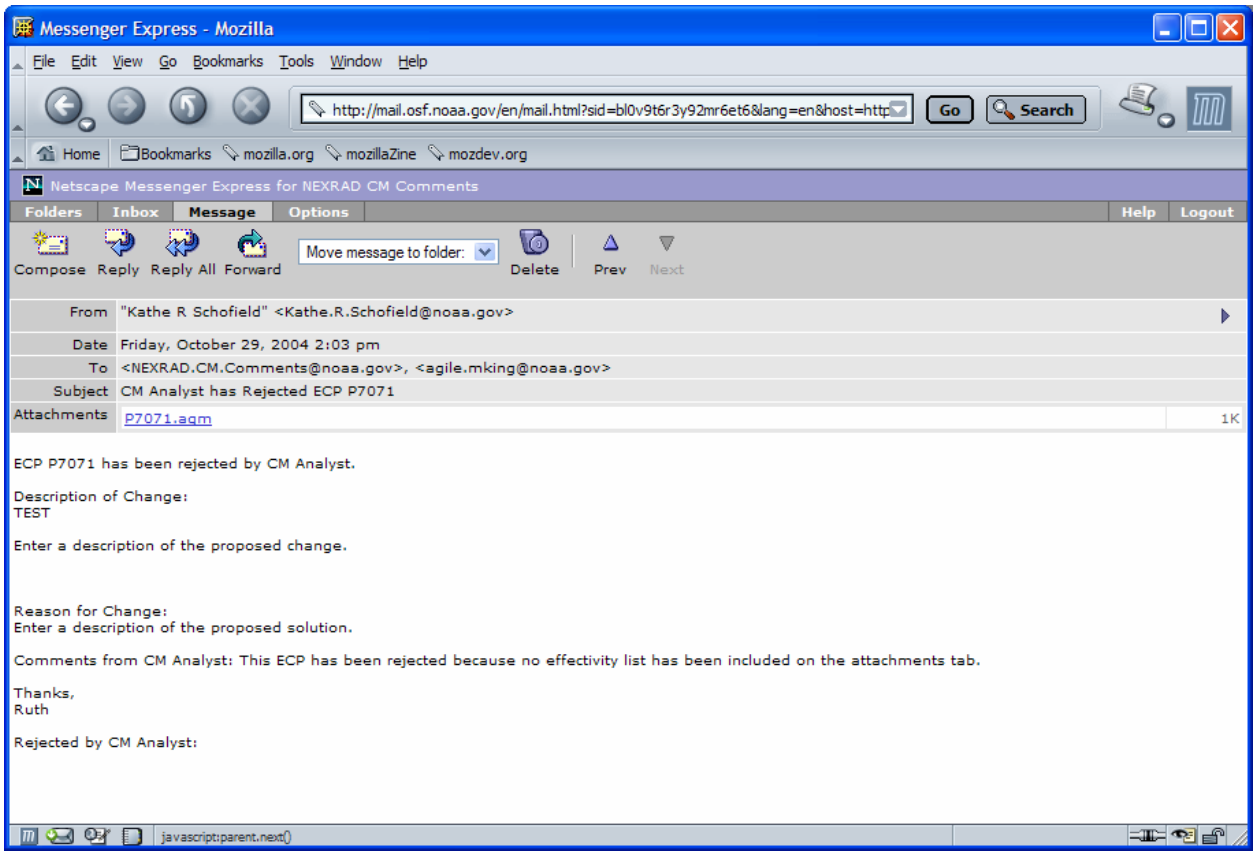
d. Agile will send the project lead an email notification that the status of the ECP has been changed to ROC Review. The email will state, "**ECP P7071 has been moved from SUBMITTED to ROC REVIEW for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only."** This is a "canned" message from Agile and one the ROC cannot alter.

e. The **ROC Review** process is explained in **ECPs Over $100,000 (Preliminary) Section 9** of this document.

f. However, if any of the three required attachments (**Attachment B** – Business Case; **Attachment E –** Rough Indication of Effectivity; **Attachment S –** Basic Development Schedule) are not included in the ECP, the ECP will be **disapproved**, thus returning it to **Pending** status. Instructions for handling rejected ECPs are described in **ECPs Over $100,000 (Preliminary) Section 8** of this document.

8. ECPs Rejected at Submitted Status

a. If the ECP is rejected by the CM Analyst, it will return to **Pending** status. Agile will send the originator an email notification of the rejection and status change.



b. The project lead should make all necessary adjustments to the ECP.

c. Once the ECP has been reconciled and the changes have been made, the project lead will return the ECP to the review cycle. To accomplish this, perform **ECPs Over $100,000 (Preliminary) Routing for Project Team Review steps 2b through 2k** of this WPI.

d. When the ECP was returned to **Pending** status, Agile once again re-populated the Signoff tab. Therefore, all team members will be required to once again perform the **ECPs Over $100,000 (Preliminary) Project Team Review**, **steps 3a through 3h** of this WPI, and provide a review decision.

e. When all team members provide their approvals, the ECP will automatically move forward to **Branch Chief Review** status.

f. Since Agile re-populated the Signoff tab, the branch chief will be required to once again perform the **ECPs Over $100,000 (Preliminary) Branch Chief Review**, **steps 5a through 5h** of this WPI, and provide a review decision.

d. When the branch chief approves the ECP, it will automatically move forward to **Submitted** status.

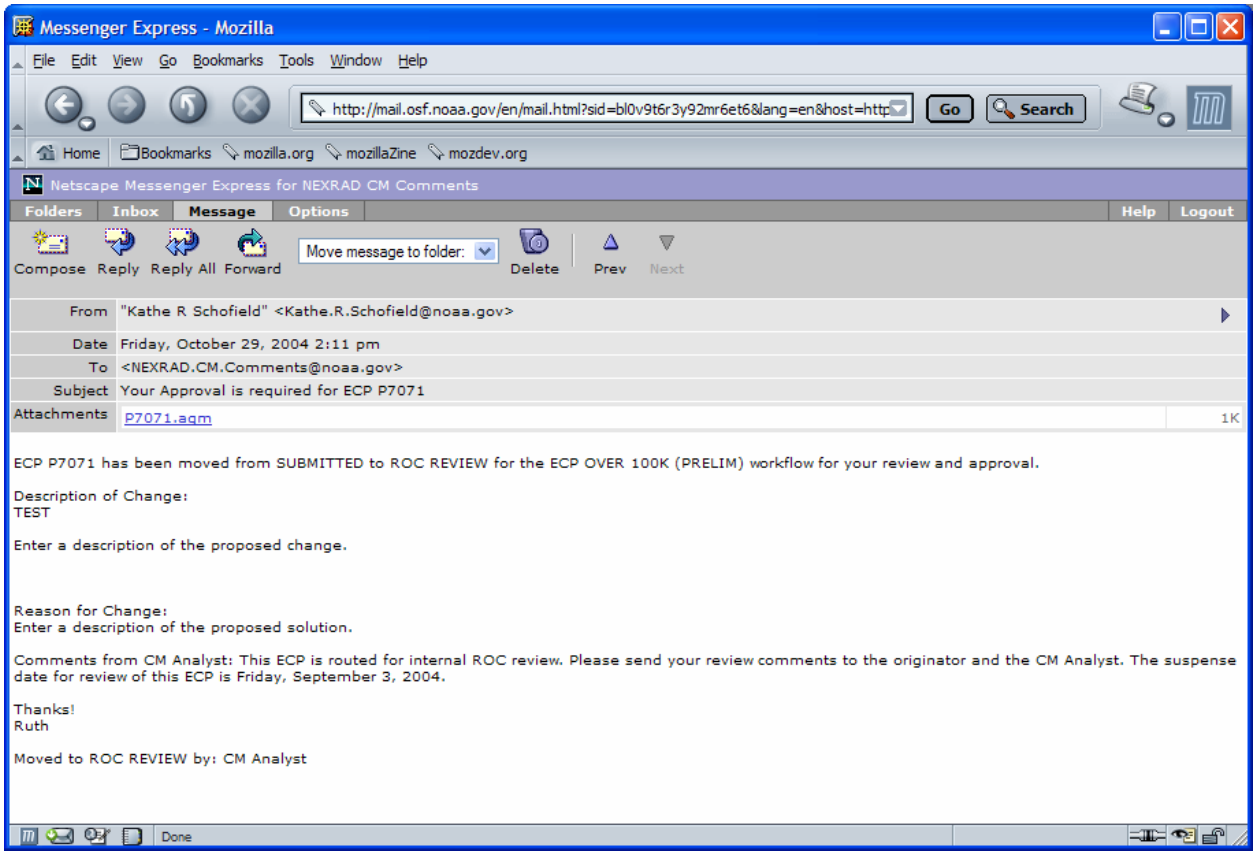
e. Agile will send the project lead an email notification that the status of the ECP has been changed to **Submitted**.

f. When the ECP has once again been submitted, the CM Analyst will perform the **ECPs Over $100,000 (Preliminary) Submitted review steps 7a through 7c** of this WPI and provide a review decision. When the CM Analyst approves the ECP, it will be routed for **ROC Review**.

9. ROC Review

a. The WSR-88D Configuration Control Board (**CCB**) has approval authority for ECPs with a cost between $100,000 and $1,000,000. However, it is understood that the ROC is the technical authority for the WSR-88D system. Therefore, all ECPs, no matter the costing threshold, are reviewed for technical accuracy by ROC personnel. ECPs in the **ECPs Over 100K (PRELIM)** workflow will be routed to TRC members for review.

b. Agile will send each TRC member an email notification of the ECP requiring his review.



c. When the TRC member receives the ECP for review, he will have **10 days** to provide **approval** or **disapproval** of the ECP. Agile automatically monitors this process and notifies the CM Analyst when the review cycle has ended.

Please Note: If the ECP has not advanced to TRC status by the end of the **10-day** review cycle, Agile escalates the ECP to the CM Team Lead for action.

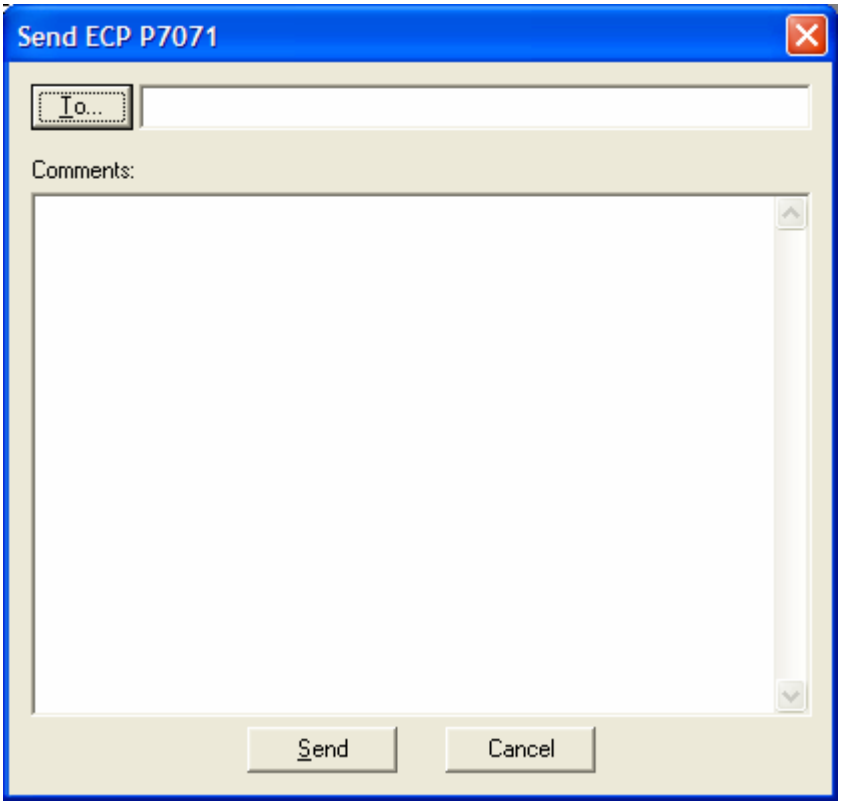
d. To review the ECP, click on the Agile document link (**P7071.agm**) in the email notification, which will launch Agile.

e. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

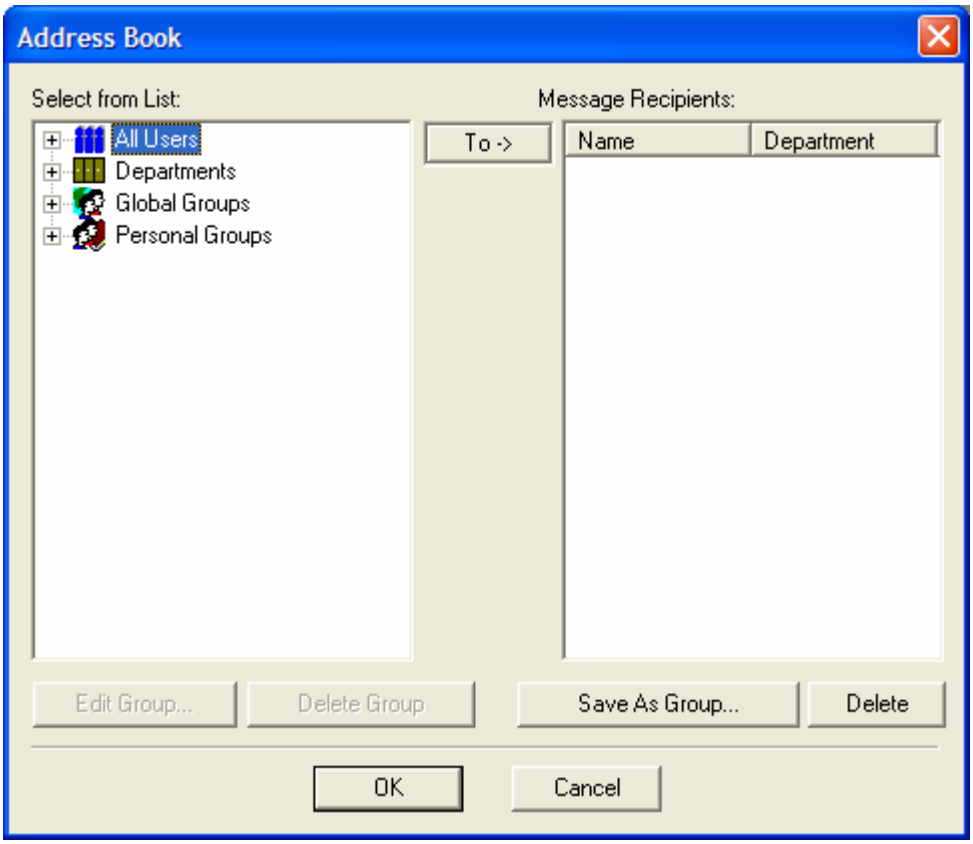
f. The ECP to be reviewed (ECP **P7071**) will be displayed.

g. Review the ECP to ensure that it's complete - all information is correct and it contains all required attachments. To approve the ECP, click the **Send** button located on the Agile toolbar.

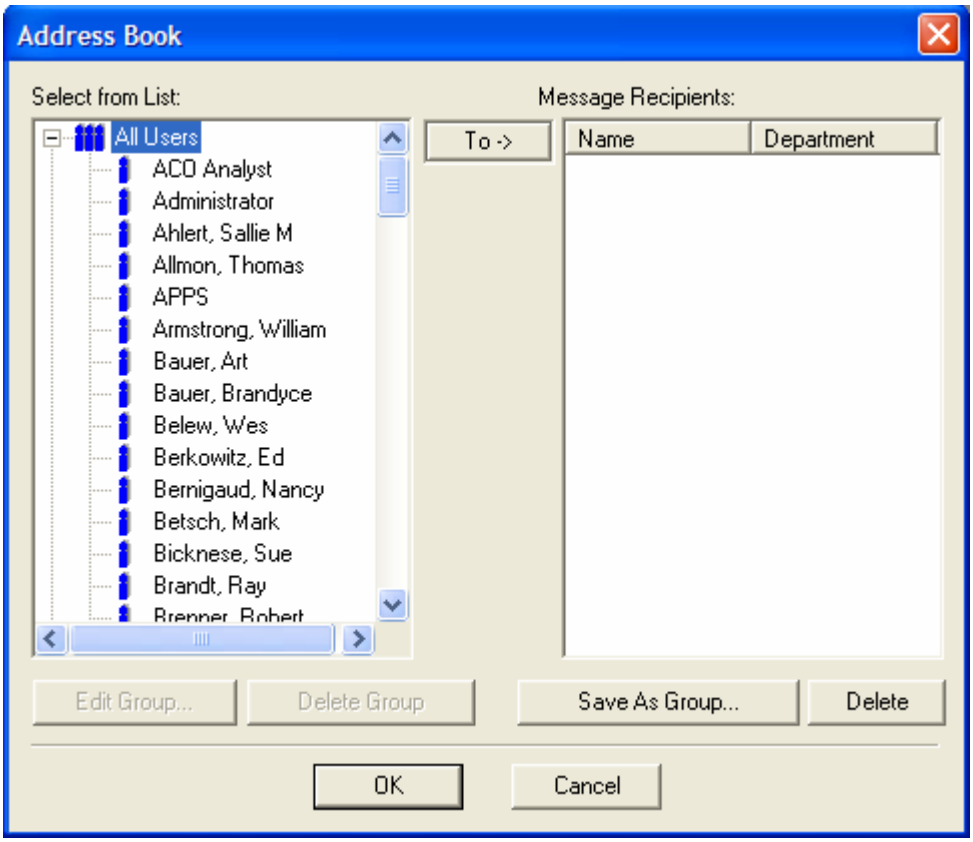
h. The **Send ECP Pxxxx** (ECP **P7071**) dialog box will be displayed.



i. Click the **To** button on the **Send ECP P7071** dialog box to reveal the **Agile Address Book**.

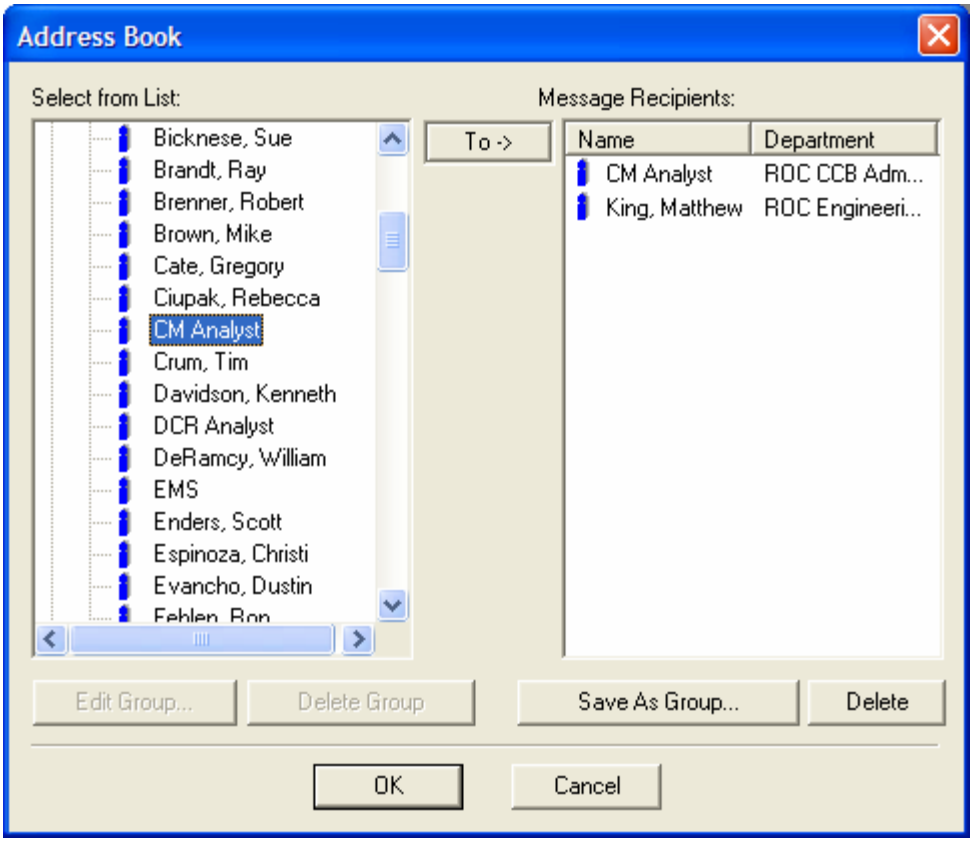


j. Click on the **plus sign** (+) located to the left of **All Users**. This will expand the All Users node.



k. To select addressees, double click the **name** of each person who is to receive approval notification. This will move the addressees' names to the **Message Recipients** window on the right-hand side of the Address Book.

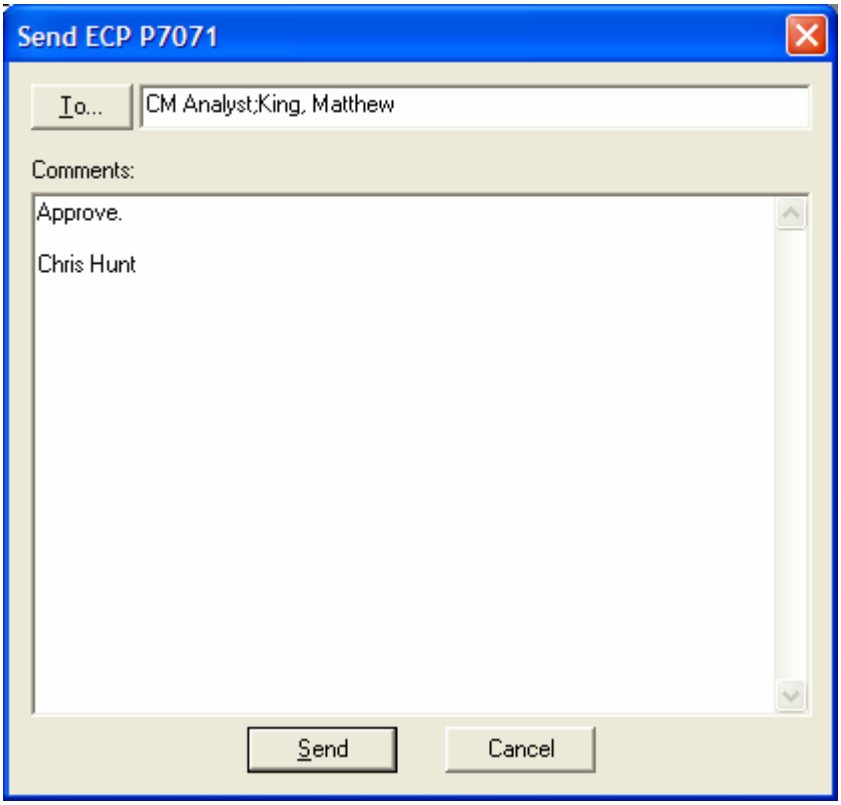
Please note: The **originator** of the ECP and the **CM Analyst** must always be selected.



l. Once all addressees have been added, click the **OK** button at the bottom of the Address Book.

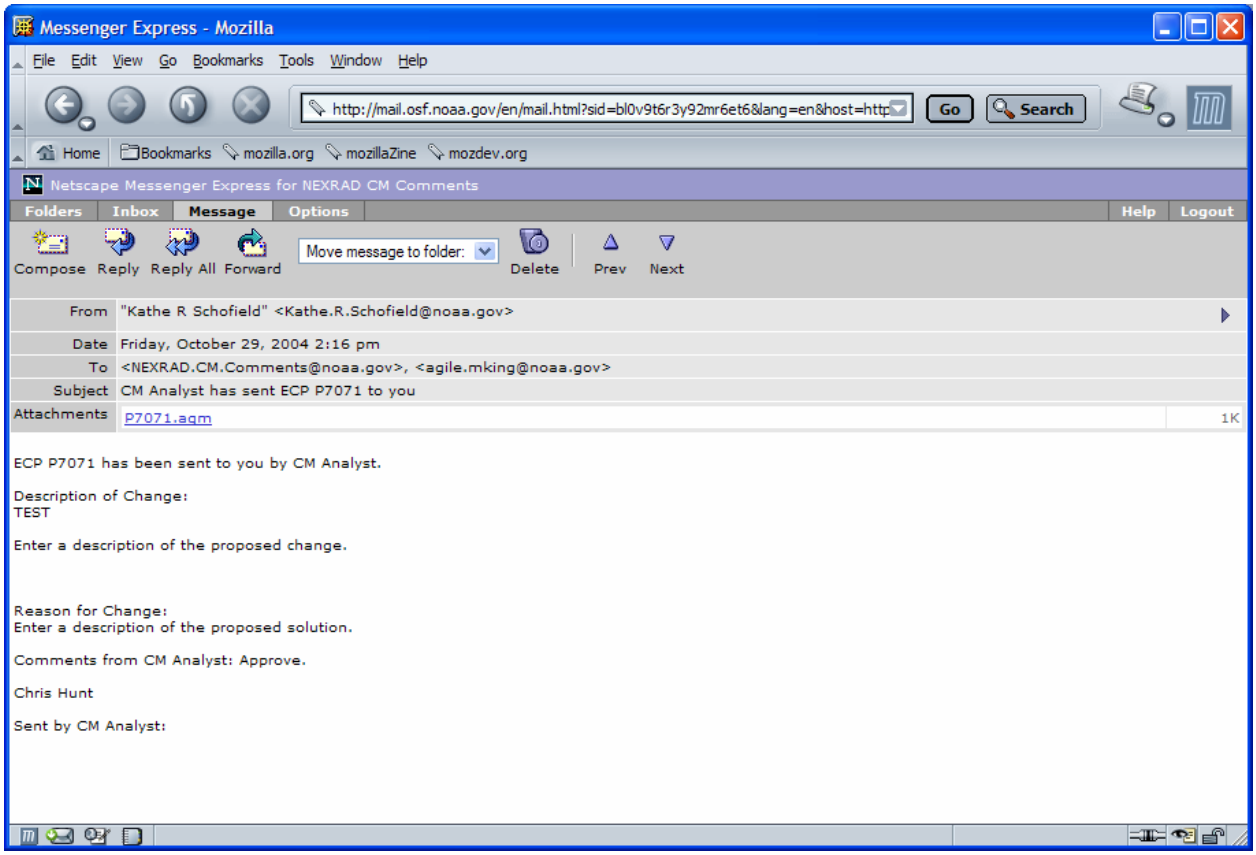
m. The **Send ECP Pxxxx** (ECP **P7071**) will appear with all addressees displayed.

n. Enter review comments/approval recommendation in the **Comments** block on the **Send ECP P7071** dialog box.



o. Click the **Send** button located at the bottom of the **Send ECP P7071** dialog box.

p. Each addressee will receive an email notification containing the review comments.



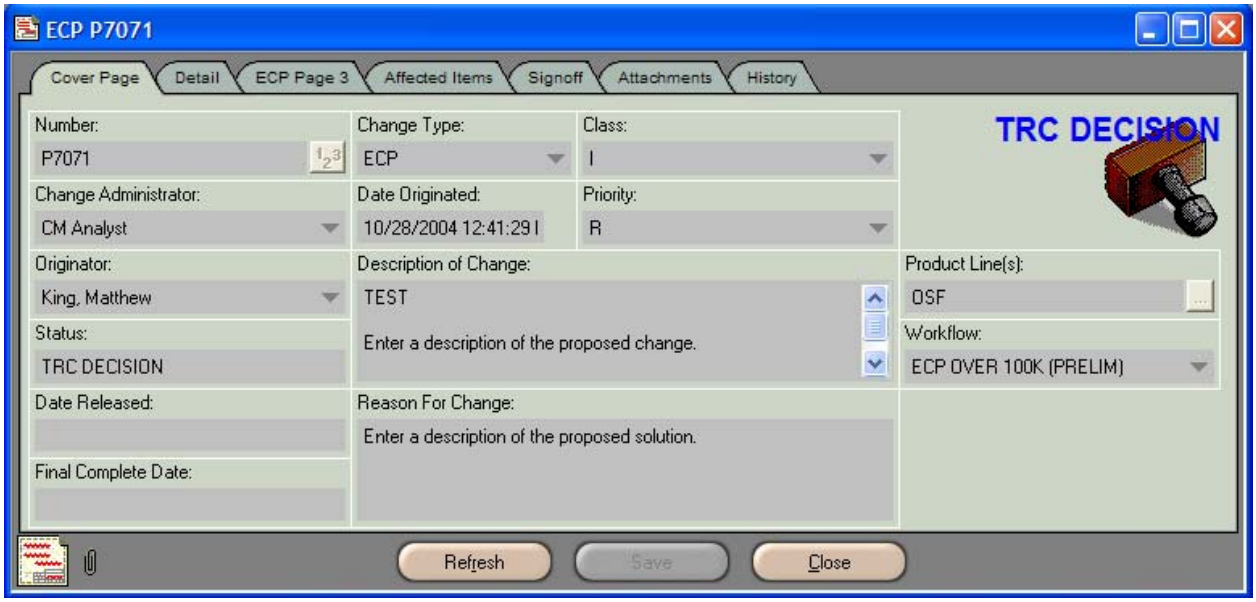
q. At the conclusion of the ECP's review cycle, the CM Analyst will advance the ECP to **TRC** status. Agile will send the project lead an email notification of the status change. The email will state, "**ECP P7071 has been moved from ROC REVIEW to TRC for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only**." This is a "canned" message from Agile and one the ROC cannot alter.

r. If dissenting comments are received, the ECP will not move into a hold status. Instead, it will be adjudicated at the TRC meeting.

10. TRC

a. Once the ECP has completed its ROC review cycle, the ECP will move to **TRC** status and remain in this status until it is presented to the TRC at the next scheduled TRC meeting. Agile automatically monitors the length of time the ECP remains at TRC status and notifies the CM Analyst when the allotted amount of time for an ECP in TRC status has expired.

Please Note: If the ECP has not moved from TRC status by the end of the **40-day** allotted time period, Agile escalates the ECP to the CM Team Lead for action.

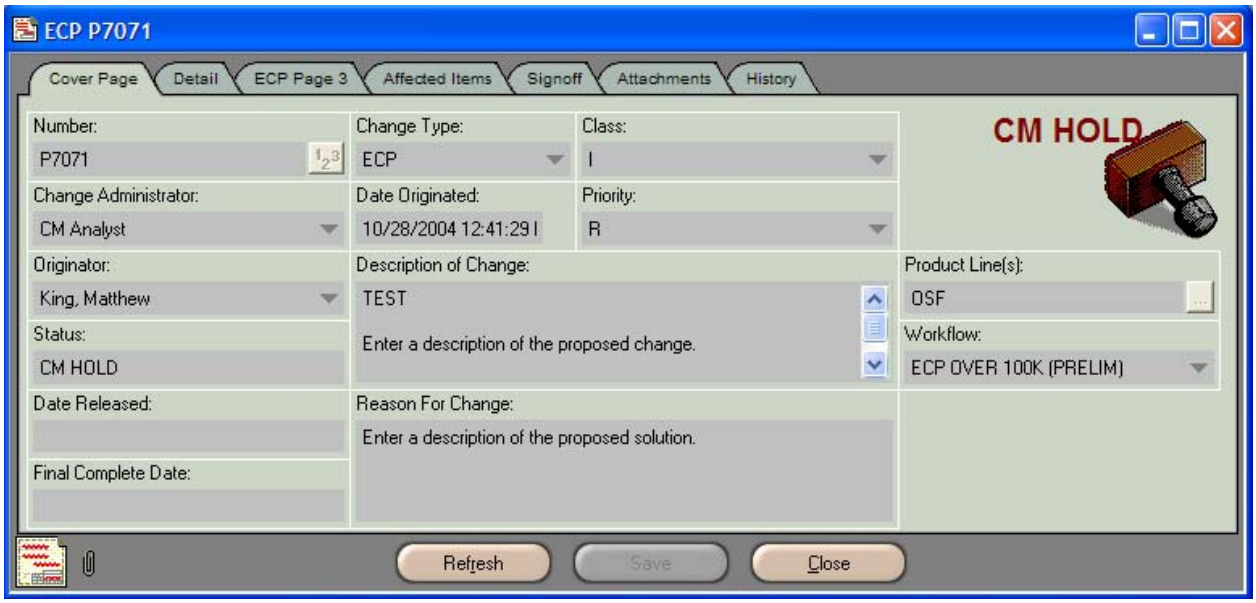


b. When presented to the TRC, if the ECP has no dissenting comments and all TRC members agree, the ECP will be approved for advancement to **Agency Review** status. At the time the TRC agrees the ECP can be sent for **Agency Review**, it must also determine if the ECP will move forward as is, in its **Preliminary** state, or if it is complete and can be routed as a **Formal** ECP. The process for a Preliminary ECP moving forward to Agency Review is explained in **ECPs Over $100,000 (Preliminary) Section 12** of this document. An ECP moving forward as a Formal ECP to Agency Review will follow the process explained in **ECPs Over $100,000 (Formal) Section 12** of this WPI.

c. However, if there are dissenting review comments that cannot be resolved during the TRC meeting, the CM Analyst will move the ECP to **CM Hold – Mediate –** status. Instructions for handling ECPs in CM Hold – Mediate **–** status are explained in **ECPs Over $100,000 (Preliminary) Section 11** of this document.

11. CM Hold – Mediate -

a. If an ECP with dissenting comments cannot be resolved during the TRC meeting, the ECP is placed in **CM Hold – Mediate –** status. In this status, the CM Analyst will work with the originator and the party that provided the dissenting comments in an effort to bring the parties to a mutual agreement concerning the ECP. This may require the originator to gather additional data, make adjustments to the ECP, etc.



b. When the ECP moves into CM Hold – Mediate - status, the CM Analyst will have **30 days** to reconcile the dispute concerning the ECP. Agile automatically monitors this process and notifies the CM Analyst when the review cycle has ended.

Please Note: If the ECP has not advanced from CM Hold – Mediate - status by the end of the **30 days**, Agile escalates the ECP to the CM Team Lead for action.

c. Agile will automatically send the originator email notification that the ECP has entered **CM Hold – Mediate –** status. The email will state, "**ECP P7071 has been moved from TRC to CM HOLD for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only."** This is a "canned" message from Agile and cannot be altered by the ROC.

d. Once an agreement has been reached, the CM Analyst will move the ECP from **CM Hold – Mediate –** status and re-introduce it back into the workflow. The ECP can be placed anywhere in the workflow depending on the outcome of the mediation. For example, if the agreement calls for the originator to provide a more detailed description of the proposed solution, the ECP would be returned to **Pending** status to allow the project lead to add the required information. Or, if the agreement was to provide answers to review questions that had not been addressed

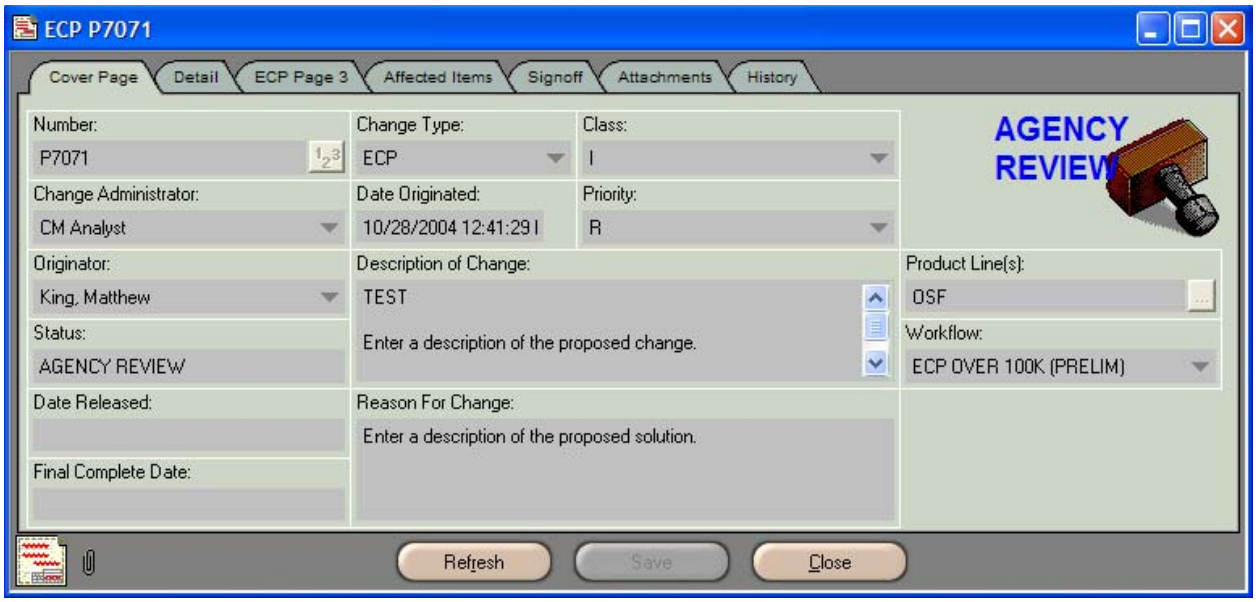
during the review cycle or the TRC meeting, the ECP could be returned to **TRC** status following receipt of the necessary answers.

e. When the terms of agreement have been fulfilled and the ECP is ready to be returned to the workflow, the originator is to notify the CM Analyst who will provide processing instructions for the originator. It is very important that the originator follow these instructions, as they will explain how to move the ECP forward in the timeliest manner and avoid unnecessary delays. The CM Analyst's instructions will be included in the Comments section of the email message.

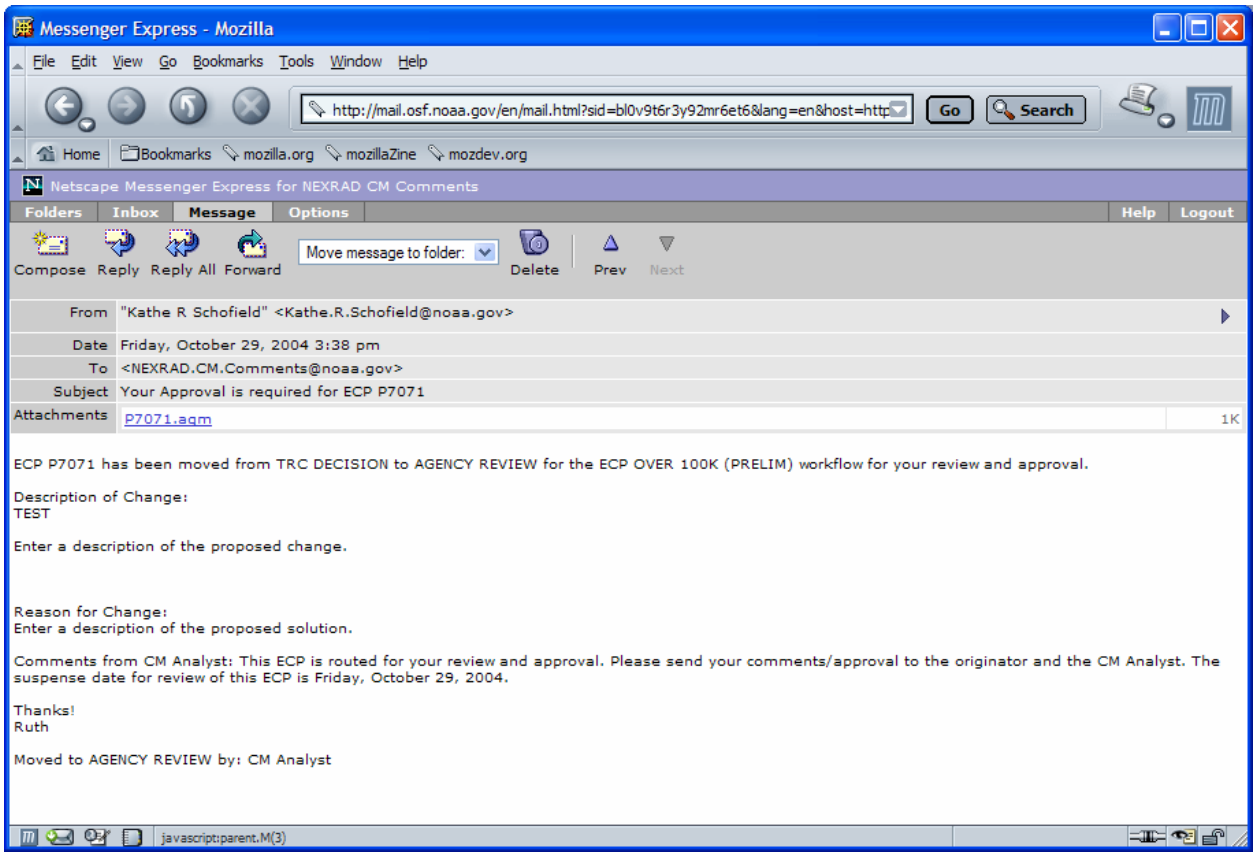
f. Once the ECP is returned to the workflow, it will move forward following the regular steps of the workflow.

12. Agency Review

a. With the TRC's approval, the CM Analyst will route the ECP for **Agency Review**. The WSR-88D Configuration Control Board (**CCB**), consisting of the three agency points of contact and the ROC Director, has approval authority for ECPs with a cost between $100,000 and $1,000,000.



b. When the ECP is routed, Agile will send each CCB member an email notification of the ECP requiring his review.

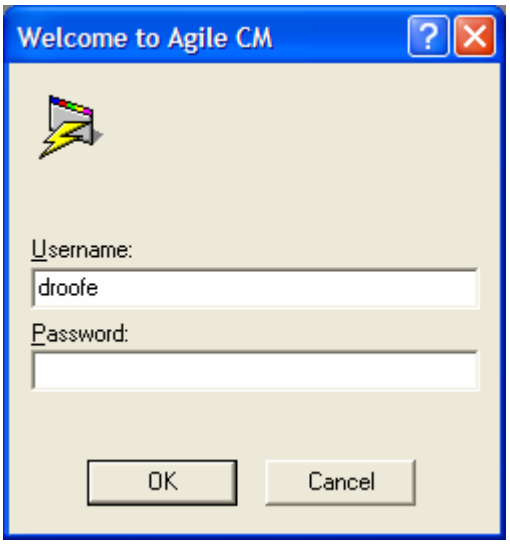


c. When the agency POC receives the ECP for review, he will have **21 days** to provide approval or disapproval of the ECP. Agile automatically monitors this process. If the POC has not provided a decision within **20 days**, he will receive an email reminder from Agile.

Please Note: If a decision is not received by the end of the 21-day review cycle, Agile escalates the ECP to the CM Team Lead for action.

d. To review the ECP, click on the Agile document link (**P7071.agm**) in the email notification, which will launch Agile.

e. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

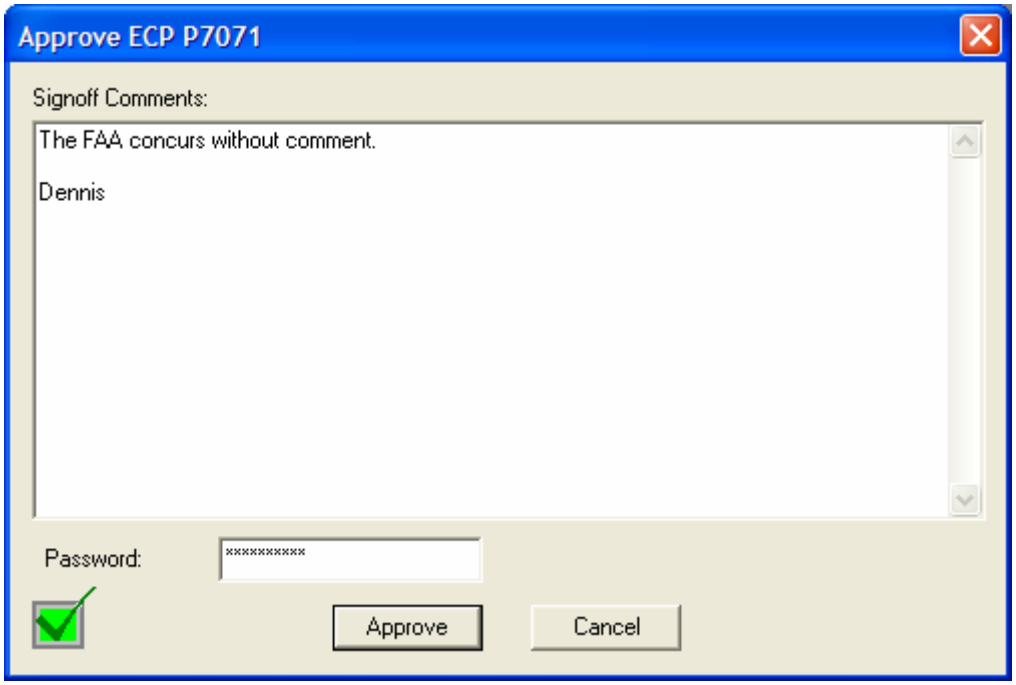


f. The ECP to be reviewed (ECP **P7071**) will be displayed.

g. Review the ECP.

h. To approve the ECP, the agency POC will click the **Approve** button located on the Agile toolbar.

i. The **Approve ECP Pxxxx** (ECP **P7071**) dialog box will be displayed. Enter any review **comments/approval** in the Signoff Comments block, then enter the **password** in the Password block and click **Approve**.



j. Following the approval of the last reviewer, the project lead will receive an email notification when the CM Analyst approves the ECP. The email will state, "**ECP P7071 has been moved from AGENCY REVIEW to CCB for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only**." This is a canned statement from Agile and one the ROC cannot alter.

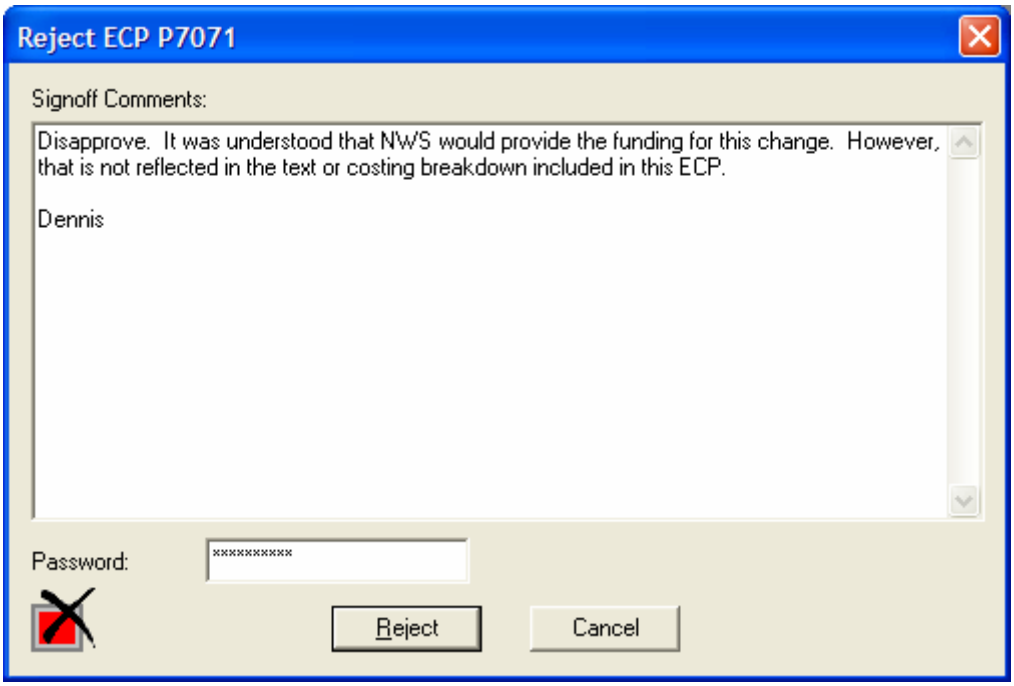
k. At this time the ECP will advance to **CCB** status. The CCB process is explained in **ECPs Over $100,000 (Preliminary) Section 14** of this WPI.

l. If the agency POCs do not approve the ECP, the ECP can be rejected. Instructions for disapproval and the process for handling rejected ECPs are described in **ECPs Over $100,000 (Preliminary) Section 13** of this document.

13. ECPs Rejected at Agency Review Status

a. If the agency POC does not approve the ECP, he may reject it by clicking the **Reject** button on the Agile toolbar.

b. The **Reject ECP Pxxxx** (ECP **P7071**) dialog box will appear. Enter the **reason for disapproval** in the Signoff Comments block and list all items in need of attention, e.g., attachments are missing, information is incorrect or incomplete, etc.



c. When all comments have been entered, type the **password** in the Password block and click the **Reject** button.

d. If any agency POCs disapprove the ECP, it will automatically move to **CM Hold – Mediate -** status.

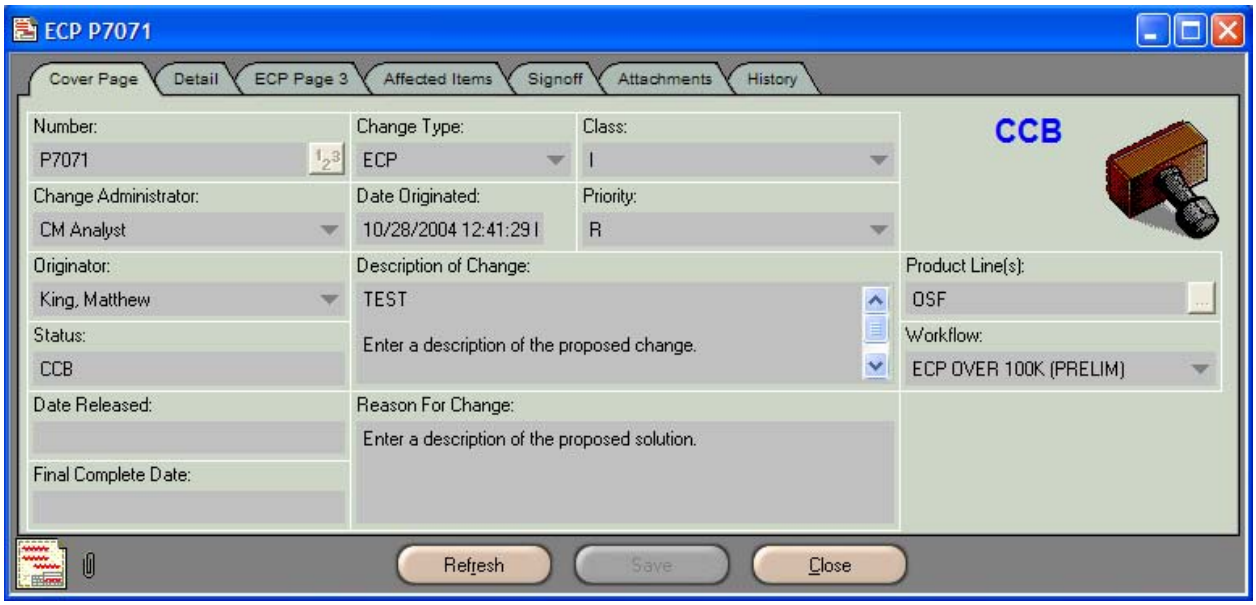
e. Agile will automatically send the originator email notification that the ECP has entered **CM Hold – Mediate –** status. The email will state, "**ECP P7071 has been moved from AGENCY REVIEW to CM HOLD for the ECP OVER 100K (PRELIM) workflow for approval. No action is required. This is for your information only."** This is a "canned" message from Agile and cannot be altered by the ROC.

Please Note: Instructions for handling ECPs in CM Hold – Mediate **–** status are explained in **ECPs Over $100,000 (Preliminary) Section 11** of this document.

14. CCB

a. Once the ECP has moved to **CCB** status it will remain in this status until it is presented to the CCB at the next scheduled CCB meeting. Agile automatically monitors the length of time the ECP remains at CCB status and notifies the CM Analyst when the allotted amount of time for an ECP in CCB status has expired.

Please Note: If the ECP has not moved from CCB status by the end of the **40-day** allotted time period, Agile escalates the ECP to the CM Team Lead for action.

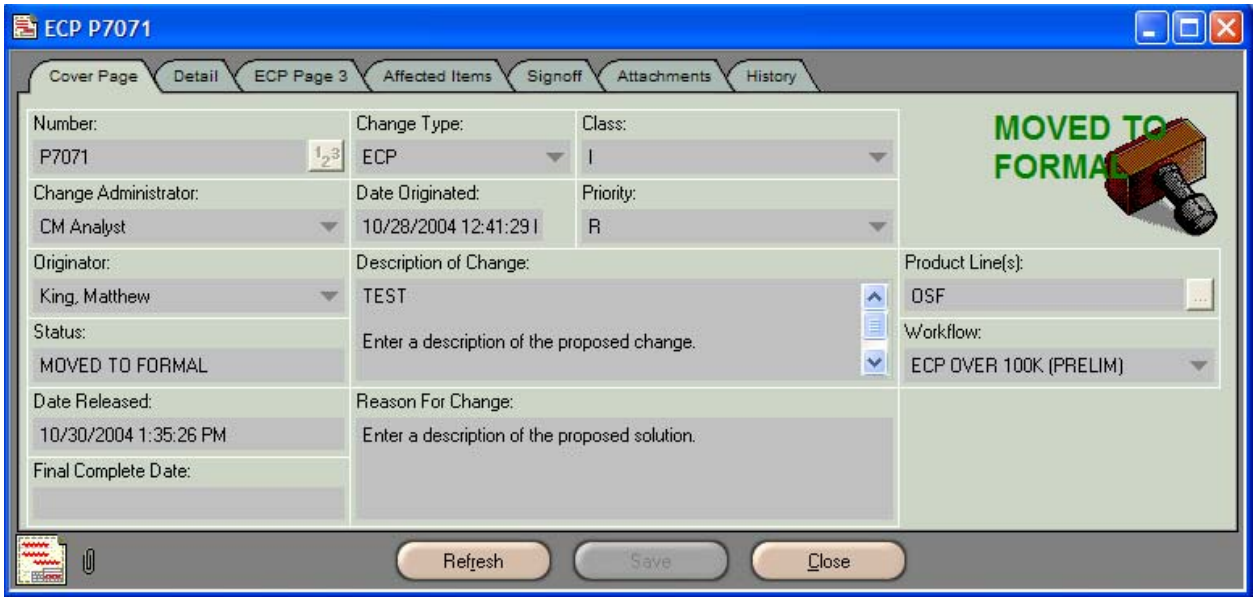


b. When presented to the CCB, if the ECP receives no dissenting comments and all CCB members agree, the Preliminary ECP will be approved and advanced to **Moved to Formal** status. The Moved to Formal process is explained in **ECPs Over $100,000 (Preliminary) Section 15** of this document.

c. If an agency POC provides dissenting comments or disapproves the ECP during the CCB meeting, the ECP will be moved to **CM Hold – Mediate –** status. Instructions for handling ECPs in CM Hold – Mediate **–** status are explained in **ECPs Over $100,000 (Preliminary) Section 11** of this document.

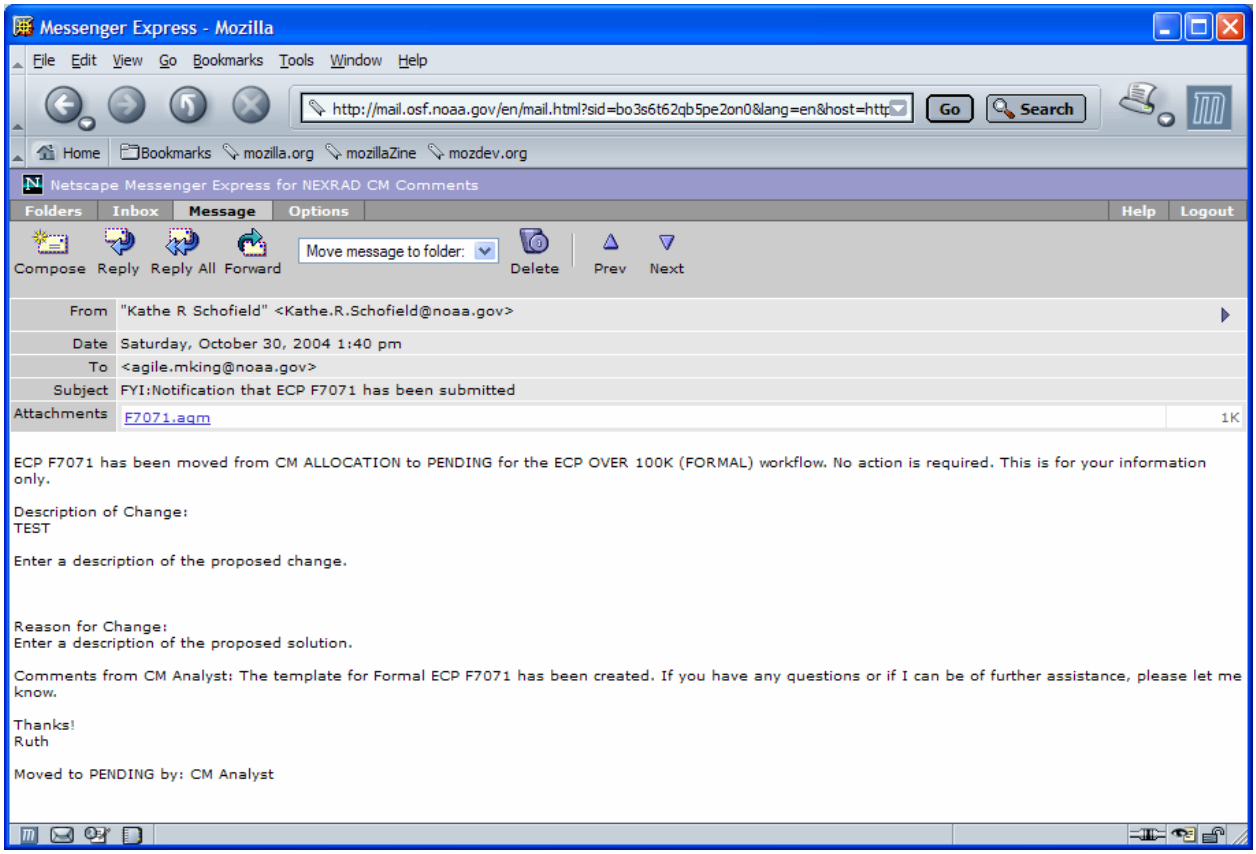
15. Moved to Formal

a. **Moved to Formal** is the final status for Preliminary ECPs. From the Moved to Formal status, the CM Analyst will perform a "save as" function in Agile and save the ECP as a Formal ECP. The ECP number will then become **Fxxxx (F7071)**.



b. The CM Analyst will then move Formal ECP forward to **CM Allocation** status.

c. In CM Allocation status, the CM Analyst will assign project team and branch chief reviewers. Then, the CM Analyst will advance the ECP to **Pending** status and send an email notification to the originator (project lead) that the Formal ECP (**F7071**) has been produced.



ECP Workflow – ECPs Over $100,000 (Formal)

1. Pending

a. The project lead will receive the Formal ECP in Pending status. All work to formalize the ECP will be performed while the ECP is in this status.

b. The project lead should begin the process of formalizing his ECP process with a **team meeting**. (The project team members will have been listed on the Detail tab of the ECP.) During Pending status, the project lead must conduct at least one team meeting.

c. During the team meeting, the team members are to provide finalized information required to populate the ECP, such as final costing, scheduling, kit information, etc.

Populating the Formal ECP

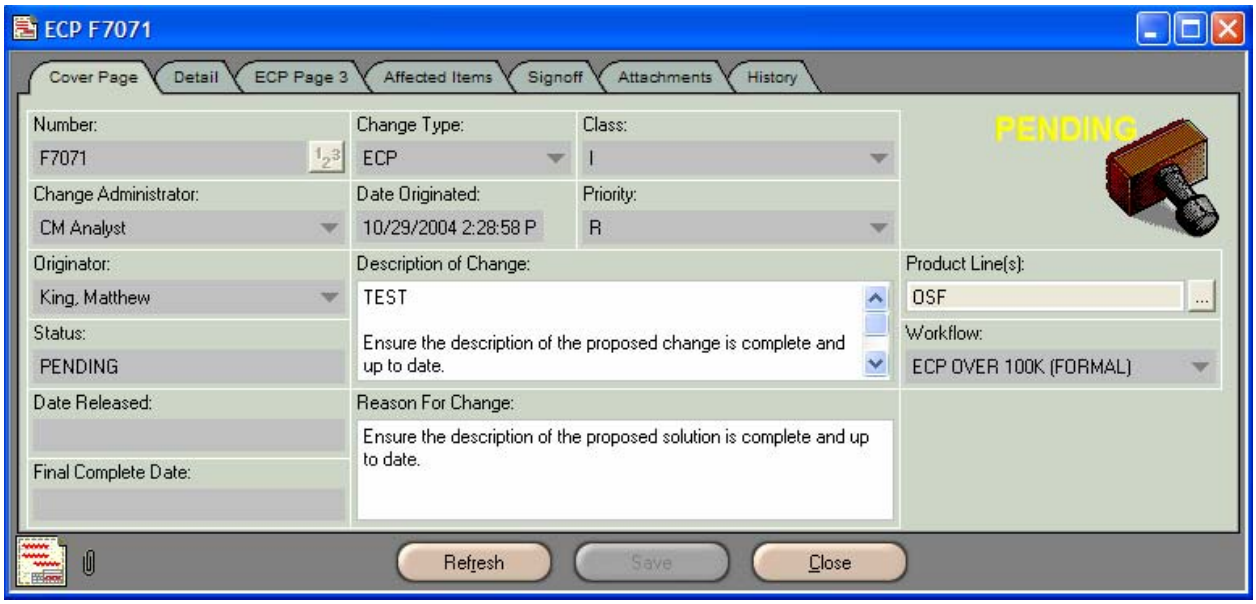
A. Cover Page

Update/complete the following blocks on the Cover Page of the ECP:

Description of Change:

If there has been an alteration in the proposed change since the Preliminary ECP was submitted, such as the problem has been discovered at additional sites or the problem involves more equipment than originally described, update the **description** of the proposed change. The description should fully identify the affected portion of the system and the problem in question.

Note: Many of the blocks on the Agile ECP form have limited character lengths, thus limiting the amount of data that can be entered. Therefore, an attachment must be used to include all necessary information in the ECP. **Attachment A** is used for this purpose. The template for Attachment A can be found on the Attachments tab of this WPI and an example of the template has been included in **Appendix C** of this document.



Reason For Change:

If there has been a change in the **proposed solution** since the Preliminary ECP was submitted, update the information in this block in sufficient detail to properly describe what will be accomplished by the project.

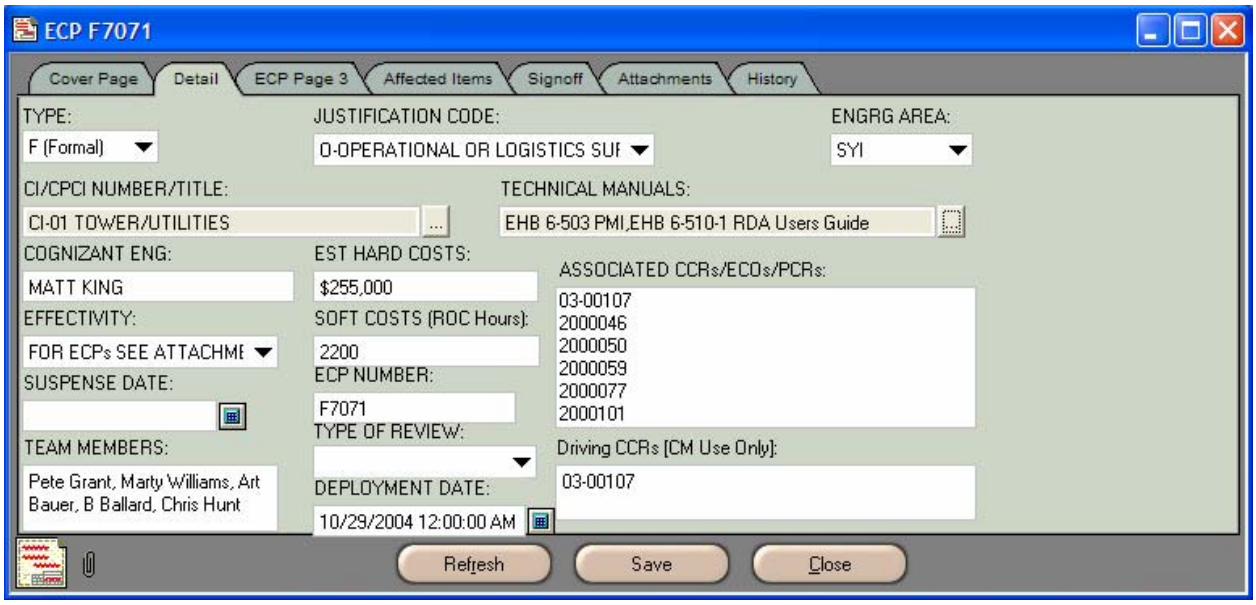
B. Detail Tab

Update/complete the following blocks on the Detail Tab:

Justification Code:

Update the the Justification Code if necessary.

Interface – To eliminate incompatibility between CIs.
Compatibility – Proposed change is necessary to make the system/item work.
Deficiency – Eliminate a deficiency (use if more descriptive code doesn't apply.)
Operational or Logistics Support – Make a significant change in operational capability or logistic support. (Commonly known as an improvement change.)
Production Stoppage – To prevent slippage in an approved production schedule.
Cost Reduction – To provide net total like cycle cost savings to the Government.
Safety – To correct a hazardous condition.
Value Engineering – For a net life cycle cost reduction.



CI/CPCI Number/Title:

Update this field if there have been changes in any CIs or CPCIs to be affected by this proposed change. All CIs and CPCIs are listed in **Appendix B** of this document.

Technical Manuals:

Update the **Technical Manual** block if necessary. All Technical Manuals are listed in **Appendix B** of this document.

Estimated Hard Costs:

Most likely the **Estimated hard costs** (procurements, travel, printing, field labor, shipping, media, credit card purchases, etc.) for the project have changed since the Preliminary ECP was produced. Calculate any new costing and attach it to the Attachments tab of the ECP as **Attachment C**. An example of the template has been included in **Appendix E** of this document. The Microsoft Excel template for Attachment C can be found on the Attachments tab of this WPI in Agile.

Associated CCRs/ECOs/PCRs:

List all **CCRs**, **ECOs** and **PCRs** to be implemented by the project. It is *very important* to list all ECOs here, as they will not be listed on the Affected Items tab.

Effectivity:

Select "**FOR ECPs SEE ATTACHMENT M**" from the **Effectivity** drop-down list. List the final effectivity in **Attachment M** and attached to the Attachments tab of the Agile ECP. Enter **N/A** in any blocks listed in Attachment M that are not applicable to the ECP. An example of the template has been included in **Appendix F** of this document. The template for Attachment M can be found on the Attachments tab of this WPI in Agile.

Soft Costs (ROC Hours):

Obtain from each team member an estimated final number of staff hours he or she will spend on the project. Enter each estimate in the **Soft Costs** table included as part of **Attachment C**, and enter the team's **total hours** in the Soft Costs block on the **Detail tab** of the ECP. An example of the template has been included in **Appendix E** of this document. The template for Attachment C can be found on the Attachments tab of this WPI in Agile.

Please Note: The Time Management System (**TMS**) database is an additional source from which to obtain the number of hours team members have spent on the project. Instructions for using TMS to obtain this information can be found in **Appendix A** of this WPI.

Deployment Date:

To display the Deployment Date calendar, click the calendar button located on the right hand side of the Deployment Date block. Select the ECP's **estimated date of deployment**.

A MicroSoft Project **schedule** is required for each ECP and should be attached to the Attachments tab as **Attachment S**. An example of the Attachment S template has been included in **Appendix G** of this document. The MS Project template for Attachment S can be found on the Attachments tab of this WPI in Agile.

Please Note: The **Suspense Date** and **Type of Review** blocks will be completed by the CM Analyst when the ECP is routed for review. However, the Suspense Date and Type of Review blocks may be completed by the project lead to reflect the 7-day project team review period, if he so chooses.

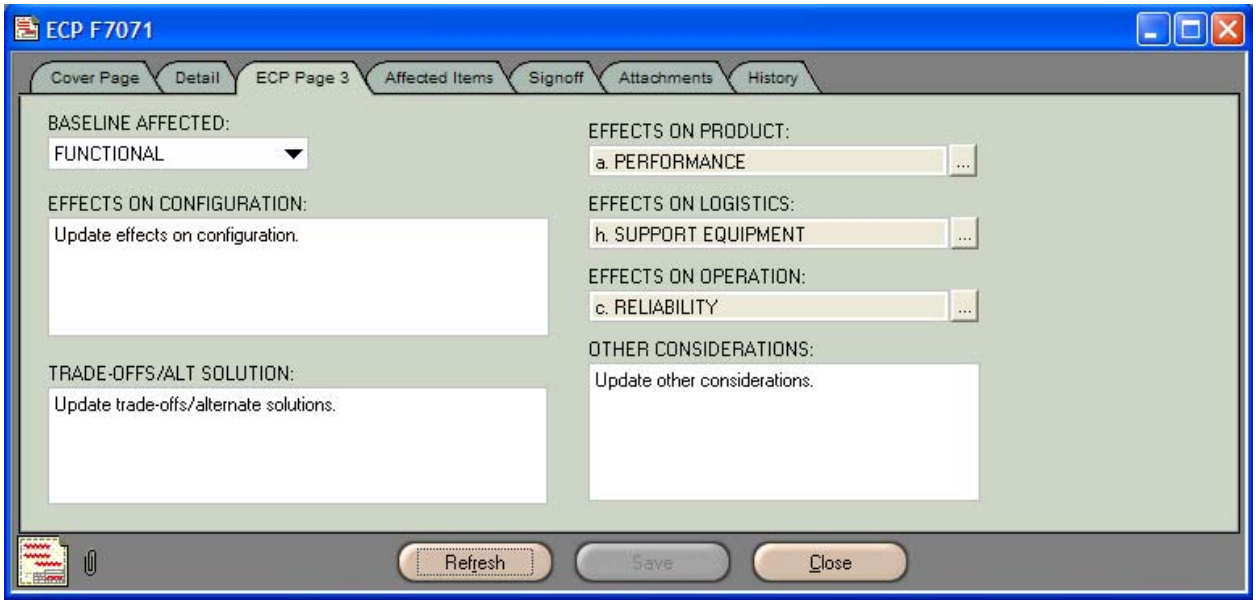
C. ECP Page 3

Complete the following blocks on the ECP Page 3 tab:

Baseline Affected:

Update the **Baseline Affected** block if necessary.

Functional
Allocated
Product



Effects on Product:

Update the **Effects On Product** block if necessary.

Performance
Weight-Balance-Stability (Aircraft)
Weight-Moment (Other Equipment)
CDRL, Technical Data
Nomenclature

Explain the effects of each in **Attachment A**.

Effects On Configuration:

Update the **Effects On Configuration** if necessary.

Please Note: Many of the blocks on the Agile ECP form have limited character lengths, thus limiting the amount of data that can be entered. Therefore, an attachment must be used to include all necessary information in the ECP. **Attachment A** is used for this purpose. The template for Attachment A can be found on the Attachments tab of this WPI and an example of the template has been included in **Appendix C** of this document.

Effects on Logistics:

Update the **Effects on Logistics** if necessary.

ILS Plans
Maintenance Concept, Plans and Procedures
Logistics Support Analyses
Interim Support Programs
Spares and Repair Parts
Tech Manuals/Programming Tapes
Facilities
Support Equipment
Operator Training
Operator Training Equipment
Maintenance Training
Maintenance Training Equipment
Contract Maintenance
Packaging Handling, Storage, Transportability

Explain these effects in **Attachment A** if they are not covered in the modification/retrofit plan (**Attachment M**), which is the usual source for this type of information.

Effects on Operation:

Select all applicable effects from the **Effects on Operation** drop-down list:

Safety
Survivability (includes nuclear survivability)
Reliability
Maintainability
Service Life
Operation Procedures
Electromagnetic Interference
Activation Schedule
Critical Single Point Failure Items
Interoperability

Explain the effects of each in **Attachment A**. Quantitative values are required when reliability and service life are impacted.

Trade-offs/Alternate Solution:

Provide a summary of the various solutions considered with an analysis showing the reasons for adopting the solution proposed by the ECP. Use **Attachment A** to include additional details.

Other Considerations:

Explain other considerations in this block. Below are examples of possible effects. Use **Attachment A** to include additional details.

- Interfaces having an effect on adjacent or related items (output, input, size, mating connections, etc.)
- Physical constraints, i.e., removal or repositioning of items, structural rework, increase or decrease in overall dimensions.
- Software (other than operational, maintenance, and training software) requiring a change to existing code and/or resources, or addition of new software.
- Government Furnished Data (GFD) changed, modified or now obsolete.
- Rework required on other equipment not previously included, which will effect the existing operational configuration.
- Additional or modified system test procedures.
- Any changes affecting existing warranties or guarantees.
- Changes or updates to the parts control program.
- Effects on life cycle cost projections for the configuration item or program.

D. Affected Items Tab

No items are to be added to the Affected Items tab!

All affected items should be documented on separate ECOs and listed on the Detail tab of the ECP. The ECO process is explained in Agile Work Practice Instructions **WPI0010**.

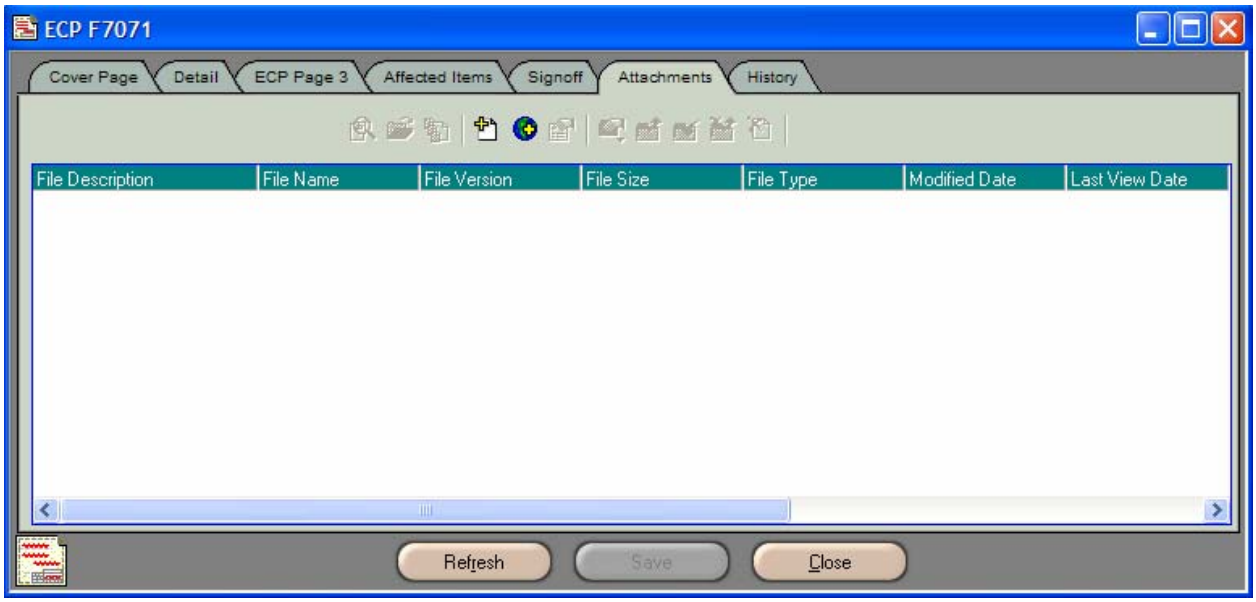
E. Signoff Tab

The Signoff tab is populated by the CM Analyst and the Agile workflow.

F. Attachments Tab

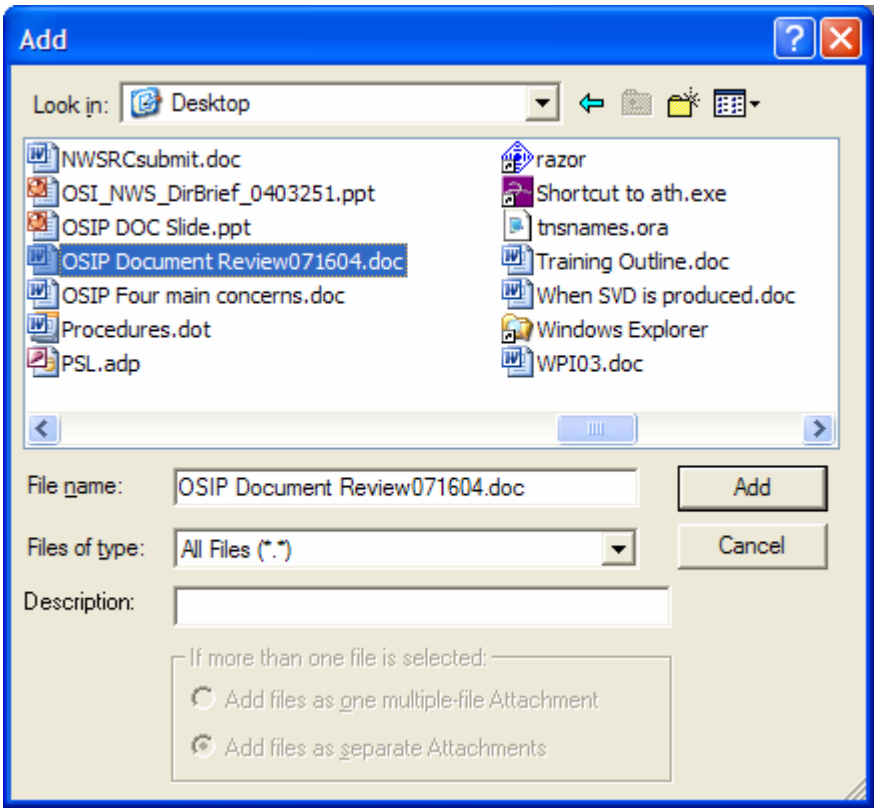
ECP attachments will vary from ECP to ECP; however, the Attachments tab is to contain all documentation needed to clarify the proposed change. **ALL** Formal ECPs must contain **costing**, **schedule**, and **modification/retrofit/effectivity** attachments and those costing more than $100,000 are required to include a **business case**. **Attachment B** is used for the business case. Instructions for producing a business case can be found in **Appendix D** of this document. For reference, an example of a business case attachment has also been included in Appendix D.

To add attachments, select the Attachments tab, place the cursor in the white space on the tab and click the mouse button. A thin, blue boarder will be displayed ensuring the tab is activated.



Click the **Add Attachment** button located on the Attachment tab's toolbar. The add dialog box will appear.

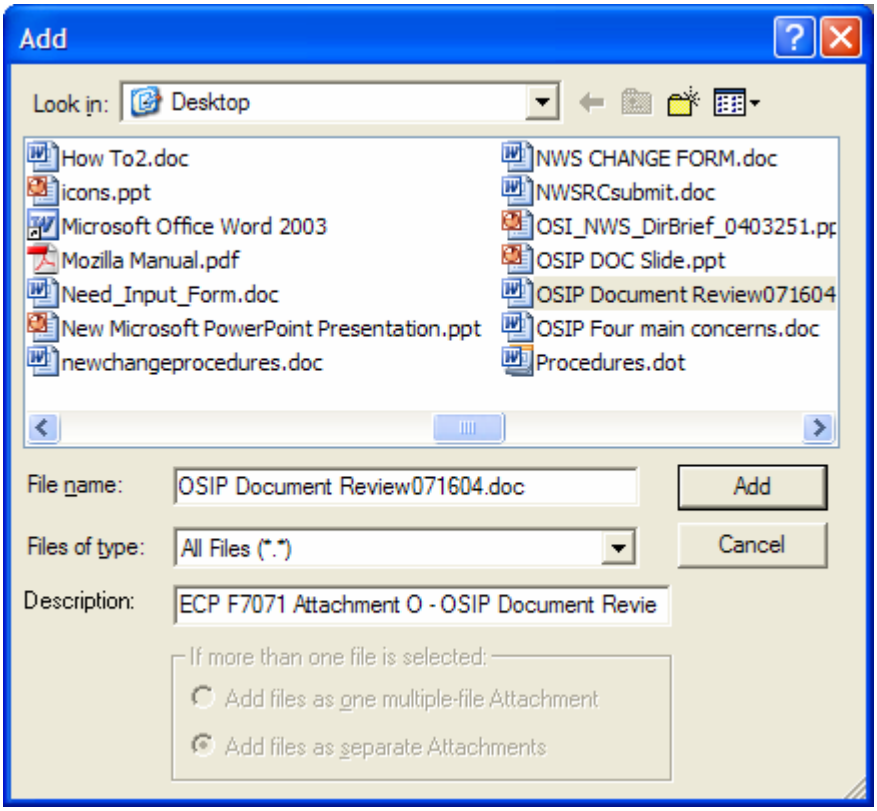
Locate the file to be attached and click on the **file name**. This will highlight the name of the file and enter it in the File name block.



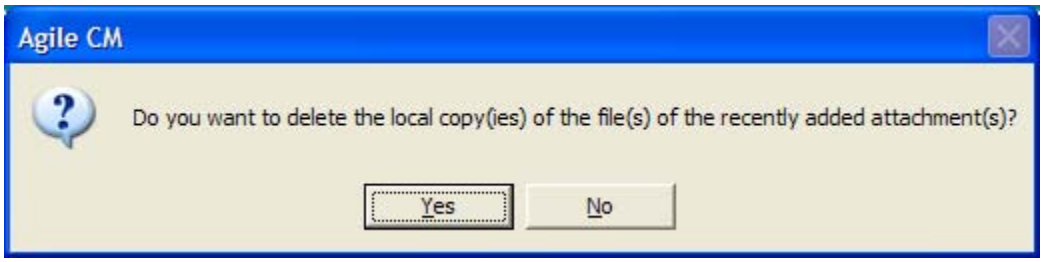
Using the following naming convention, enter a **description of the file** in the Description block on the Add dialog box:

ECP Fxxxx Attachment A – Additional Information
ECP Fxxxx Attachment B – Business Case
ECP Fxxxx Attachment C – Costing
ECP Fxxxx Attachment M – Modification/Retrofit Plan/Effectivity
ECP Fxxxx Attachment S - Schedule
(Where Fxxxx is the ECP number, e.g., ECP F7071 Attachment A – Additional Information)

Use this naming convention on any additional attachments, e.g., ECP F7071 Attachment T – Team Meeting Minutes; ECP F7071 Attachment I – Warning Instructions; ECP F7071 Attachment O – Obstruction Light Diagram; etc.



Click the **Add** button on the Add dialog box. The file will be added and Agile will display a prompt offering the option to delete the local copy of the file that was added to the Attachments tab.



To retain the local file, click **No**. To delete the file, click **Yes**.

G. History Tab:

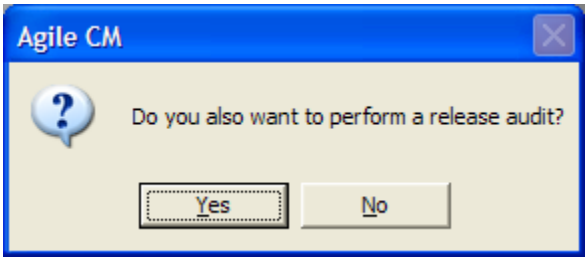
The History tab is automatically populated by Agile and is a permanent record of all Agile activity performed on the ECP.

2. Routing for Project Team Review

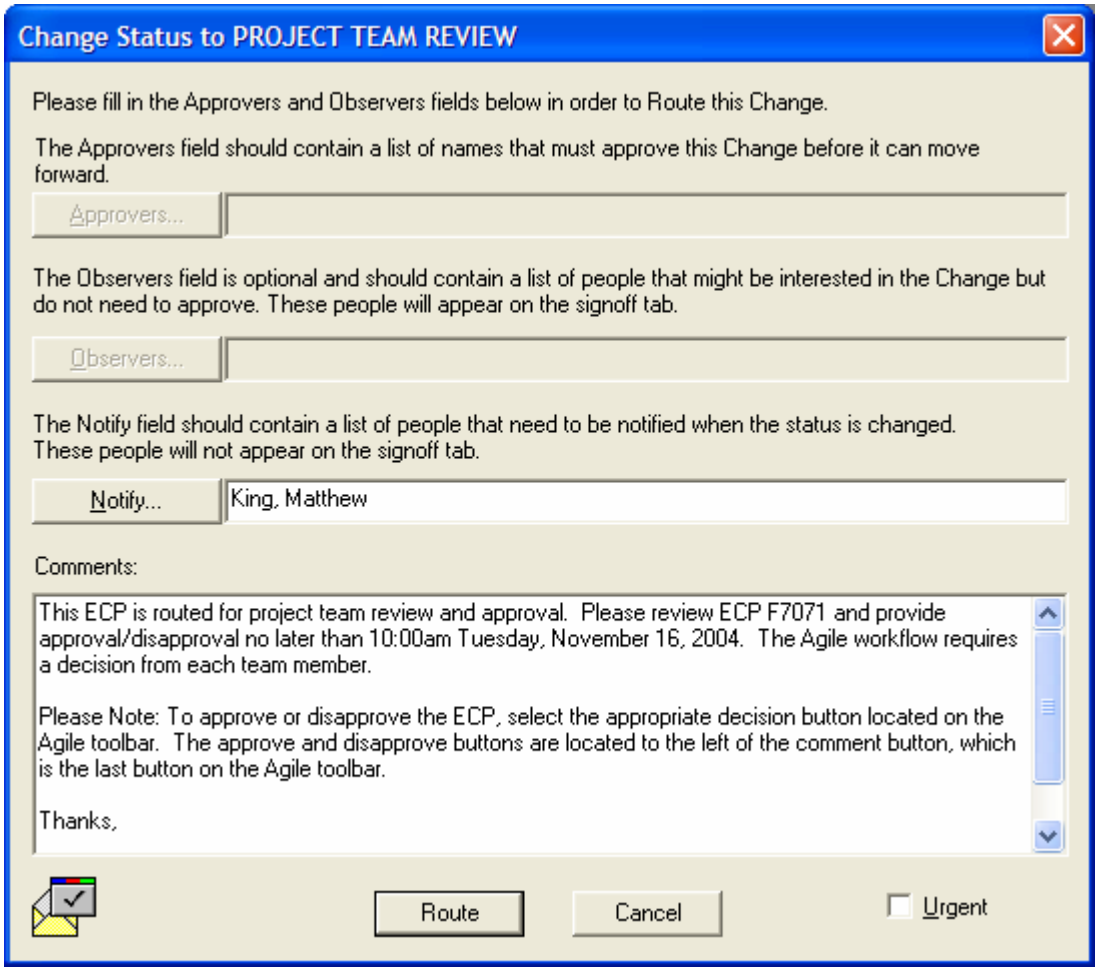
a. Once the ECP is complete, the originator will route the ECP for project team review. The team members will have been assigned by the TRC and added to the ECP by the CM Analyst when the ECP was created.

b. Click the **Next Status** button on the Agile toolbar.

c. Agile will display a prompt offering to perform a release audit. Click **Yes**.



d. The **Change Status to Project Team Review** dialog box will be displayed. Agile will automatically enter the name of the project lead in the Notify box. The approvers' (team members) names will not be displayed in the Approvers box because they were previously assigned on the Signoff tab by the CM Analyst when the ECP was in CM Allocation status.



e. In the Comments box, the project lead will enter **instructions** for the team members reviewing the ECP. These directions must include a **suspense date** by which time the reviewer must have approved/disapproved the ECP. The suspense date will be no later than **7 days** from the date and time the ECP is routed for review.

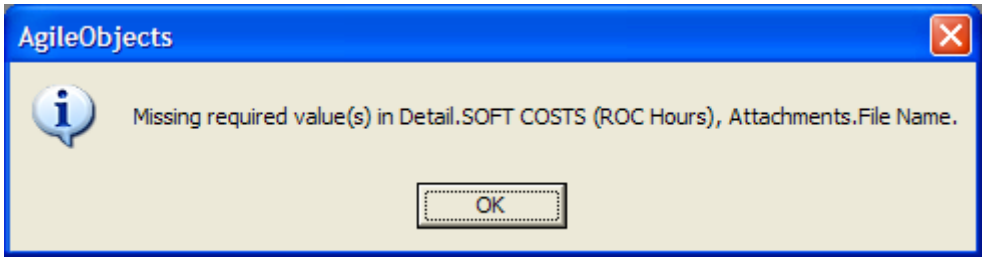
It may be helpful to also provide instructions concerning how to approve/disapprove. For example:

> **This ECP is routed for project team review and approval. Please review ECP F7071 and provide approval/disapproval no later than 10:00am Tuesday, November 16, 2004. The Agile workflow requires a decision from each team member.**

Please Note: To approve or disapprove the ECP, select the appropriate decision button located on the Agile toolbar. The approve and disapprove buttons are located to the left of the comment button, which is the last button on the Agile toolbar.

f. Click the **Route** button located on the bottom of the Change Status to Project Team Review dialog box.

g. A screen will appear describing any required information that is missing from the ECP. Click **OK** and **correct all errors** found during the audit.

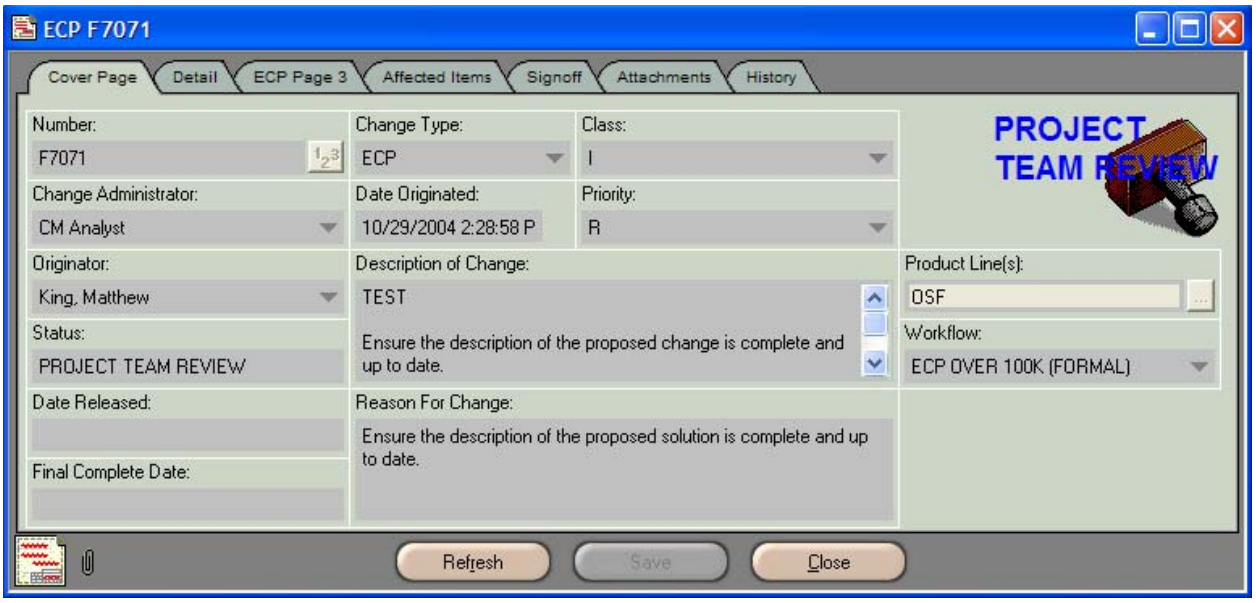


h. After correcting errors, click the **Next Status** button on the Agile toolbar. Agile will once again display the prompt offering to perform a release audit. Click **Yes**.

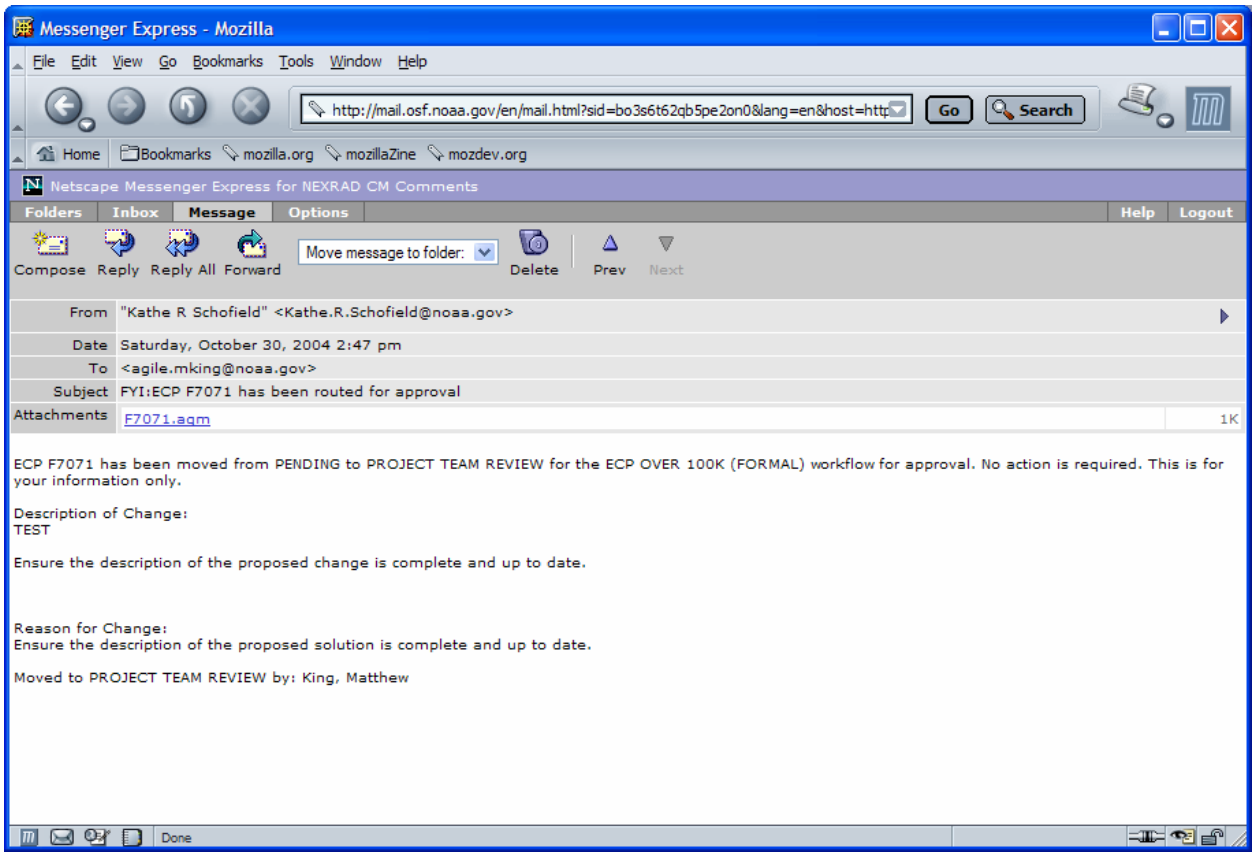
i. The **Change Status to Project Team Review** dialog box will be displayed once again. The name of the project lead will be in the Notify box and the instructions previously entered in the Comments box will also be displayed.

j. Click the **Route** button located on the bottom of the Change Status to Project Team Review dialog box.

k. The status of the ECP will change to **Project Team Review**.



l. Agile will send each team member an **email notification** of the ECP requiring his review and approval. Please note that Agile "canned" comments are always located in the first line of the email message and cannot be edited by the ROC. Any **additional information/instructions** from the sender will be located below in the **Comments section** of the email.

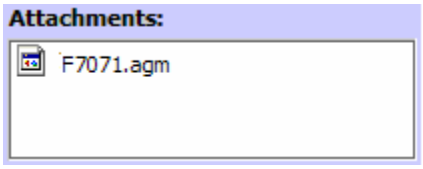


3. Project Team Review

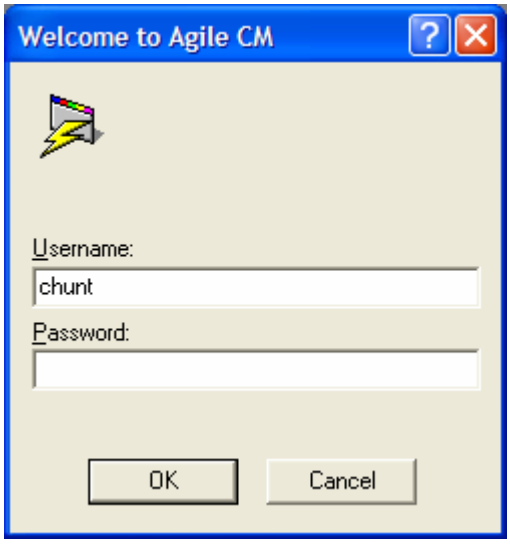
a. When the ECP is routed for review, the project team members will have **7 days** to provide approval or disapproval of the ECP. Agile automatically monitors this process, which requires a response from all team members. Any team members who have not provided a decision within **5 days** will receive an email reminder from Agile.

Please Note: If a decision is not received by the end of the 7-day review cycle, Agile escalates the ECP to the team member's team lead for action.

b. To review the ECP, click on the Agile document link (**F7071.agm**) in the email notification. This will launch Agile.



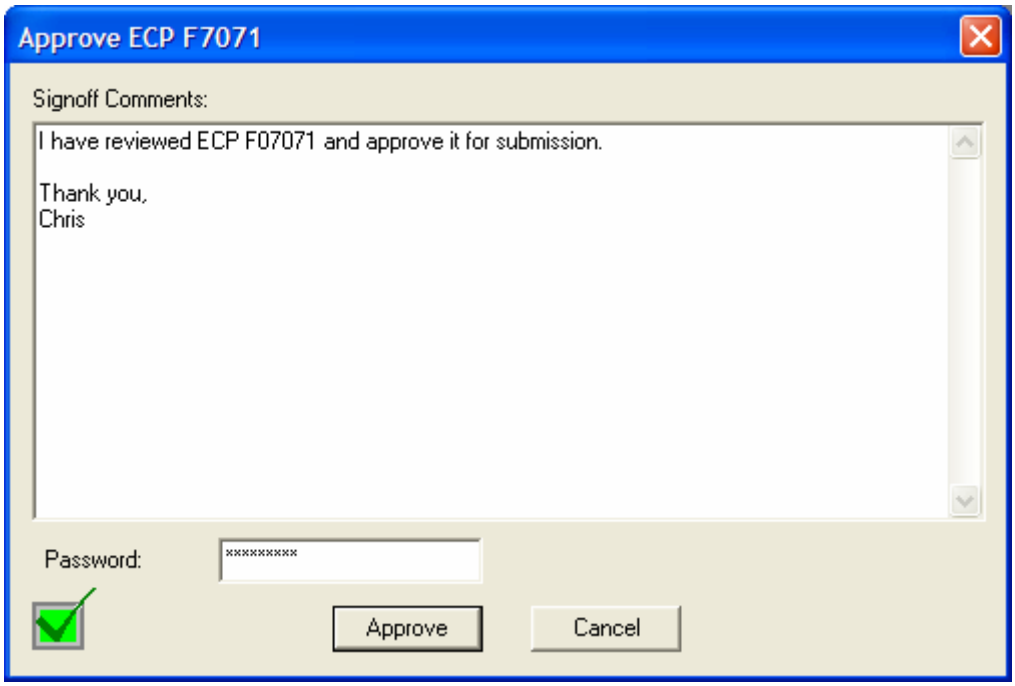
c. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.



d. The ECP to be reviewed (ECP **F7071**) will be displayed.

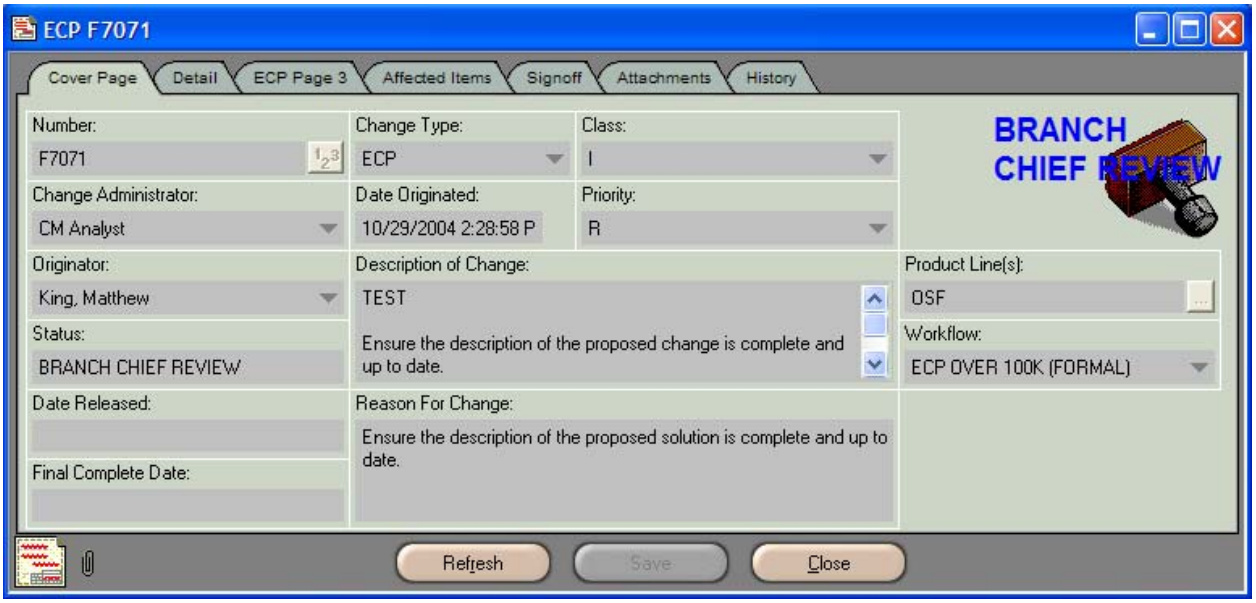
e. Each team member is to review the ECP to ensure that it's complete - all information is correct and it contains all required attachments. To approve the ECP for submission, the team member will click the **Approve** button located on the Agile toolbar.

f. The **Approve ECP Fxxxx** (ECP **F7071**) dialog box will be displayed. Enter any review **comments** in the Signoff Comments block, then enter the password in the **Password** block and click **Approve**.



g. The project lead will receive an email notification when all team members have approved the ECP. The email will state, "**ECP F7071 has been moved from PROJECT TEAM REVIEW to BRANCH CHIEF REVIEW for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only.**" This is a canned statement from Agile and cannot be altered by the ROC.

h. Once all team members have provided their approvals, the ECP will automatically move forward to **Branch Chief Review** status. The branch chief review process is described in **ECPs Over $100,000 (Formal) Section 5** of this document

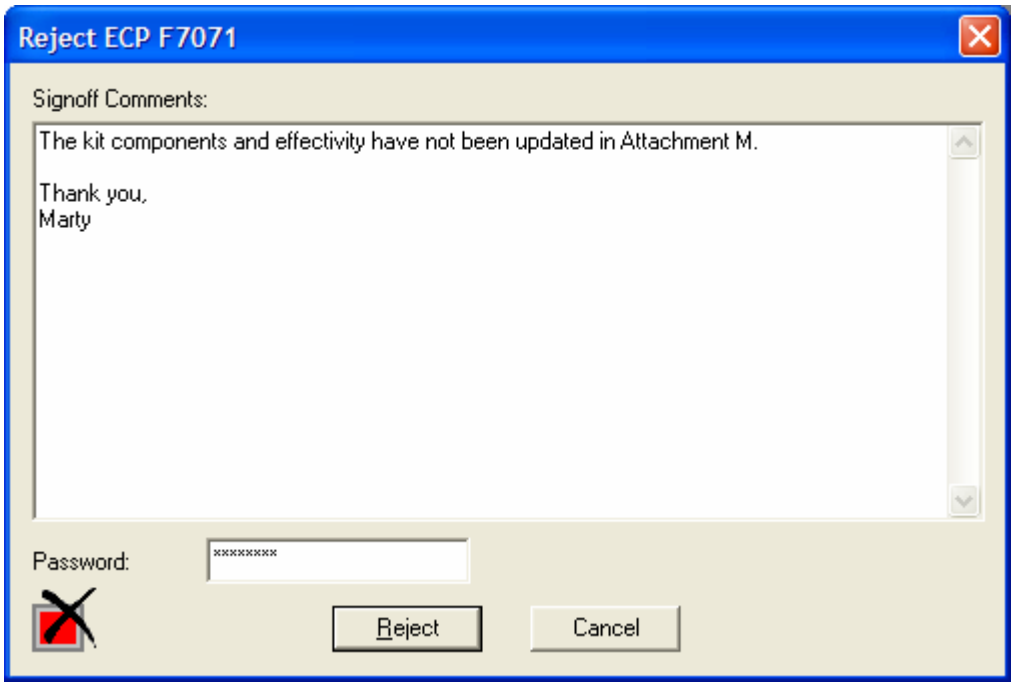


i. If a team member does not agree the ECP is ready for submission, the ECP can be disapproved. Instructions for disapproval and the process for handling rejected ECPs are described in **ECPs Over $100,000 (Formal) Section 4** of this document.

4. ECPs Rejected During Project Team Review

a. If a team member does not agree the ECP is ready for submission, he may reject the ECP by clicking the **Reject** button on the Agile toolbar.

b. The **Reject ECP Fxxxx** (ECP **F7071**) dialog box will appear. In the Signoff Comments block, enter the **reason for disapproval** and list all items in need of attention, e.g., attachments are missing, information is incorrect or incomplete, etc.



c. When all comments have been entered, type the **password** in the Password block and click the **Reject** button.

h. If any team members disapprove the ECP, it will automatically return to **Pending** status.

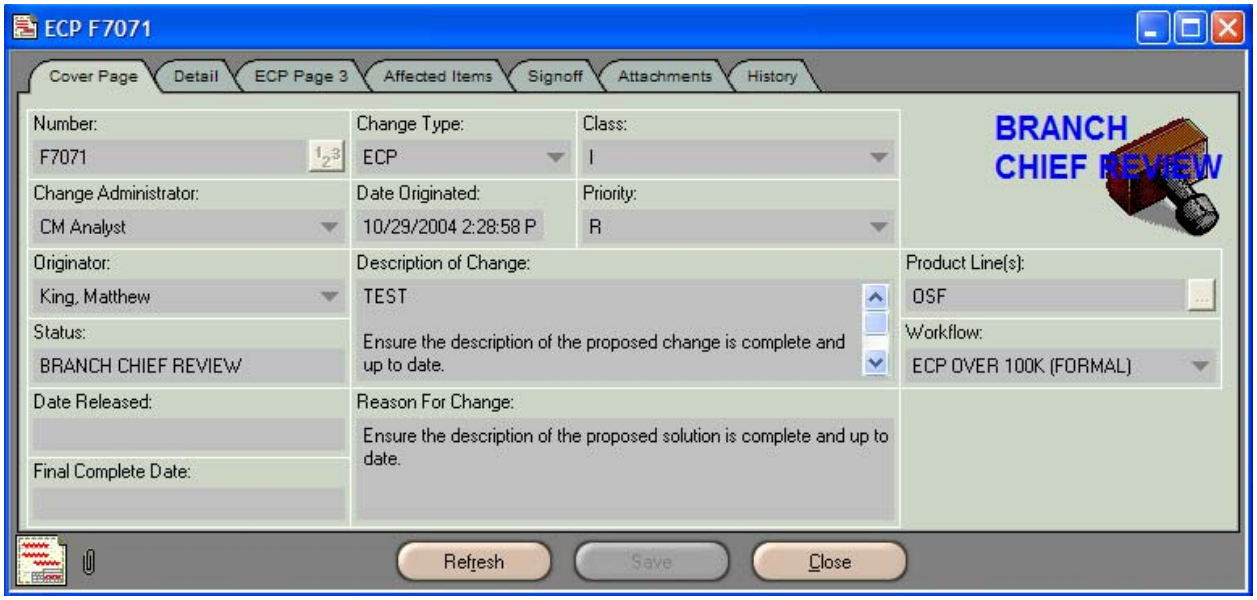
i. The project lead will receive **email notification** from Agile stating the ECP has been returned to Pending status.

j. The project lead should make all necessary adjustments to the ECP. If there is disagreement concerning the suggested changes, a **team meeting** should be held to reconcile the problems.

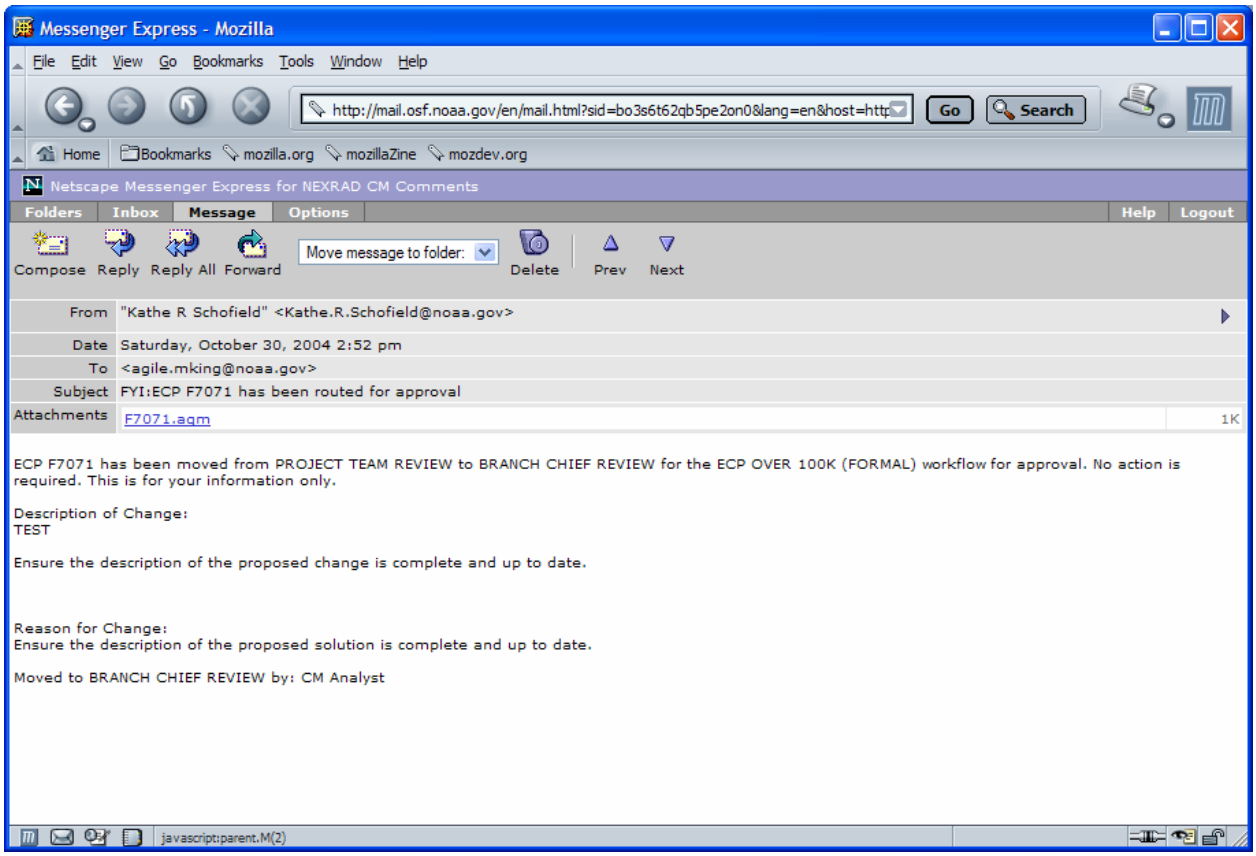
k. Once the ECP has been reconciled and the changes have been made, the project lead will return the ECP to the review cycle. To accomplish this, perform **ECPs Over $100,000 (Formal) Routing for Project Team Review steps 2b through 2k** of this WPI.

Please Note: When the ECP was returned to Pending status, Agile automatically re-populated the **Signoff** tab, as shown in the graphic below. Therefore, all team members must once again perform the **ECPs Over $100,000 (Formal) Project Team Review steps 3a through 3h** of this WPI and provide a review decision.

h. When all team members provide their approvals, the ECP will automatically move forward to **Branch Chief Review** status.

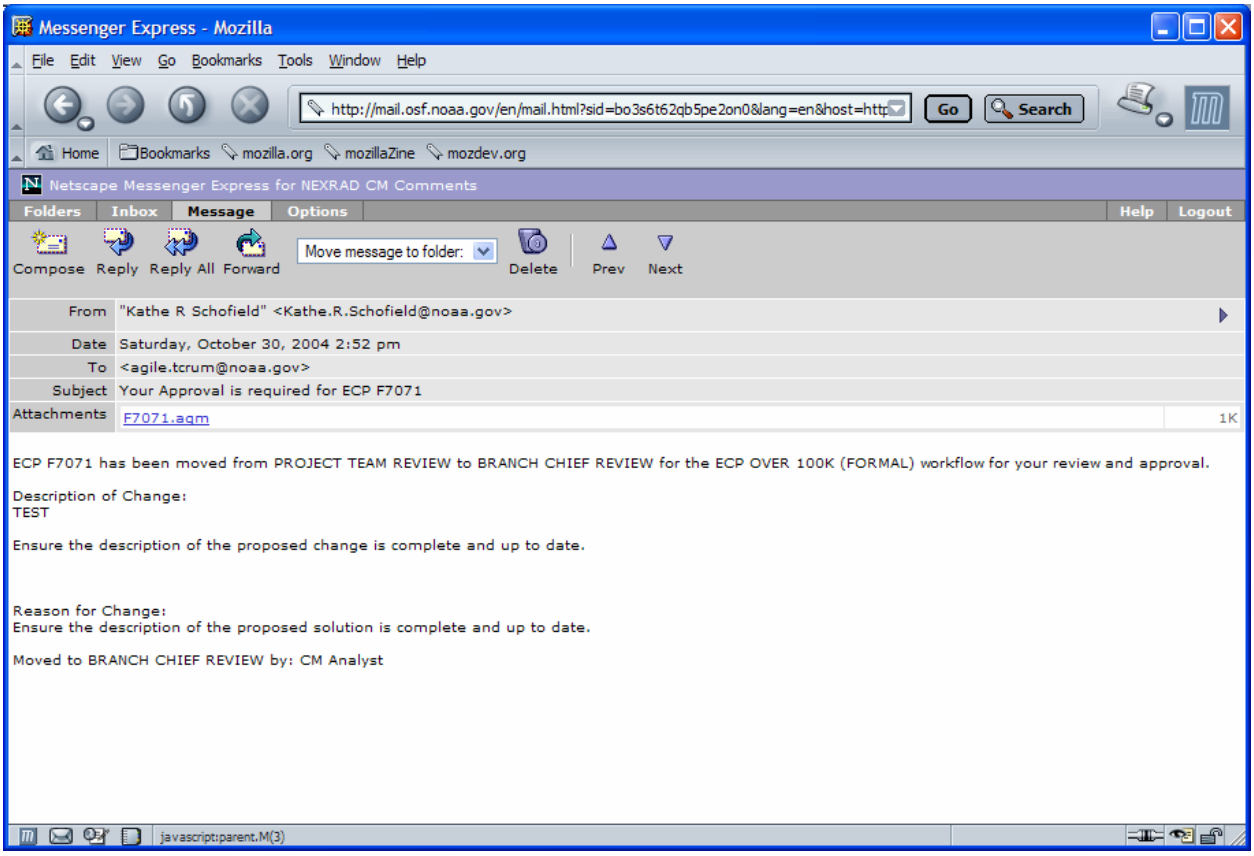


i. Agile will send the project lead an email notification that the status of the ECP has changed to **Branch Chief Review** status.



5. Branch Chief Review

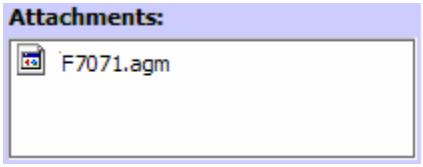
a. When the ECP enters **Branch Chief Review** status, Agile will send the branch chief an email notification of the ECP requiring his review and approval.



b. When the branch chief receives the ECP for review, he will have **7 days** to provide approval or disapproval of the ECP. Agile automatically monitors this process. If the branch chief has not provided a decision within **5 days**, he will receive an email reminder from Agile.

Please Note: If a decision is not received by the end of the 7-day review cycle, Agile escalates the ECP to the CM Team Lead for action.

c. To review the ECP, click on the Agile document link (**F7071.agm**) in the email notification. This will launch Agile.

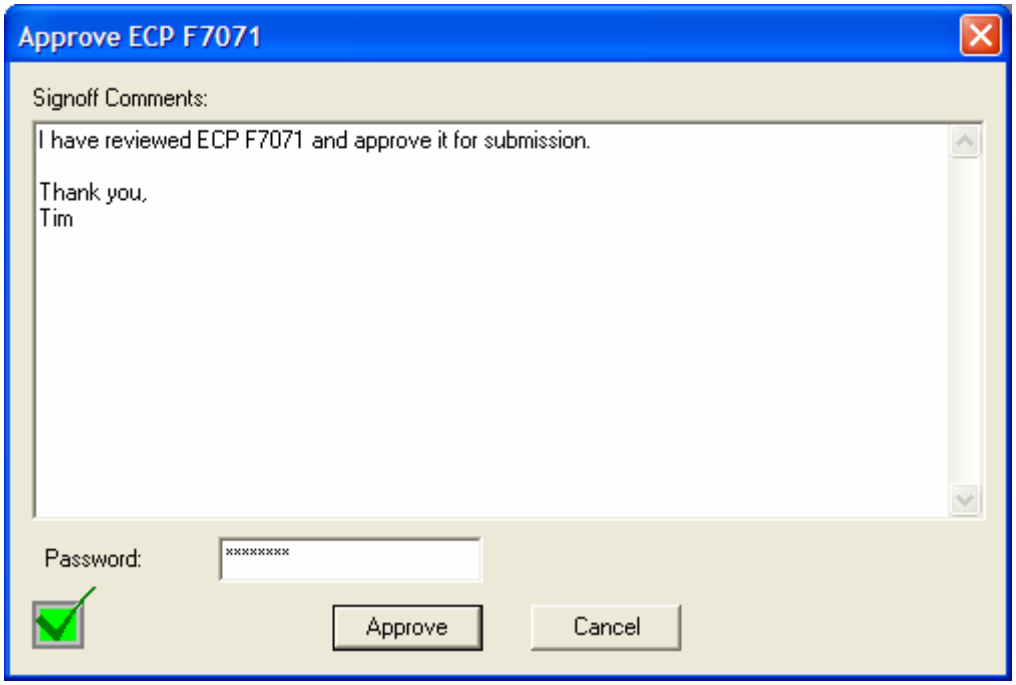


d. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

k. The ECP to be reviewed (ECP **F7071**) will be displayed.

l. The branch chief is to review the ECP to ensure that it's complete - all information is correct and it contains all required attachments. To approve the ECP for submission, the branch chief will click the **Approve** button located on the Agile toolbar.

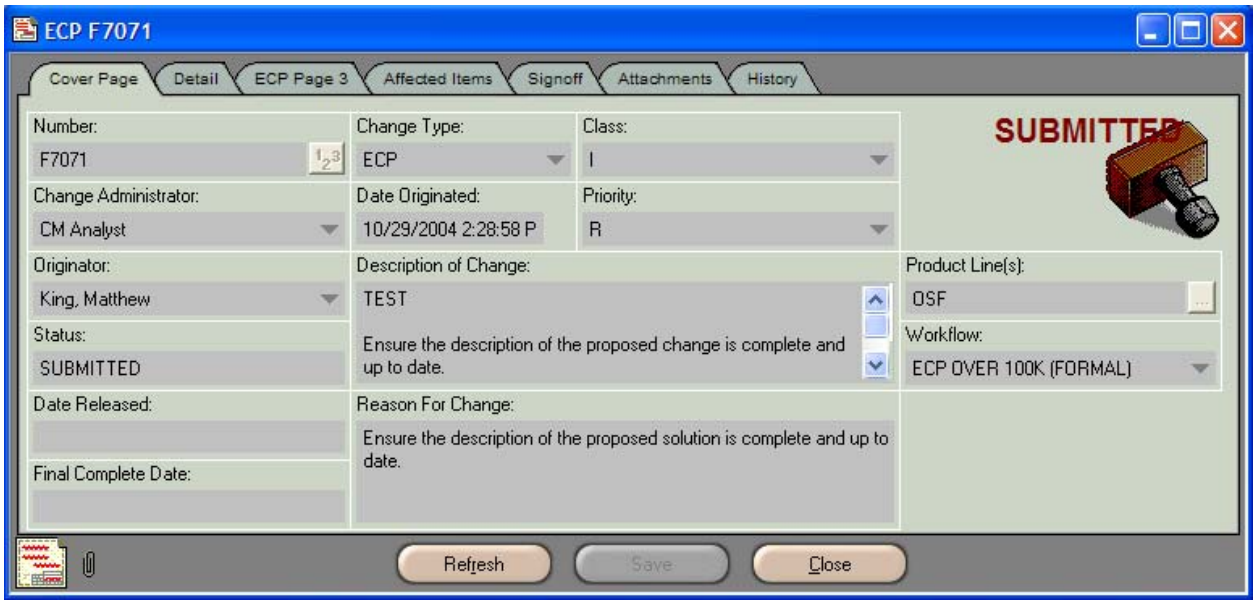
m. The **Approve ECP Fxxxx** (ECP **F7071**) dialog box will be displayed. Enter any review **comments** in the Signoff Comments block, then enter the **password** in the Password block and click **Approve**.



n. The project lead will receive an email notification when the branch chief approves the ECP. The email will state, "**ECP F7071 has been moved from BRANCH CHIEF REVIEW to SUBMITTED for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only**." This is a canned statement from Agile and one the ROC cannot alter.

o. If the branch chief does not agree the ECP is ready for submission, the ECP can be disapproved. Instructions for disapproval and the process for handling rejected ECPs are described in **ECPs Over $100,000 (Formal) Section 6** of this document.

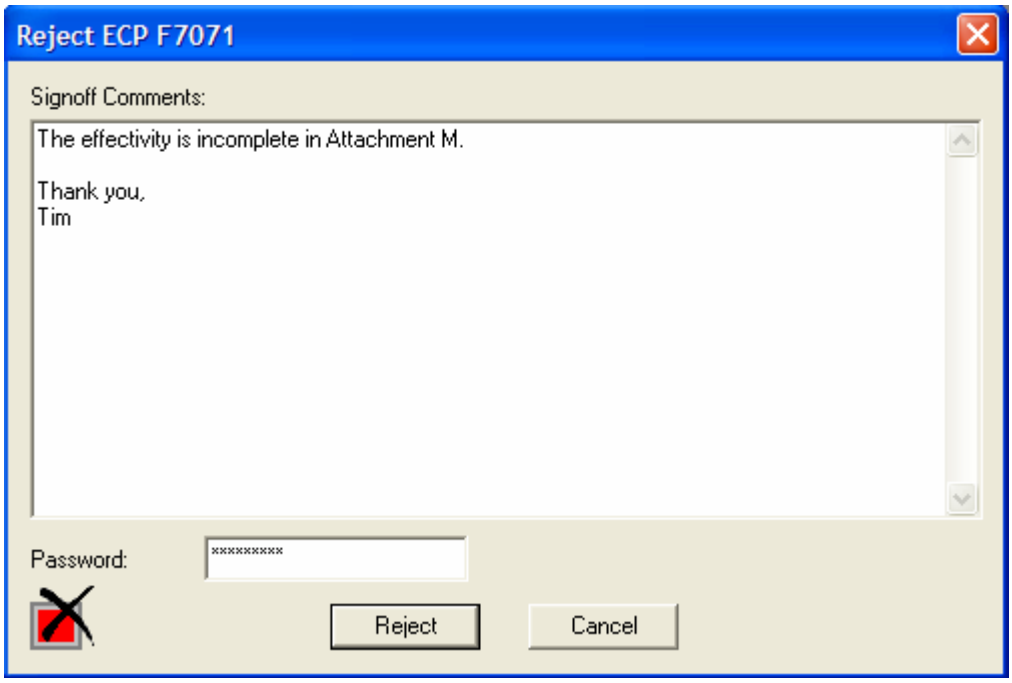
p. Once the branch chief has provided his approval, the ECP will automatically move forward to **Submitted** status. The process for Submitted ECPs is described in **ECPs Over $100,000 (Formal) Section 7** of this WPI.



6. ECPs Rejected During Branch Chief Review

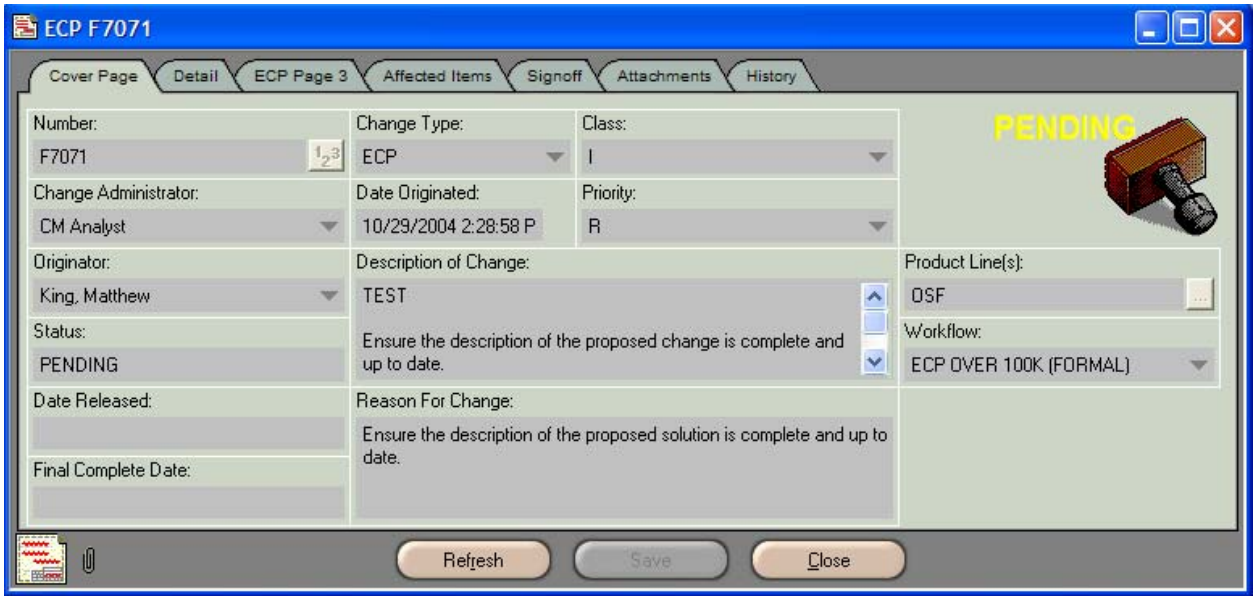
a. If the branch chief does not agree that the ECP is ready for submission, he may reject the ECP by clicking the **Reject** button on the Agile toolbar.

b. The **Reject ECP Fxxxx** (ECP **F7071**) dialog box will appear. Enter the **reason for disapproval** in the Signoff Comments block and list all items in need of attention, e.g., attachments are missing, information is incorrect or incomplete, etc.



c. When all comments have been entered, type the password in the **Password** block and click the **Reject** button.

m. The ECP will automatically return to **Pending** status.



n. The project lead will receive an email notification from Agile stating the ECP has been returned to **Pending** status.

o. The project lead should make all necessary adjustments to the ECP.

p. Once the ECP has been reconciled and the changes have been made, the project lead will return the ECP to the review cycle. To accomplish this, perform **ECPs Over $100,000 (Formal) Routing for Project Team Review steps 2b through 2k** of this WPI.

q. When the ECP was returned to **Pending** status, Agile once again re-populated the Signoff tab. Therefore, all team members will be required to once again perform the **ECPs Over $100,000 (Formal) Project Team Review steps 3a through 3h** of this WPI and provide a review decision.

r. When all team members provide their approvals, the ECP will automatically move forward to **Branch Chief Review** status.

s. Since Agile re-populated the Signoff tab, the branch chief will be required to once again perform the **ECPs Over $100,000 (Formal) Branch Chief Review steps 5a through 5h** of this WPI and provide a review decision.

t. When the branch chief approves the ECP, it will automatically move forward to **Submitted** status.

u. Agile will send the project lead an email notification that the status of the ECP has been changed to **Submitted**.

7. Submitted ECPs

a. Agile will send an email notification to the CM Analyst that the ECP has been submitted.

b. The CM Analyst will review the ECP to ensure, as much as possible, the completeness and accuracy of the information provided.

c. If the ECP is complete (contains information in all required fields and all attachments have been included), the CM Analyst will advance the ECP to **ROC Review** status.

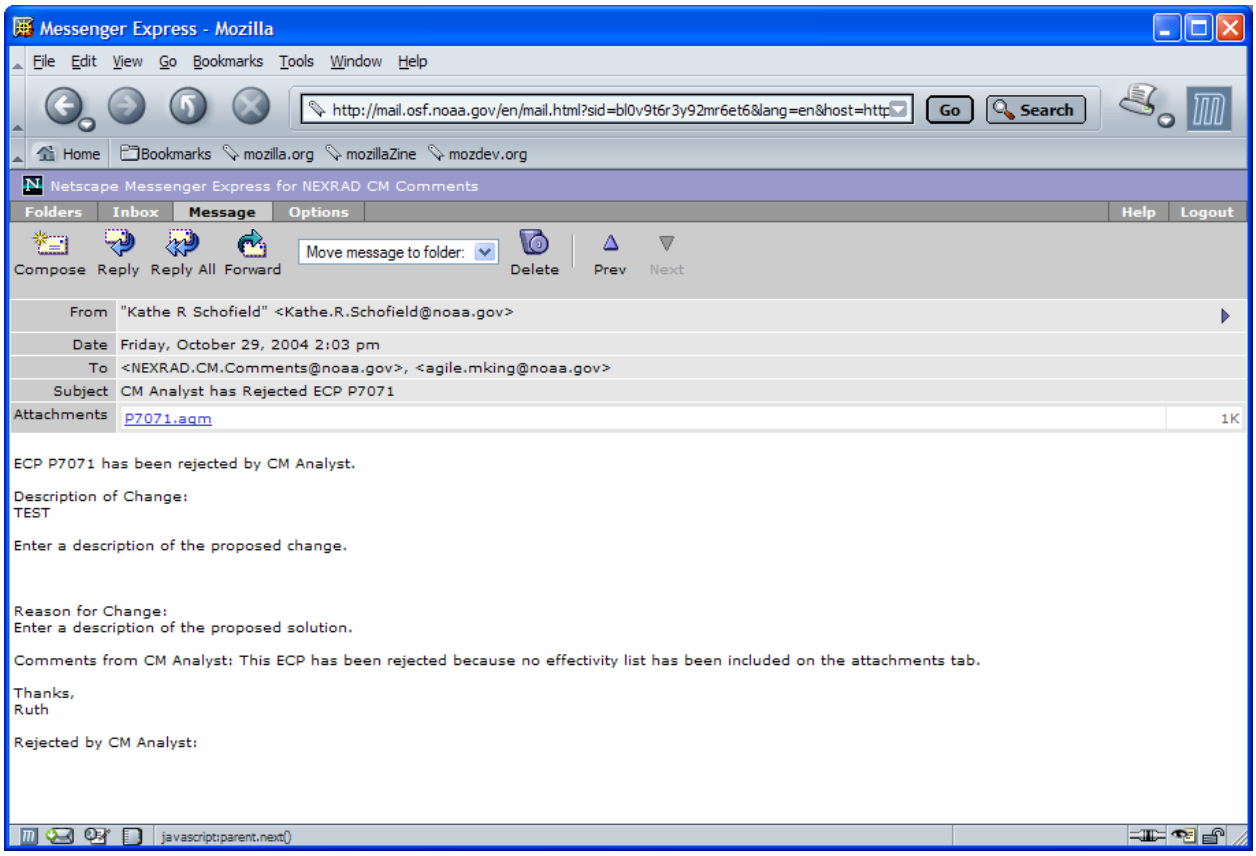
d. Agile will send the project lead an email notification that the status of the ECP has been changed to ROC Review. The email will state, "**ECP F7071 has been moved from SUBMITTED to ROC REVIEW for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only."** This is a "canned" message from Agile and one the ROC cannot alter.

e. The **ROC Review** process is explained in **ECPs Over $100,000 (Formal) Section 9** of this document.

f. However, if any of the four required attachments (**Attachment B** – Business Case; **Attachment C –** Costing; **Attachment M –** Modification/Retrofit Plan/Effectivity; **Attachment S –** Schedule) are not included in the ECP, the ECP will be **disapproved**, thus returning it to **Pending** status. Instructions for handling rejected ECPs are described in **ECPs Over $100,000 (Formal) Section 8** of this document.

8. ECPs Rejected at Submitted Status

a. If the ECP is rejected by the CM Analyst, it will return to **Pending** status. Agile will send the originator an email notification of the rejection and status change.



b. The project lead should make all necessary adjustments to the ECP.

c. Once the ECP has been reconciled and the changes have been made, the project lead will return the ECP to the review cycle. To accomplish this, perform **ECPs Over $100,000 (Formal) Routing for Project Team Review steps 2b through 2k** of this WPI.

d. When the ECP was returned to **Pending** status, Agile once again re-populated the Signoff tab. Therefore, all team members will be required to once again perform the **ECPs Over $100,000 (Formal) Project Team Review**, **steps 3a through 3h** of this WPI, and provide a review decision.

e. When all team members provide their approvals, the ECP will automatically move forward to **Branch Chief Review** status.

f. Since Agile re-populated the Signoff tab, the branch chief will be required to once again perform the **ECPs Over $100,000 (Formal) Branch Chief Review**, **steps 5a through 5h** of this WPI, and provide a review decision.

g. When the branch chief approves the ECP, it will automatically move forward to **Submitted** status.

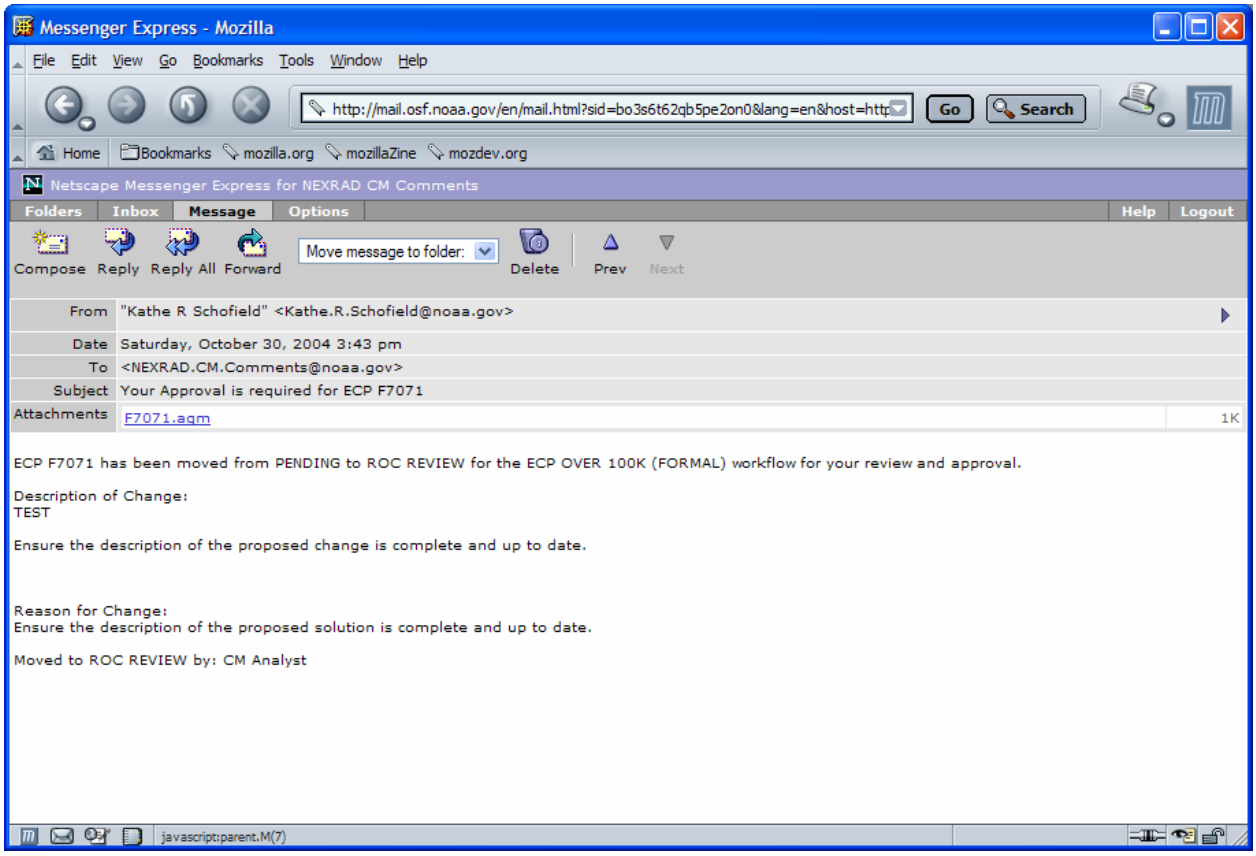
h. Agile will send the project lead an email notification that the status of the ECP has been changed to **Submitted**.

i. When the ECP has once again been submitted, the CM Analyst will perform the **ECPs Over $100,000 (Formal) Submitted review steps 7a through 7c** of this WPI and provide a review decision. When the CM Analyst approves the ECP, it will be routed for **ROC Review**.

9. ROC Review

a. The WSR-88D Configuration Control Board (**CCB**) has approval authority for ECPs with a cost between $100,000 and $1,000,000. However, it is understood that the ROC is the technical authority for the WSR-88D system. Therefore, all ECPs, no matter the costing threshold, are reviewed for technical accuracy by ROC personnel. ECPs in the **ECP Over 100K** workflow will be routed to TRC members for review.

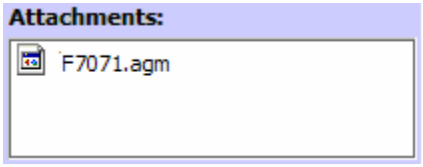
b. Agile will send each TRC member an email notification of the ECP requiring his review.



c. When the TRC member receives the ECP for review, he will have **10 days** to provide **approval** or **disapproval** of the ECP. Agile automatically monitors this process and notifies the CM Analyst when the review cycle has ended.

Please Note: If the ECP has not advanced to TRC status by the end of the **10-day** review cycle, Agile escalates the ECP to the CM Team Lead for action.

d. To review the ECP, click on the Agile document link (**F7071.agm**) in the email notification, which will launch Agile.

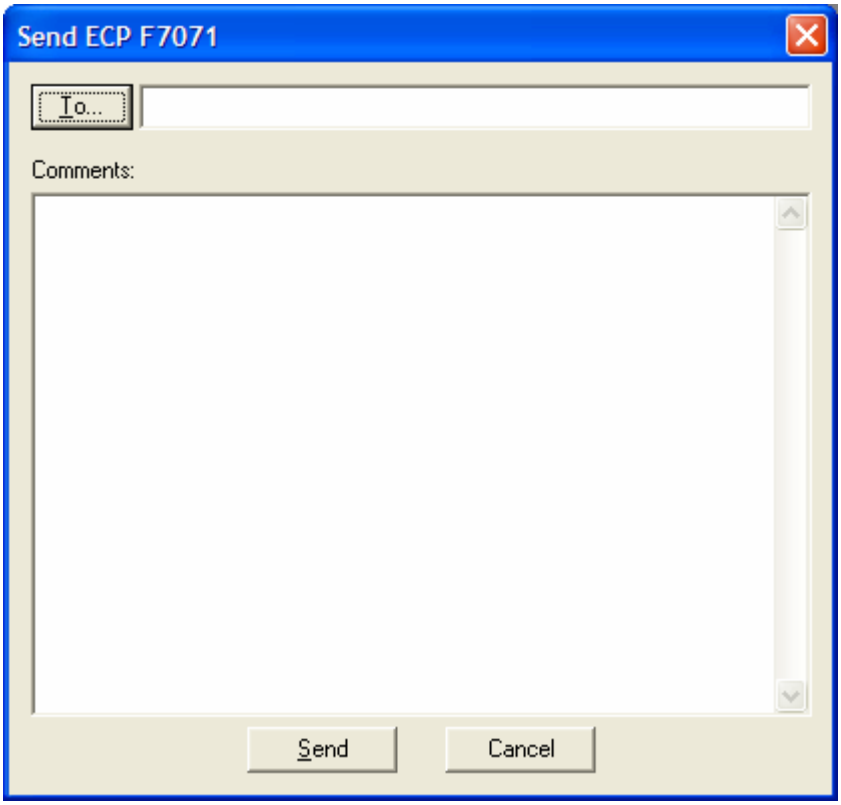


e. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

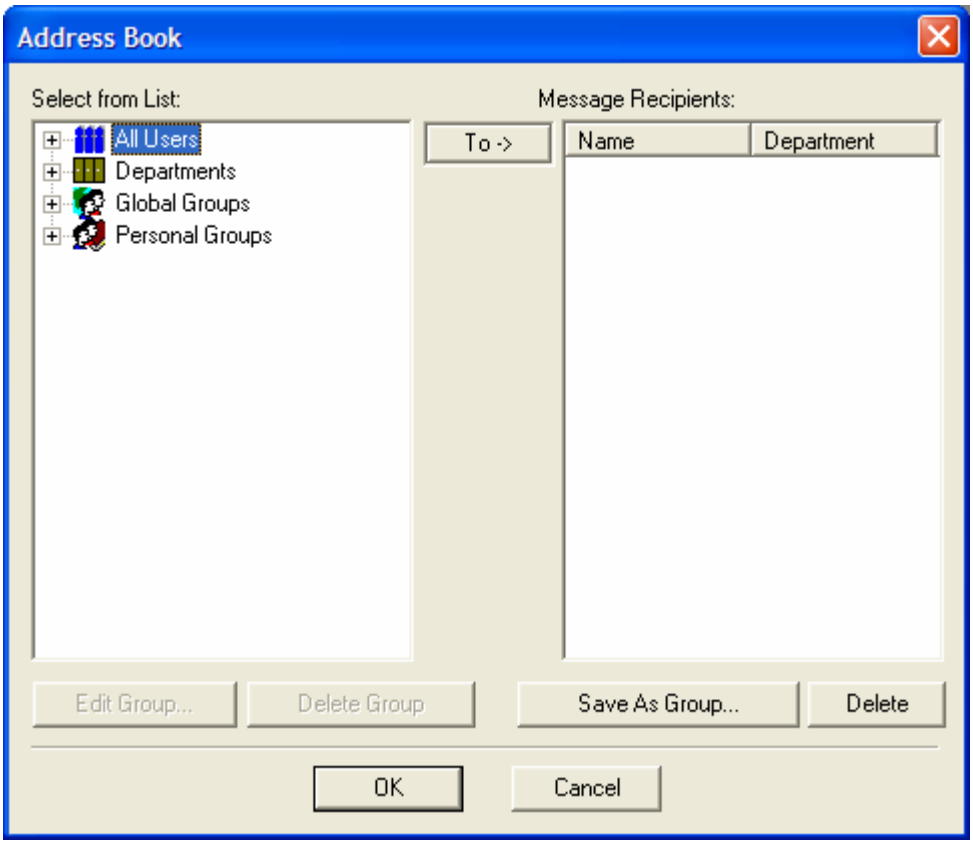
f. The ECP to be reviewed (ECP **F7071**) will be displayed.

g. Review the ECP to ensure that it's complete - all information is correct and it contains all required attachments. To approve the ECP, click the **Send** button located on the Agile toolbar.

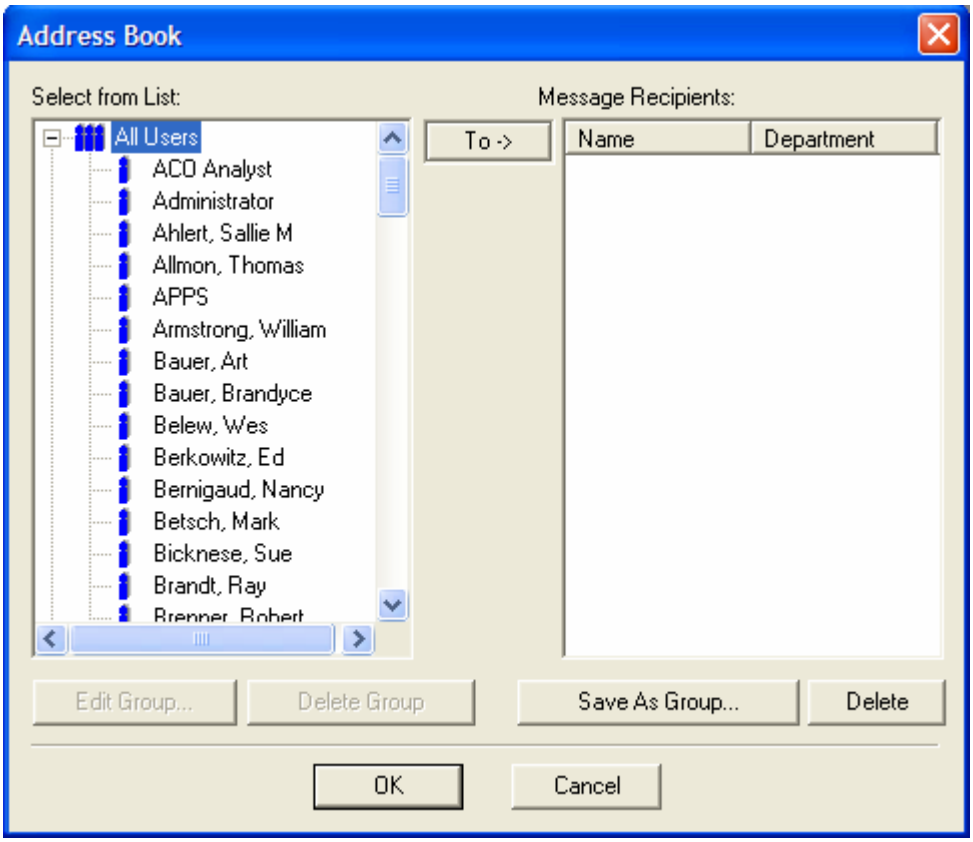
h. The **Send ECP Fxxxx** (ECP **F7071**) dialog box will be displayed.



i. Click the **To** button on the **Send ECP F7071** dialog box to reveal the **Agile Address Book**.

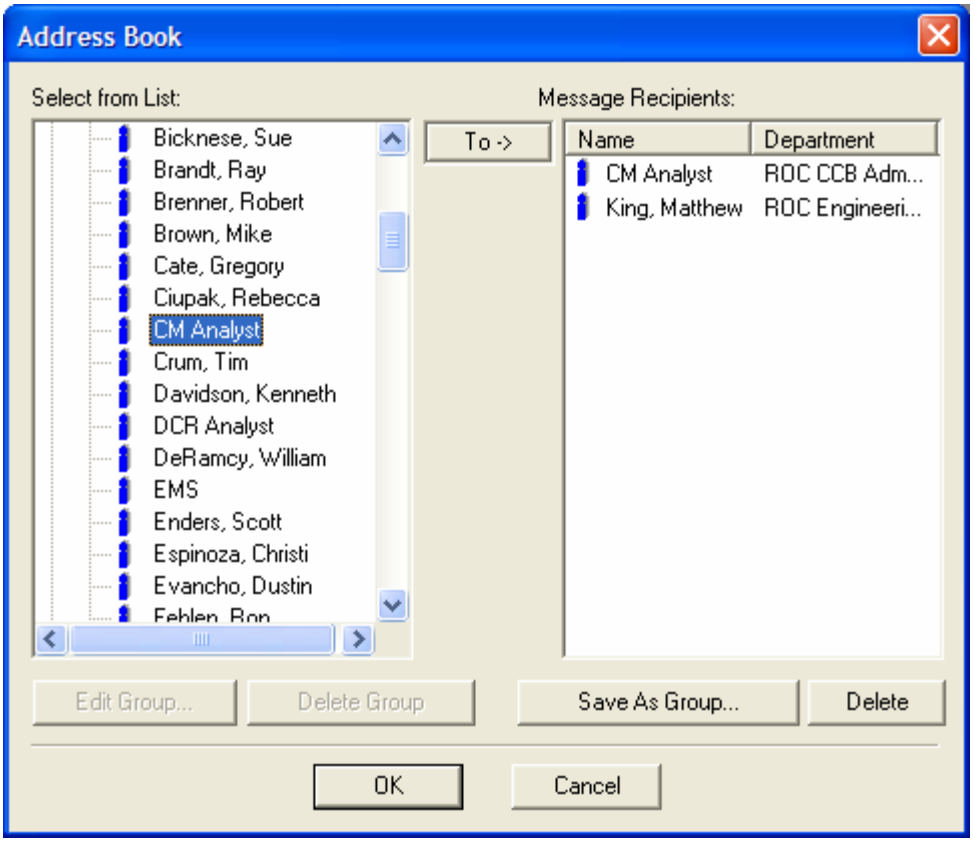


j. Click on the **plus sign** (+) located to the left of **All Users**. This will expand the All Users node.



k. To select addressees, double click the **name** of each person who is to receive approval notification. This will move the addressees' names to the **Message Recipients** window on the right-hand side of the Address Book.

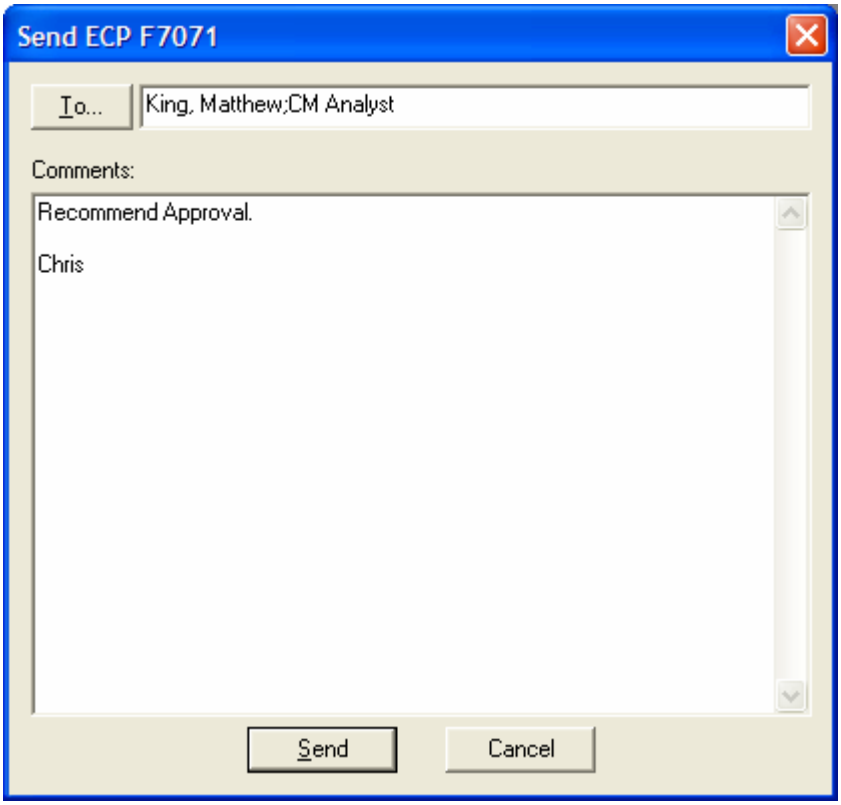
Please note: The **originator** of the ECP and the **CM Analyst** must always be selected.



l. Once all addressees have been added, click the **OK** button at the bottom of the Address Book.

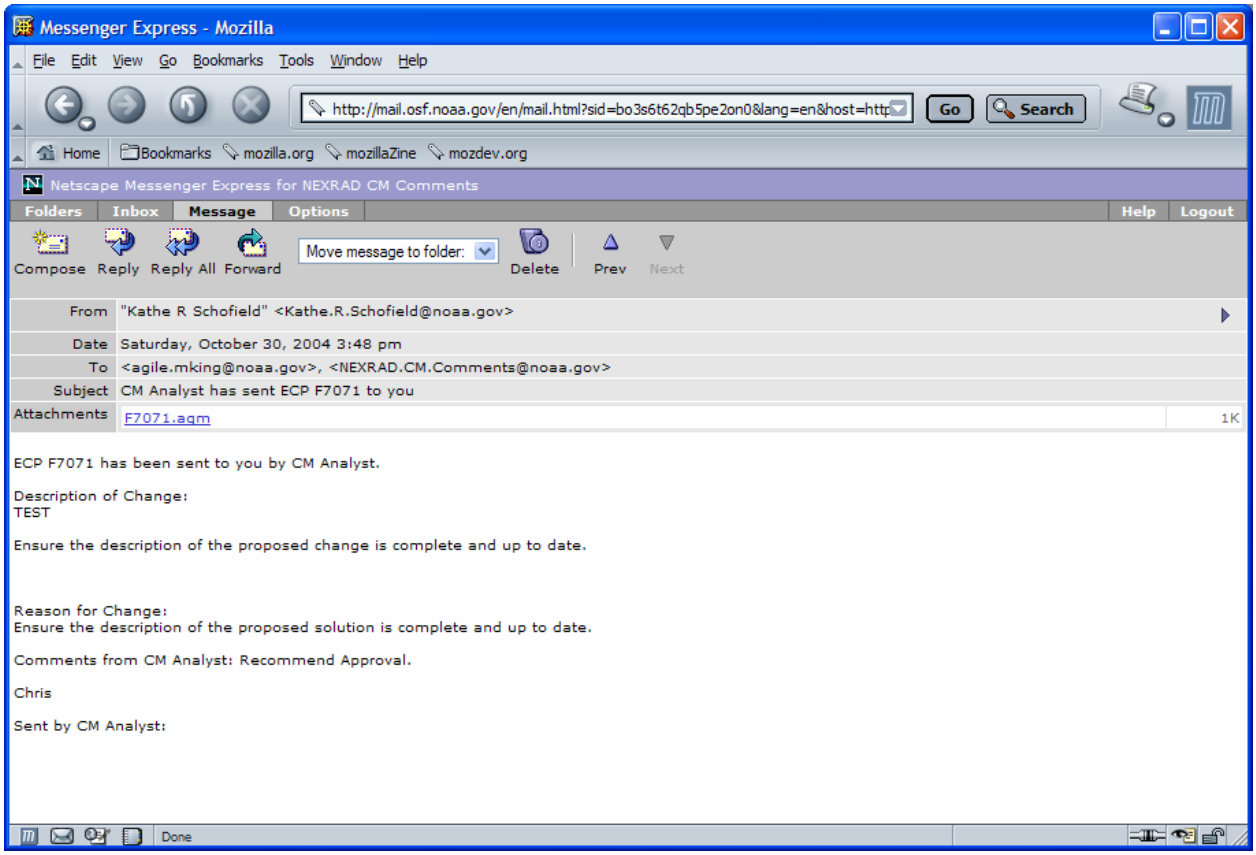
m. The **Send ECP Fxxxx** (ECP **F7071**) will appear with all addressees displayed.

n. Enter review comments/approval recommendation in the **Comments** block on the **Send ECP F7071** dialog box.



o. Click the **Send** button located at the bottom of the **Send ECP F7071** dialog box.

p. Each addressee will receive an email notification containing the review comments.



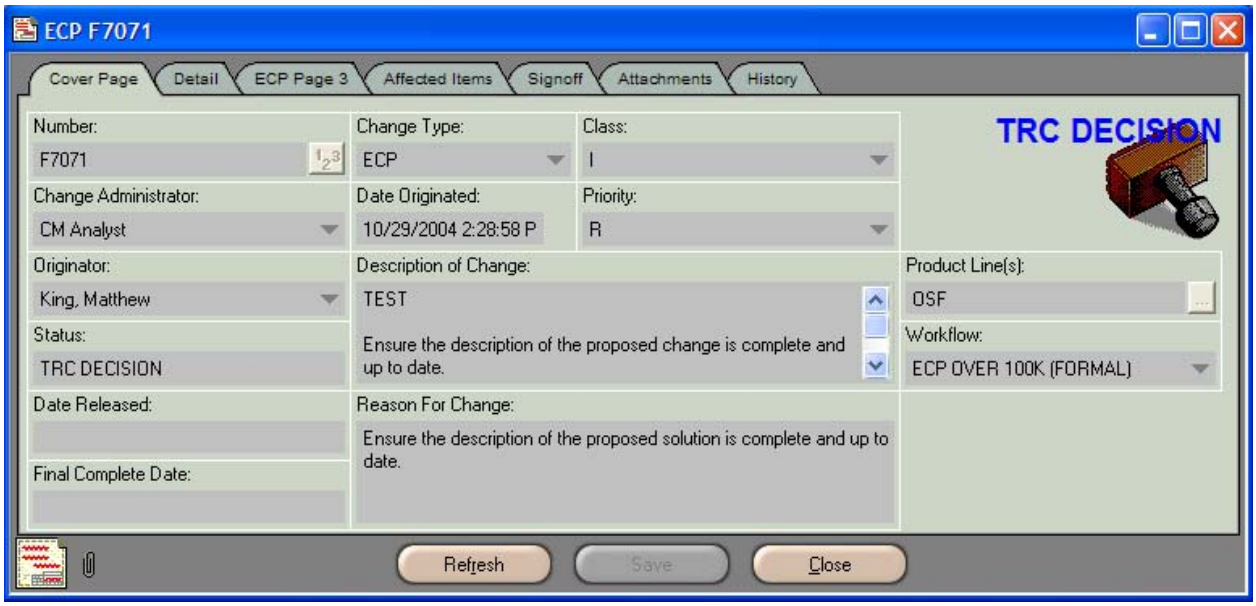
q. At the conclusion of the ECP's review cycle, the CM Analyst will advance the ECP to **TRC** status. Agile will send the project lead an email notification of the status change. The email will state, "**ECP F7071 has been moved from ROC REVIEW to TRC for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only**." This is a "canned" message from Agile and one the ROC cannot alter.

r. If dissenting comments are received, the ECP will not move into a hold status. Instead, it will be adjudicated at the TRC meeting.

10. TRC

a. Once the ECP has completed its ROC review cycle, the ECP will move to **TRC** status and remain in this status until it is presented to the TRC at the next scheduled TRC meeting. Agile automatically monitors the length of time the ECP remains at TRC status and notifies the CM Analyst when the allotted amount of time for an ECP in TRC status has expired.

Please Note: If the ECP has not moved from TRC status by the end of the **40-day** allotted time period, Agile escalates the ECP to the CM Team Lead for action.



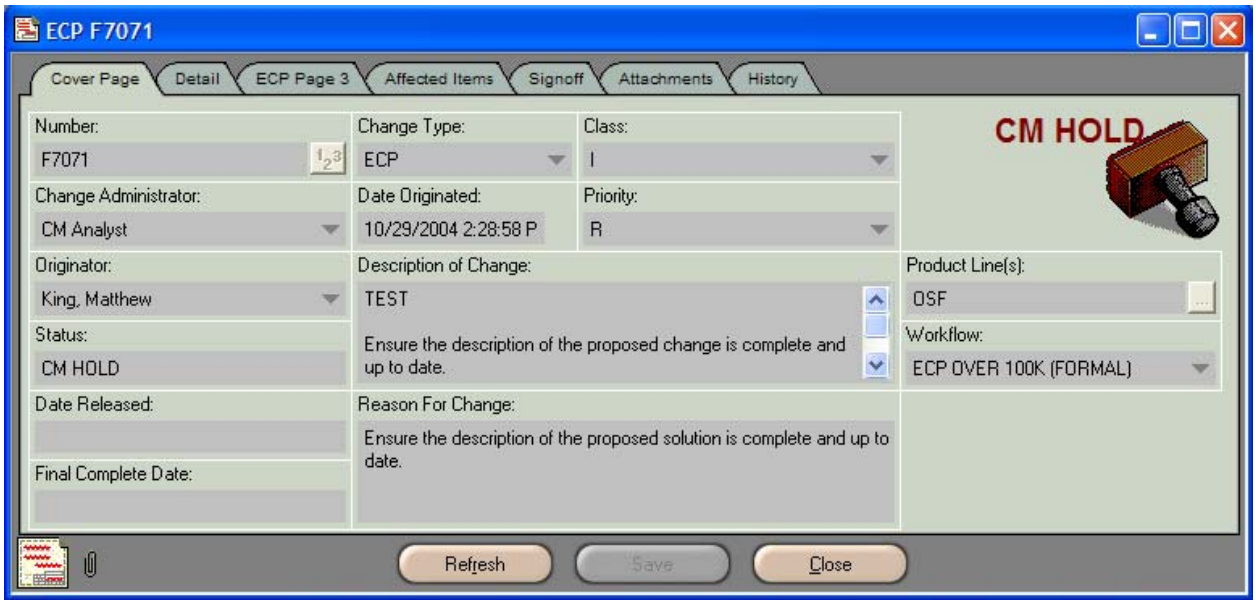
b. When presented to the TRC, if the ECP has no dissenting comments and all TRC members agree, the ECP will be advanced to **Agency Review** status. The Agency Review process for ECPs is explained in **ECPs Over $100,000 (Formal) Section 12** of this document.

c. However, if there are dissenting review comments that cannot be resolved during the TRC meeting, the CM Analyst will move the ECP to **CM Hold – Mediate –** status. Instructions for handling ECPs in CM Hold – Mediate **–** status are explained in **ECPs Over $100,000 (Formal) Section 11** of this document.

11. CM Hold – Mediate -

a. If an ECP with dissenting comments cannot be resolved during the TRC meeting, the ECP is placed in **CM Hold – Mediate –** status. In this status, the CM Analyst will work with the originator and the party that provided the dissenting comments

in an effort to bring the parties to a mutual agreement concerning the ECP. This may require the originator to gather additional data, make adjustments to the ECP, etc.



b. When the ECP moves into CM Hold – Mediate - status, the CM Analyst will have **30 days** to reconcile the dispute concerning the ECP. Agile automatically monitors this process and notifies the CM Analyst when the review cycle has ended.

Please Note: If the ECP has not advanced from CM Hold – Mediate - status by the end of the **30 days**, Agile escalates the ECP to the CM Team Lead for action.

c. Agile will automatically send the originator email notification that the ECP has entered **CM Hold – Mediate –** status. The email will state, "**ECP F7071 has been moved from TRC to CM HOLD for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only."** This is a "canned" message from Agile and cannot be altered by the ROC.

d. Once an agreement has been reached, the CM Analyst will move the ECP from **CM Hold – Mediate –** status and re-introduce it back into the workflow. The ECP can be placed anywhere in the workflow depending on the outcome of the mediation. For example, if the agreement calls for the originator to provide a more detailed description of the proposed solution, the ECP would be returned to **Pending** status to allow the project lead to add the required information. Or, if the agreement was to provide answers to review questions that had not been addressed during the review cycle or the TRC meeting, the ECP could be returned to **TRC** status following receipt of the necessary answers.

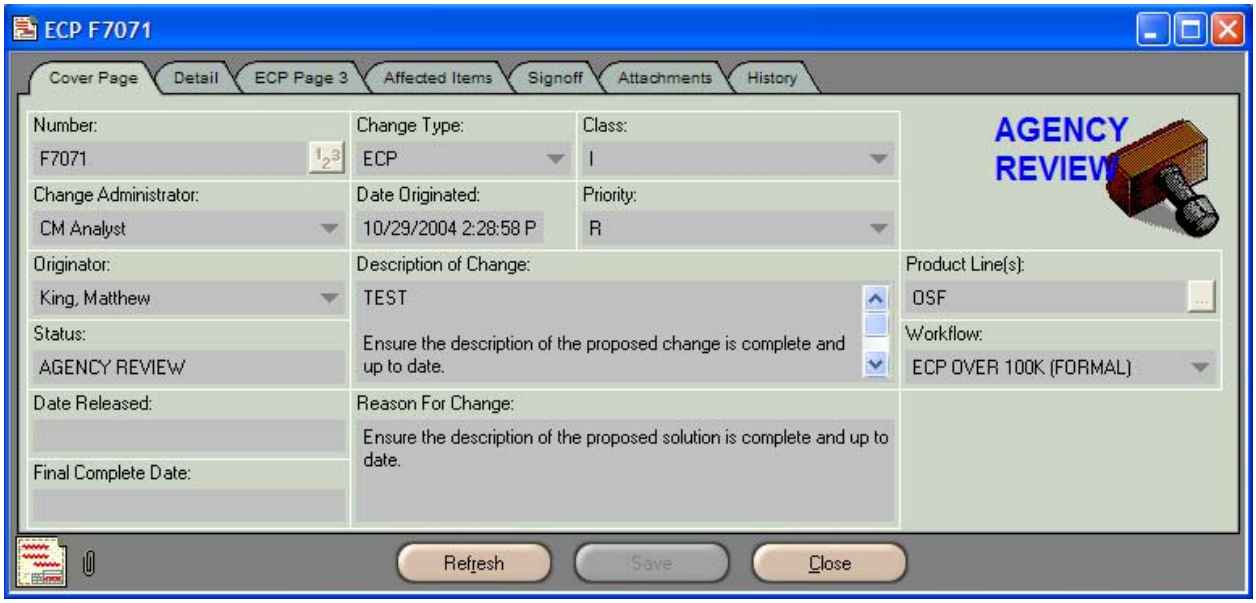
e. When the terms of agreement have been fulfilled and the ECP is ready to be returned to the workflow, the originator is to notify the CM Analyst who will

provide processing instructions for the originator. It is very important that the originator follow these instructions, as they will explain how to move the ECP forward in the timeliest manner and avoid unnecessary delays. The CM Analyst's instructions will be included in the Comments section of the email message.

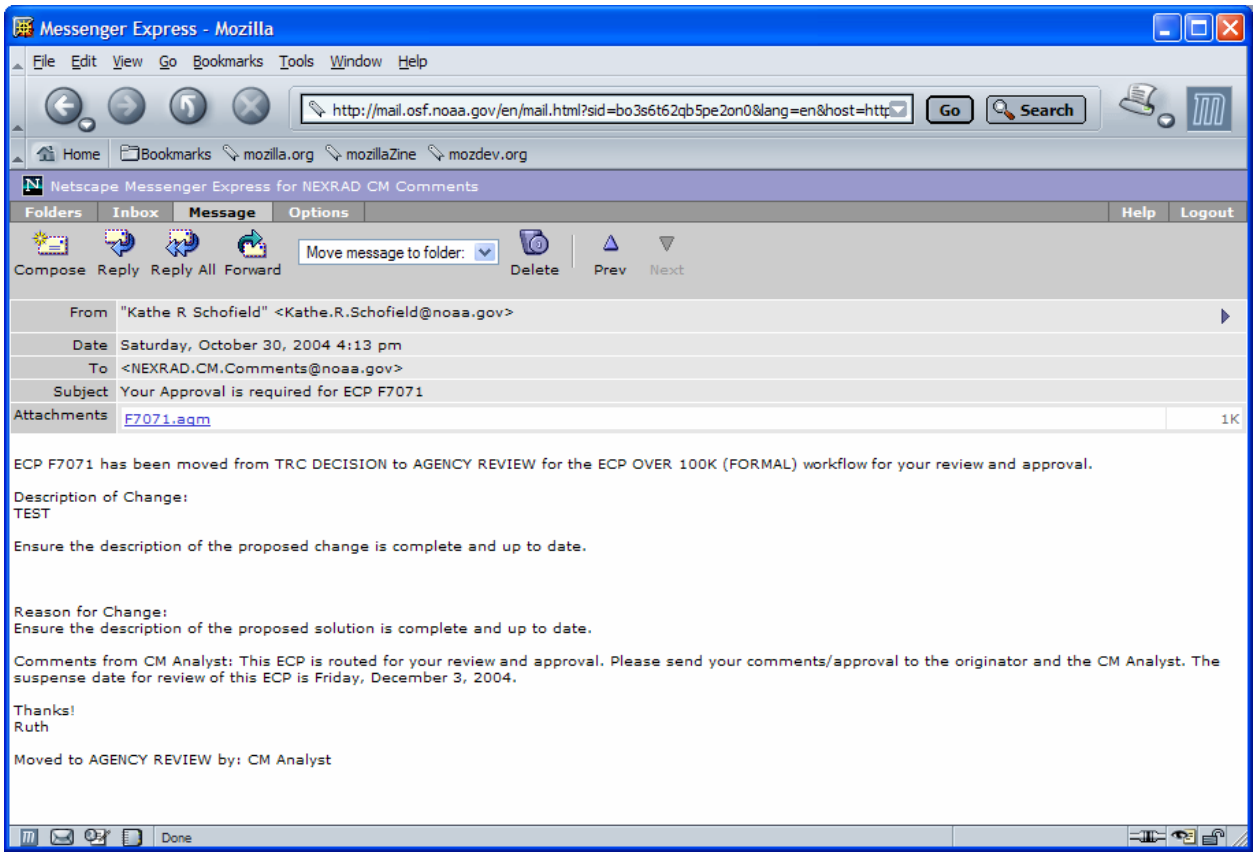
f. Once the ECP is returned to the workflow, it will move forward following the regular steps of the workflow.

12. Agency Review

a. With the TRCs approval, the CM Analyst will route the ECP for **Agency Review**. The WSR-88D Configuration Control Board (**CCB**), consisting of the three agency points of contact and the ROC Director, has approval authority for ECPs with a cost between $100,000 and $1,000,000.



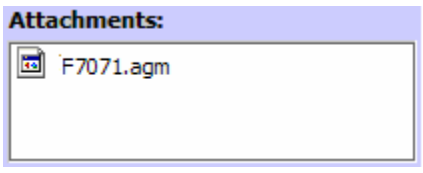
b. When the ECP is routed, Agile will send each CCB member an email notification of the ECP requiring his review.



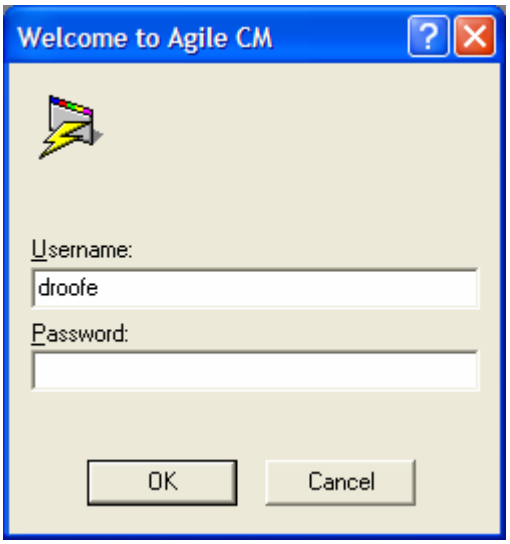
c. When the agency POC receives the ECP for review, he will have **21 days** to provide approval or disapproval of the ECP. Agile automatically monitors this process. If the POC has not provided a decision within **20 days**, he will receive an email reminder from Agile.

Please Note: If a decision is not received by the end of the 21-day review cycle, Agile escalates the ECP to the CM Team Lead for action.

d. To review the ECP, click on the Agile document link (**F7071.agm**) in the email notification, which will launch Agile.



e. The **Welcome to Agile CM** login screen will be displayed. Complete the **Username** and **Password** information and click **OK**.

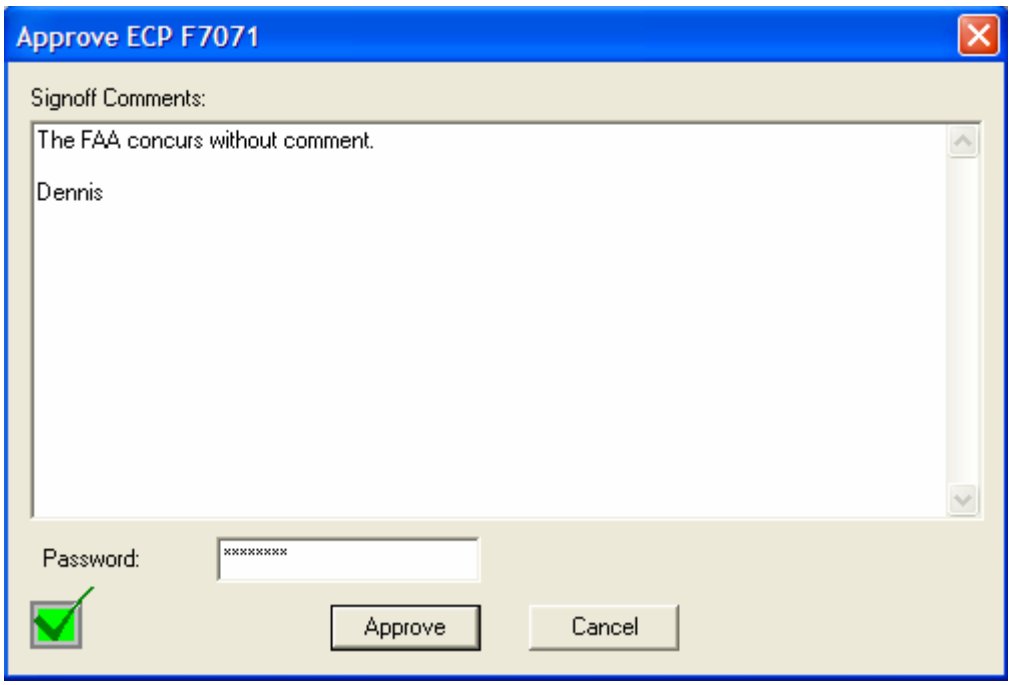


f. The ECP to be reviewed (ECP **F7071**) will be displayed.

g. Review the ECP.

h. To approve the ECP, the agency POC will click the **Approve** button located on the Agile toolbar.

i. The **Approve ECP Fxxxx** (ECP **F7071**) dialog box will be displayed. Enter any review **comments/approval** in the Signoff Comments block, then enter the **password** in the Password block and click **Approve**.



j. Following the approval of the last reviewer, the project lead will receive an email notification when the CM Analyst approves the ECP. The email will state, "**ECP F7071 has been moved from AGENCY REVIEW to CCB for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only**." This is a canned statement from Agile and one the ROC cannot alter.

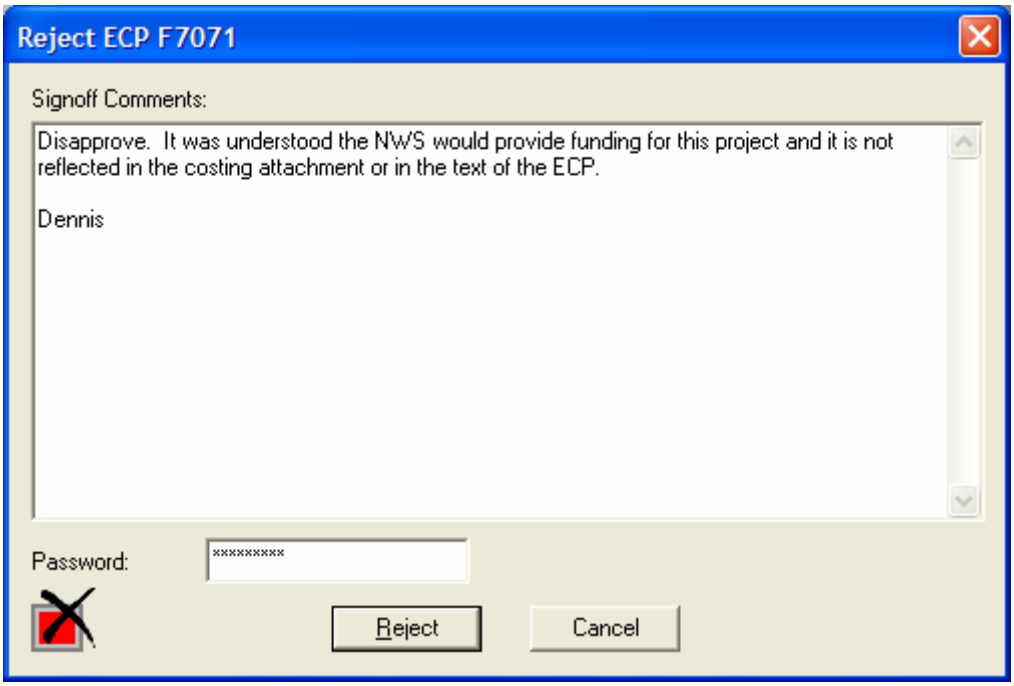
k. At this time the ECP will advance to **CCB** status. The CCB process is explained in **ECPs Over $100,000 (Formal) Section 14** of this WPI.

l. If the agency POCs do not approve the ECP, the ECP can be rejected. Instructions for disapproval and the process for handling rejected ECPs are described in **ECPs Over $100,000 (Formal) Section 13** of this document.

13. ECPs Rejected at Agency Review Status

a. If the agency POC does not approve the ECP, it can be rejected. Click the **Reject** button on the Agile toolbar.

b. The **Reject ECP Fxxxx** (ECP **F7071**) dialog box will appear. Enter the **reason for disapproval** in the Signoff Comments block and list all items in need of attention, e.g., attachments are missing, information is incorrect or incomplete, etc.



c. When all comments have been entered, type the **password** in the Password block and click the **Reject** button.

d. If any agency POCs disapprove the ECP, it will automatically move to **CM Hold – Mediate -** status.

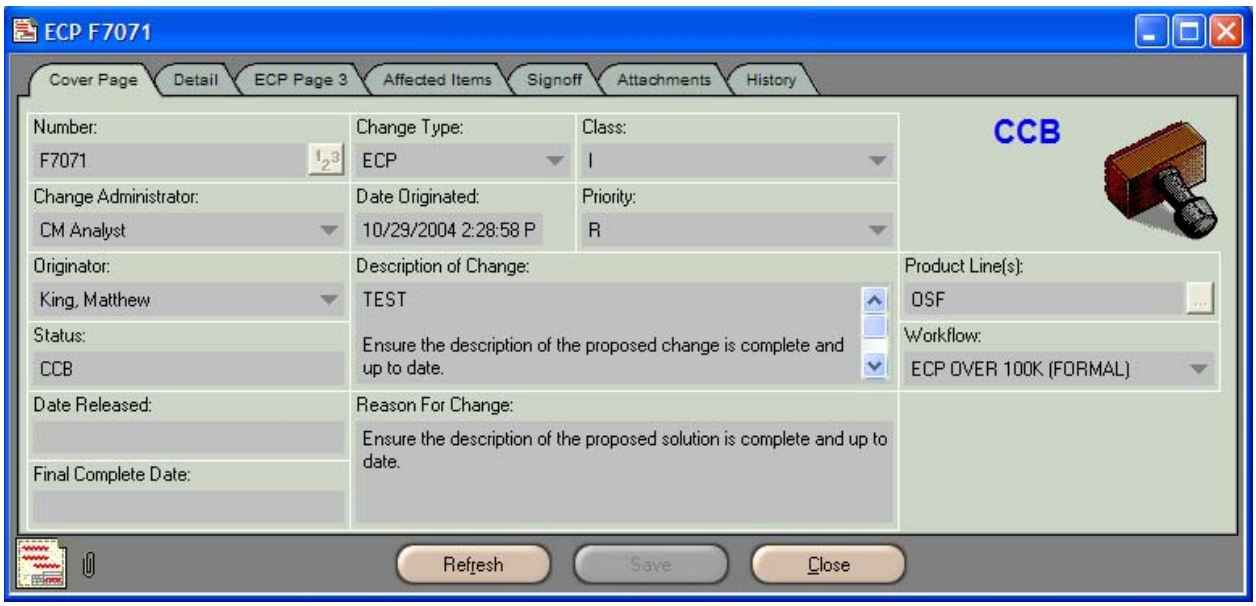
e. Agile will automatically send the originator email notification that the ECP has entered **CM Hold – Mediate –** status. The email will state, "**ECP F7071 has been moved from AGENCY REVIEW to CM HOLD for the ECP OVER 100K (FORMAL) workflow for approval. No action is required. This is for your information only."** This is a "canned" message from Agile and cannot be altered by the ROC.

Please Note: Instructions for handling ECPs in CM Hold – Mediate **–** status are explained in **ECPs Over $100,000 (Formal) Section 11** of this document.

14. CCB

a. Once the ECP has moved to **CCB** status it will remain in this status until it is presented to the CCB at the next scheduled CCB meeting. Agile automatically monitors the length of time the ECP remains at CCB status and notifies the CM Analyst when the allotted amount of time for an ECP in CCB status has expired.

Please Note: If the ECP has not moved from CCB status by the end of the **30-day** allotted time period, Agile escalates the ECP to the CM Team Lead for action.

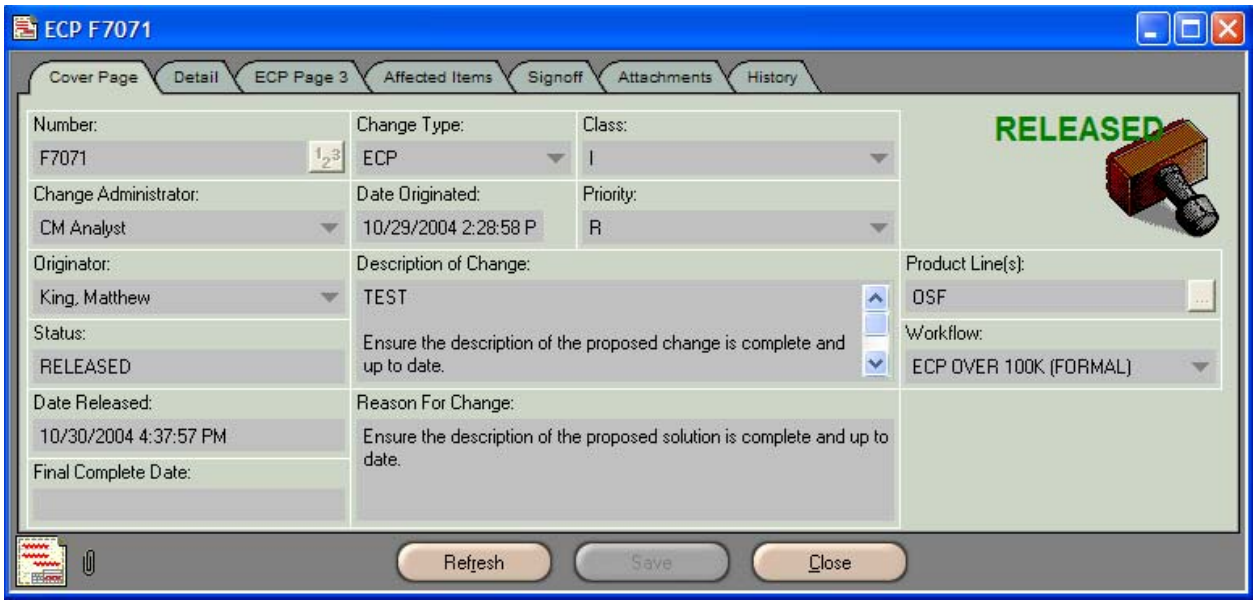


b. When presented to the CCB, if the ECP receives no dissenting comments and all CCB members agree, the Formal ECP will be approved and advanced to **Released** status. The Released process is explained in **ECPs Over $100,000 (Formal) Section 15** of this document.

c. If an agency POC provides dissenting comments or disapproves the ECP during the CCB meeting, the ECP will be moved to **CM Hold – Mediate –** status. Instructions for handling ECPs in CM Hold – Mediate **–** status are explained in **ECPs Over $100,000 (Formal) Section 11** of this WPI.

15. Released

a. The **Released** status in the Agile ECP workflow means the ECP has been approved by the appropriate approval authority – the **CCB** for ECPs costing $100,000 - $1,000,000.



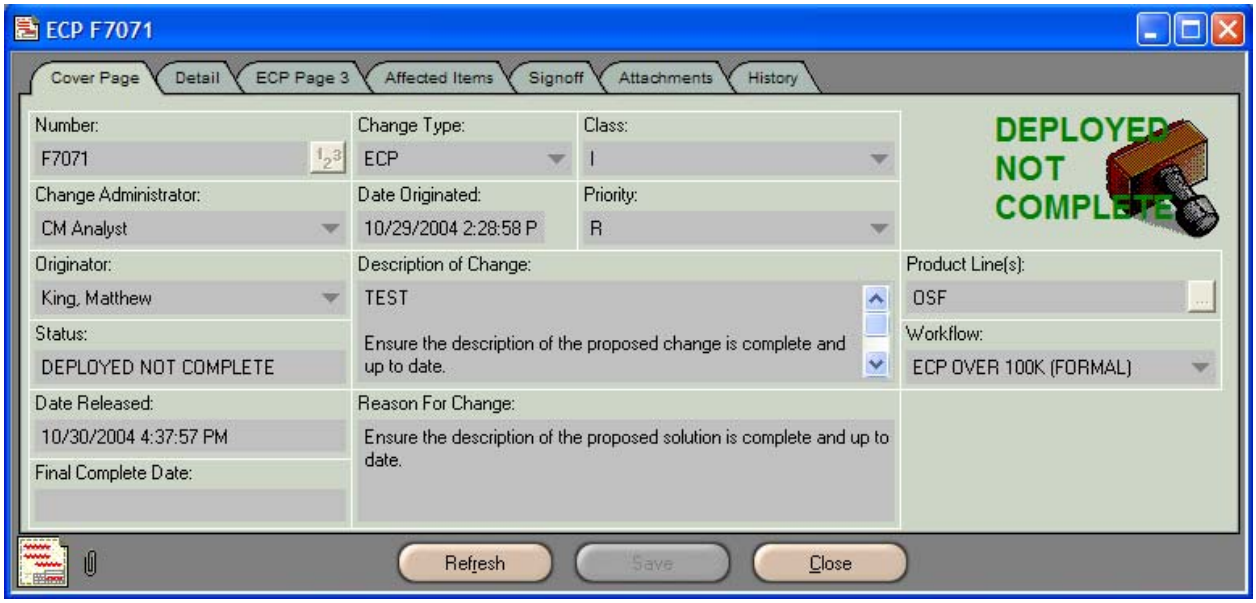
b. The project lead will receive an email notification when the CM Analyst approves the ECP for release. The email will state, "**ECP F7071 has been moved from CCB to RELEASED for the ECP OVER 100K (FORMAL) workflow. No action is required. This is for your information only.**" This is a "canned" message from Agile and cannot be altered by the ROC.

c. If there are outstanding deliverables for the ECP, the CM Analyst will advance the ECP to **Deployed – Not Complete –** status and send the originator and team members email notification explaining the status change and their responsibility to notify the CM Analyst when these deliverables are complete. **The Deployed – Not Complete –** process is explained in **ECPs Over $100,000 (Formal) Section 16** of this document.

d. If the ECP is complete and has no outstanding deliverables when released, the ECP will be advanced to **Deployed** status. The **Deployed** process is explained in **ECPs Over $100,000 (Formal) Section 17** of this document.

16. Deployed – Not Complete –

a. If an ECP is approved, yet has outstanding deliverables, the originator and team members have a requirement to notify the CM Analyst when these deliverables are complete. The CM Analyst will send the originator and team members email notification explaining this requirement. Agile automatically monitors this process and will notify the CM Analyst if the ECP has not advanced from **Deployed – Not Complete –** status within **60 days**, at which time the CM Analyst will contact the originator and each team member for a status update.

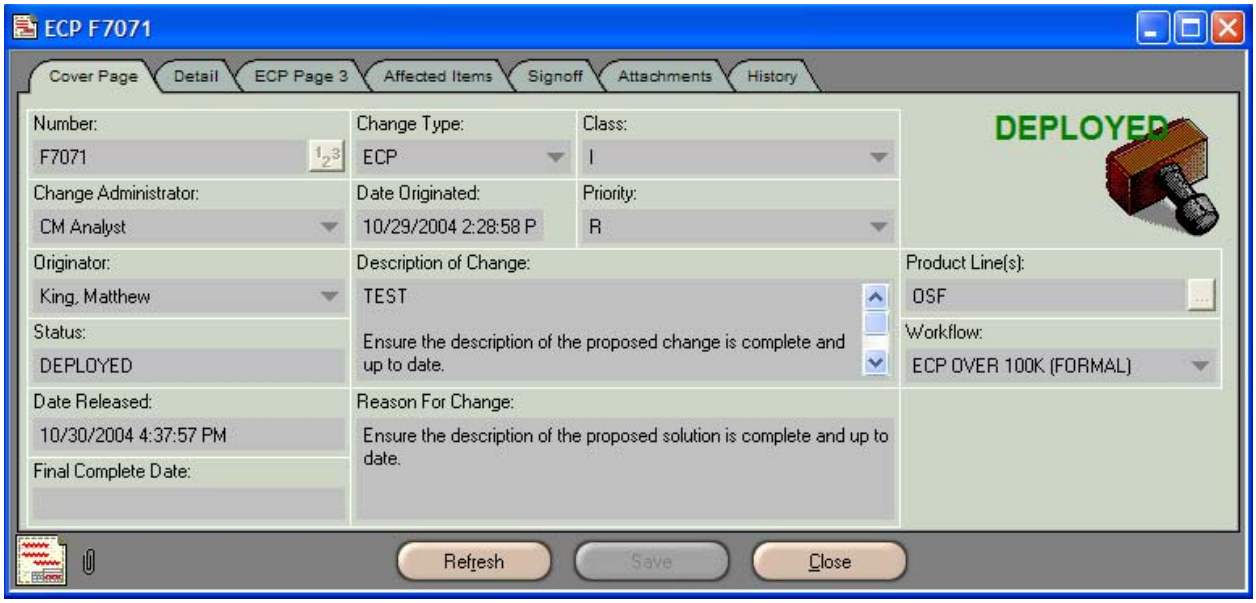


b. If the deliverables have yet to be completed, the ECP will remain in **Deployed – Not Complete –** status and the **60-day** cycle will begin again. **Deployed – Not Complete - steps 16a-16b** will be repeated until the ECP deliverables have been completed.

c. Once the CM Analyst receives notification that all deliverables have been completed, the ECP will be advanced to **Deployed** status. Agile will send the project lead email notification of the status change.

17. Deployed

a. Upon notification that all outstanding deliverables have been completed, the CM Analyst will advance the ECP to **Deployed** status.



b. Agile will send the originator email notification of the change in status.

c. The completion of the ECP will be reported in the TRC agenda/minutes.

18. Revision or Change to an ECP

Please Note: Appendix H contains a table describing circumstances in which an ECP would require a **revision** or a **change**.

a. If an ECP requires a revision or change, the CM Analyst will produce the ECP template and send it to the project lead.

b. The project lead will update the Cover Page Description of Change and Reason For Change blocks to explain how the revision differs from the base ECP.

c. Complete the Detail tab CI/CPCI Number/Title; Technical Manuals; Est Hard Costs; Soft Costs; Associated CCRs/ECOs/PCRs; and Deployment Date blocks with the revision information that differs from the information included in the base ECP.

d. Complete the ECP Page 3 blocks as necessary.

e. Attach the three required attachments (**Attachment C –** Costing; **Attachment M –** Modification/Retrofit Plan/Effectivity; **Attachment S –** Schedule) using the following naming convention:

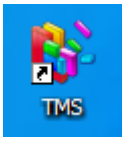
ECP FxxxxR1 Attachment A – Additional Information
ECP FxxxxR1 Attachment C – Costing
ECP FxxxxR1 Attachment M – Modification/Retrofit Plan/Effectivity
ECP FxxxxR1 Attachment S - Schedule
(Where FxxxxR1 is the ECP number, e.g., ECP F7071R1 Attachment A – Additional Information.)

Use this naming convention on any additional attachments, e.g., ECP F7071R1 Attachment T – Team Meeting Minutes; ECP F7071R1 Attachment I – Warning Instructions; ECP F7071R1 Attachment O – Obstruction Light Diagram; etc.

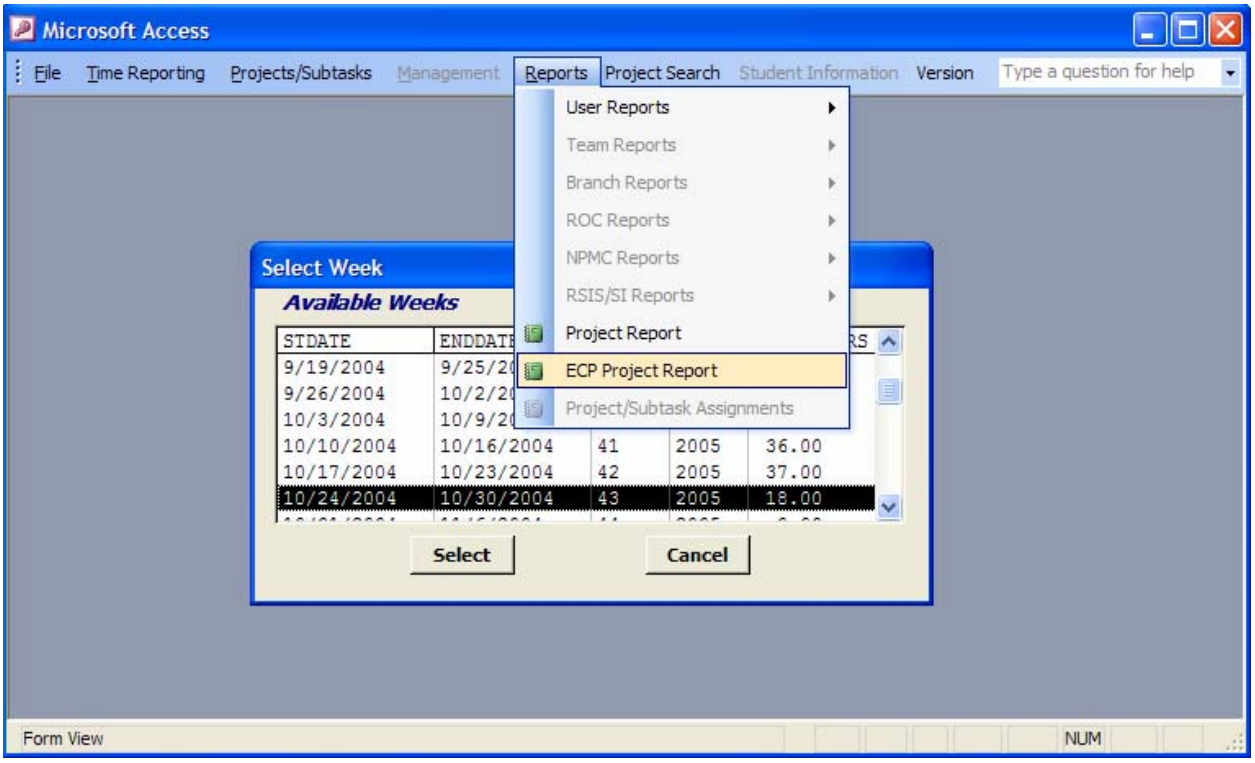
If a schedule, modification/retrofit plan, or effectivity list are not applicable, add the templates to the attachments tab. In the attachment make the notation "**Not Applicable**" and include an explanation as to why the data the attachment would normally contain is not applicable. For example, if the revised ECP changes the costing in an amount greater than $2500 due to the need for an additional part in the kit, but there was no change to the deployment schedule, the revised ECP would require a costing attachment and modification/retrofit/effectivity plan, but not a new schedule. In this case, all three attachments would be added to the ECP. The costing attachment would contain a breakdown of the new costs. The modification/retrofit/effectivity plan would be updated to include the new kit requirements. The schedule attachment would contain a statement similar to the following, "Not Applicable. This revised ECP causes no change to the schedule that was provided for the original ECP." This will ensure uniformity of all ECPs and will notify the reviewers that the information was not overlooked, but rather deemed unnecessary for the project at hand.

f. Once all required ECP blocks have been completed and attachments attached, the ECP will follow the regular steps of the workflow beginning at **Section 2** of this WPI, **Routing for Project Team Review**.

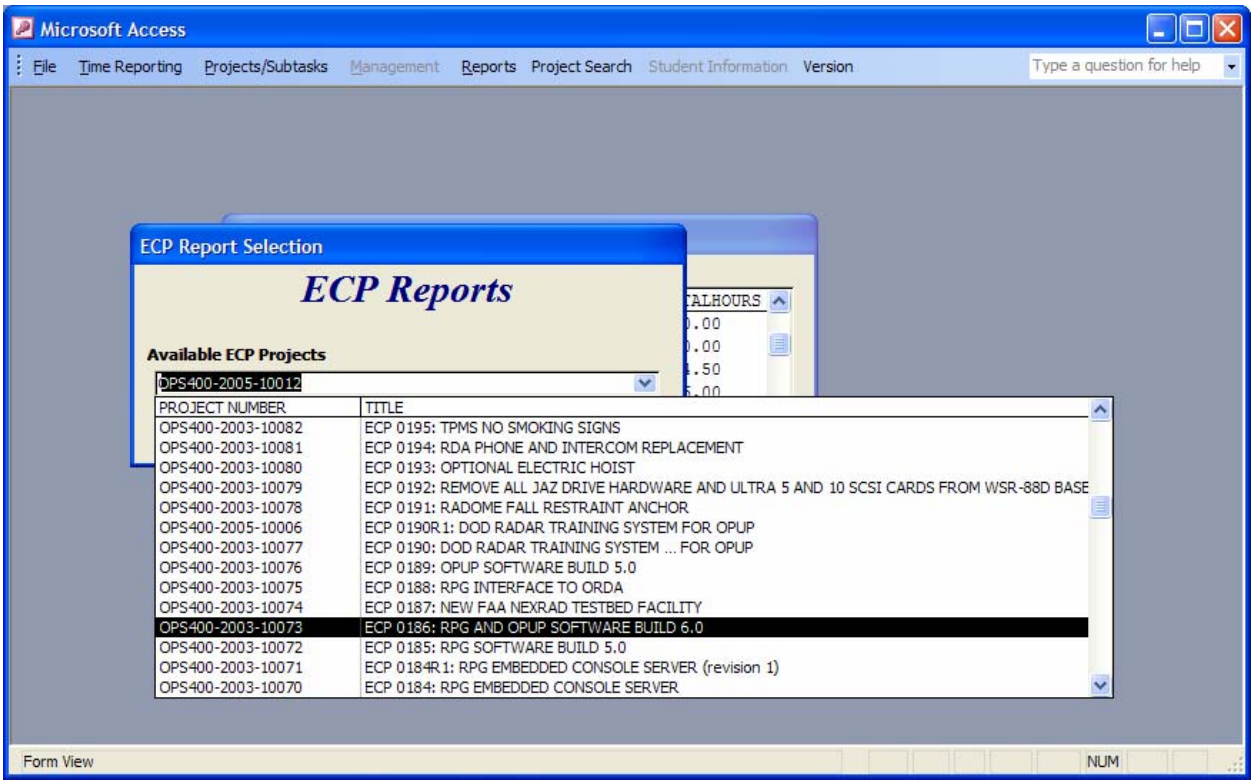
Appendix A - Team Member Hours in TMS

1. Open **TMS** using the desktop TMS icon. 

2. From the TMS toolbar, select **Reports** to display the Reports drop-down menu, and then select **ECP Project Report**.

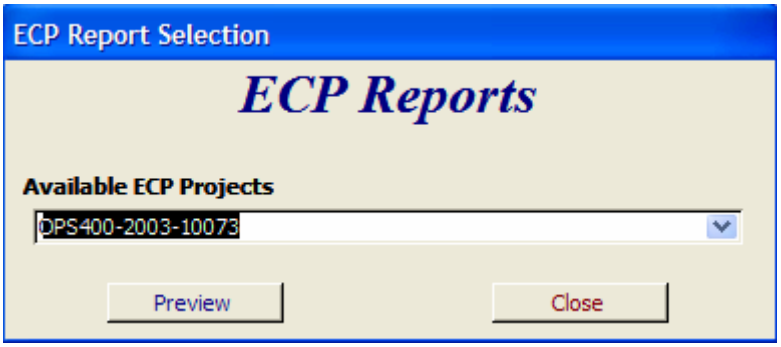


3. The **ECP Report Selection** dialog box will be displayed. Click on the blue down arrow located on the right-hand side of the **Available ECP Projects** window. The Available ECP Projects drop-down menu will be displayed.



4. Using the scroll bar on the right-hand side of the drop-down menu, scroll through the available ECPs to locate the desired ECP.

5. To select the ECP, click on the **ECP title**. Then click the **Preview** button on the bottom of the **ECP Report Selection** dialog box.



6. An **ECP Report** will be displayed, which provides a total number of hours worked on the project listed by branch, by section, and total project hours.

ECP REPORT

OPS400-2003-10073

ECP 0186: RPG AND OPUP SOFTWARE BUILD 6.0

APPS		
	APPS	1840.15
	Total Branch Hours	**1840.15**
DIR		
	DIR	31.25
	Total Branch Hours	**31.25**
ENG		
	ENG	4.50
	SW	13740.43
	SYS	71.00
	Total Branch Hours	**13815.93**
OPS		
	EMS	2.00
	FST	17.00
	OPS	69.50
	ROT	3777.00
	Total Branch Hours	**3865.50**
PGM		
	CMT	1288.50
	PGM	5.00
	RMT	48.00
	SDT	2149.00
	Total Branch Hours	**3490.50**
	Total Project Hours	**23043.33**

Wednesday, October 27, 2004

Appendix B – CI/CPCI/Tech Manual Tables

CI Number	CI Title
CI-01	Tower/Utilities
CI-02	Antenna/Pedestal
CI-03	Transmitter
CI-04	Receiver Signal Processor
CI-05	RDA Control
CI-06	Wideband Communications
CI-07	RPG Equipment
CI-08	PUP/RPGOP Equipment
CI-09	RDA Equipment
CI-11	Archive II
CI-12	OPUP Equipment
CI-14	Signal Processor
CI-15	RDA Host
CI-16	DAU
CI-21	ORDA Power Management
CI-30	MSCF Equipment

CPCI Number	CPCI Title
CPCI-01	RDASC
CPCI-02	Signal Processor
CPCI-03	RPG
CPCI-04	Product Display (PUP)
CPCI-05	Graphics Display
CPCI-06	RDASTS
CPCI-07	Data Processing
CPCI-08	Graphics Display Diagnostics
CPCI-09	OPUP Applications
CPCI-10	OS (Concurrent)
CPCI-11	RPG Solaris Operating System
CPCI-13	Data Management
CPCI-14	RRRAT
CPCI-17	Pedestal Firmware
CPCI-18	MSCF Software
CPCI-19	RDA Control Program
CPCI-21	Sigmet RVP08 Program
CPCI-22	SDS/CM
CPCI-23	RPG Software Support Tools
CPCI-24	V&V
CPCI-25	Sigmet RCP08
CPCI-26	Adaptable and Geographic Data
CPCI-27	Sigmet Utilities
CPCI-28	Performance Analysis
CPCI-29	ORDA Linux Operating System
CPCI-33	Signal Proc. Assembler
CPCI-38	ORDA Software Support Tools
CPCI-48	OPUP Software Support Tools
CPCI-49	OPUP Solaris Operating System

Technical Manual Number	Technical Manual Title
	Adaptable Parameters Volume I RPG
	Adaptable Parameters Volume II PUP
	Adaptable Parameters Volume III RDA
	Adaptable Parameters Volume IV ORPG
EHB 6-500	System
EHB 6-501	IPB
EHB 6-502	WUC
EHB 6-503	PMI
EHB 6-503-1	PUP Workcards
EHB 6-503-2	RDA RPG RPIE WBC Workcards
EHB 6-503-9	Depot PMI Cards
EHB 6-505	SCSI
EHB 6-510	RDA Maintenance
EHB 6-510-1	RDA Users Guide
EHB 6-510-2	RDA SOT Users Guide
EHB 6-511	Transmitter
EHB 6-512	Single Dehydrator
EHB 6-512-1	Dual Dehydrator
EHB 6-513	LPP Pedestal Maintenance
EHB 6-514	FSP Pedestal Maintenance
EHB 6-520	RPG Maintenance
EHB 6-521	UCP Operators Manual
EHB 6-521-1	UCP Users Guide
EHB 6-523	MMP-200 Printer Guide
EHB 6-524	Okidata Microline 184 Turbo Printer Handbook
EHB 6-525	ORPG Maintenance Manual
EHB 6-526	ORPG User’s Guide
EHB 6-530	PUP Maintenance
EHB 6-531	PUP Operators Manual
EHB 6-531-1	PUP Users Guide
EHB 6-532	Color Printer
EHB 6-533 Volume I	Color Printer Print Engine
EHB 6-533 Volume II	Color Printer Print Engine

EHB 6-540	WBC Maintenance
EHB 6-541	MLOS Manual
EHB 6-545	WBC Maintenance
EHB 6-550	RPIE Maintenance
EHB 6-551-1	Bard AC
EHB 6-551-10	Onan Generator Installation Manual – Model DGDA Generator Set
EHB 6-551-11	Onan Generator Operator's Manual – OTIII Transfer Switch
EHB 6-551-12	Onan Generator Installation Manual – OTIII Transfer Switch
EHB 6-551-13	Onan Generator Service Manual – OTIII Transfer Switch
EHB 6-551-2	Chemtron Fire Systems – Testing Inspection and Maintenance
EHB 6-551-3	Chemtron Fire Systems – Micro Junior Control Panel
EHB 6-551-4	Chemtron Fire Systems – Micro 1-EV Control Panel
EHB 6-551-5	Onan Generator Cummins Engine Operation and Maintenance
EHB 6-551-6	Cutler-Hammer Safe Install Operate and Maint of Panel Boards 600V or Less
EHB 6-551-7	Drexelbrook Install and Operate Fuel Level Sensor
EHB 6-551-8	ESSCO Model S38-90 Radome
EHB 6-551-9	Onan Generator Operators Manual – Model DGDA Generator Set
EHB 6-552	Kohler Generator
EHB 6-553	Redundant RPIE
EHB 6-554-1	Installation and Operations Guide - TPS (Roesel Motor Generator)
EHB 6-554-2	Environmental Control Unit
EHB 6-554-3	Electric Toilet Unit
EHB 6-554-4	Unit Heater
EHB 6-560	Level II
EHB 6-561	8500 Cartridge Tape System
EHB 6-562	Cartridge Handling Subsystem
EHB 6-563	APC Backups Users Manual
	PUP Operator Handbook Volume I
	PUP Operator Handbook Volume II
	PUP Operator Handbook Volume III
	RDA/RPG Info Frame
	RDA/RPG Remote Access Terminal Quick Reference Sheet
	UCP Info Frame (Build 10.0)
	UCP Job Sheets
	Users Guide – RDA/RPG Remote Access Terminal

Appendix C - ECP ATTACHMENT A

ECP ATTACHMENT A

Additional Information

Cover Page, Description of Change – Enter additional information.

Cover Page, Reason For Change – Enter additional information.

Detail Tab, Associated CCRs/ECOs/PCRs – Enter additional information.

ECP Page 3, Effects on Configuration – Enter additional information.

ECP Page 3, Trade-Offs/Alt Solution – Enter additional information.

ECP Page 3, Trade-Offs/Alt Solution – Enter additional information.

Appendix D – ECP ATTACHMENT B

Business Case Instructions

NATIONAL WEATHER SERVICE INSTRUCTION 80-601

[EFFECTIVE DATE]

Science and Technology
Research and Analysis

BUSINESS CASE ANALYSIS

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/

OPR: W/OST11 (L. Stang) **Certified by:** W/OST1 (F. Kelly)

Type of Issuance: Initial.

SUMMARY OF REVISIONS: None. This is the initial issuance.

SUMMARY: This instruction defines the elements of a business case analysis (BCA). A BCA is needed to define and justify investments in alternative solutions that support the NWS Strategic Plan and mission, satisfy operational requirements, and provide a return on investment that is equal to or better than alternative uses of funding. This instruction also identifies the need for documentation of the appropriate results of a resources and analysis effort.

_____

Jack L. Hayes Date

Director, Office of Science
and Technology

Business Case Analysis

1. Introduction: The BCA:

   a. Articulates the business case for alternative solutions

   b. Identifies costs, scope, schedule, and risks early in the lifecycle, before funds are spent

   c. Facilitates obtaining of approval and funding to proceed with development

A BCA is a critical element in demonstrating to NWS and NOAA management that a program is a prudent investment and will support and enhance the NWS's ability to meet current and planned demand for its products and services. The BCA also assists NWS program managers and management in meeting programmatic and budgetary review requirements.

2. Purpose and Scope: This instruction specifies the components of a business case analysis. Each program should develop a business case that demonstrates program spending supports the NOAA Strategic Plan and NWS mission and will provide a return on investment that is equal to or better than alternative uses of funding. This instruction implements NWS Policy Directive 80-6, Research and Analysis for Improving Operations and Services, and supports the NWS Operations and Services Improvement (OSI) process.

2.1 A BCA is prepared to:

   a. Justify funding requests in order to demonstrate satisfaction of NWS requirements

   b. Present the proposed system in such a favorable, but realistic, light with respect to budgets, schedule, alignment with the NWS mission, and compliance with the NWS Information Technology architecture that it must be approved over all other initiatives

   c. Document the results of the research and analysis phase that include, as appropriate, the development of a project plan for operational development and requirements specification, all of which should support the NWS OSI process

3. Program Product Standards: This section defines the standard template for a BCA. Each subsection below defines a BCA component, which typically follows the format of and content contained in an Exhibit 300 (Capital Asset Plan and Business Case) or similar document.

The BCA is intended to be the culminating document, in conjunction with a requirements specification and operational development project plan, for evaluation by the OSI standing committee for approval to move into the operational development phase of the OSI process. Each subsection below defines a component of the BCA:

3.1 Investment Description: This section introduces the proposed system and presents an overview of the system functionality. It defines the system goals and objectives, and aligns the system goals and objectives with the NOAA/NWS goals and objectives. This section also lists all assumptions concerning the system and its implementation, including scope, schedule, workload, dependencies, technology, growth, interfaces, and lists the external factors or constraints, including time, budget, organizational structure, legislation, and physical factors.

3.2 Justification: This section describes how this investment meets NWS requirements and demonstrates how the investment supports the NWS mission, strategic goals and objectives, reduce costs or improves efficiencies; identify customers and stakeholders, alternative sources that could perform this function, and agencies and organizations affected by this initiative. This effort should be collaborative and include industry, multiple agencies, and use e-business technologies;

3.3 Performance Goals and Measures: This section provides performance goals and measures and link them to the annual performance plan, NWS mission, goals, and strategic plan. The goals must be clearly measurable investment outcomes, and, if applicable, investment outputs.

3.4 Current State Assessment: This section presents the concept of operations for the current system. This includes a discussion of the current workload, customers and stakeholders, as well as shortcoming of the current operations. In addition, this section shall summarize the requirements.

3.5 Future State Assessment: This section shows the to-be model of the proposed system and includes expected workload and growth, future customers and stakeholders, and a to-be concept of operations. This section should include a description of how the future system will meet the requirements stated in section 3.4.

3.6 Project (Investment) Management: This section describes the experience, training, education, organizational and support structure, and capabilities (skill set) of the project (investment) management team.

3.7 Alternatives and Cost/Benefit Analysis: This section looks at alternatives for the proposed system from a technical, programmatic, compliance, and management perspective. Evaluation criteria is identified and weighted. Identify at least three alternatives. Estimate the life cycle costs, including resources, maintenance, and sustainability. Identify the benefit of the proposed

system and estimate their value or benefit. Provide comparisons of the evaluation for each alternative. Evaluate each alternative against the evaluation criteria and select the best choice.

3.8 Risk Inventory and Assessment: This section identifies and categorizes risks. Risks are identified in the following categories: business or programmatic, technical, schedule, resource, and cost. Determine the probability of each risk occurring and well as the probable impact if the risk does occur. Identify a mitigation strategy for each risk, with milestones and completion dates. Risk assessments must include the schedule, initial costs, life-cycle costs, technical obsolescence, feasibility, reliability of systems, dependencies and interoperability between this investment and others, surety (asset protection) considerations, risk of creating monopoly for future procurements, capability of the agency to manage this investment, and overall risk of investment failure.

3.9 Acquisition Strategy: This section addresses how the acquisition of resources is expected to be accomplished, to include possible contractor support, and the need for development and operational sites. Expected performance evaluation methodology, such as an incentive fee, should be described.

3.10 Project (Investment) Lifecycle Schedule and Funding Plan: This section identifies major activities and milestones, funding sources, and addresses possible contract delivery and reporting requirements. Dependencies should be identified, along with the critical path. Demonstrate use of Earned Value Management System that meets ANSI-EIA-748-98, for both government and contractor costs, for those parts of the total investment that require development efforts, and show how close the investment is to meeting the approved cost, schedule, and performance goals.

3.11 Enterprise Architecture (EA): This section identifies how the proposed system conforms to the NWS EA and capital planning and investment control processes. This section should also describe the relationship between the investment and the business, data, application, and the technology layers of the EA.

3.12 Security and Privacy: This section describes the security and privacy processes and planning efforts for this proposal. All investments should demonstrate up-to-date security plans and be fully certified and accredited before becoming operational. In addition, current and projected security costs, security performance gaps, and how such funding will close the performance gaps. The NWS must demonstrate that they have fully considered privacy in the context of this investment. The NWS must comply with Section 208 of the E-government Act and, in appropriate circumstances, conduct a privacy impact assessment that evaluates the privacy risks, alternatives, and protective measures implemented at each stage of the information life cycle.

3.13 Government Paperwork Elimination Act (GPEA**)**: If this investment supports electronic transactions or record-keeping covered by GPEA, this section will briefly describe the transaction of record-keeping functions and how this investment relates to the NWS GPEA plan.

4. Responsibilities:

4.1 The Director, Office of Science and Technology (OS&T), and Office of Hydrological Development (OHD), as appropriate, will:

a. Lead the effort to develop and coordinate the BCA

b. Coordinate with NWS headquarters offices and, when necessary or directed, with NOAA and the Department of Commerce, in developing the BCA

4.2 The Office of Climate, Water, and Weather Services, the Office of Operational Systems, the Office of the Chief Information Officer, the National Centers for Environmental Prediction, and Regions will coordinate with OS&T and OHD, as appropriate, in developing the BCA.

4.3 OSI Standing Committee: Verifies the BCA has been completed prior to proceeding into the operational development phase.

References

1. OMB Circular A-11, Part 7, *Planning, Budgeting, Acquisition, and Management of Capital Assets*, July 2003
2. NWS Policy Directive 10-x, *Operations and Services Improvement Process*
3. NWS Policy Directive 10-x, *User Needs and Scientific/Technologic Opportunities*
4. NWS Policy Directive 10-x, *Operational Requirements Validation*
5. NWS Policy Directive 30-1, *Systems Deployment, Maintenance, and Assessment*
6. NWS Policy Directive 80-1, *Acquisition Program Management*
7. NWS Policy Directive 80-3, *Systems Engineering*
8. NWS Policy Directive 80-4, *Science and Technology Planning and Programming*
9. NWS Policy Directive 80-5, *Science Review and Approval*
10. NWS Policy Directive 80-6, *Research and Analysis for Improving Operations and Services Improvement*
11. NWS Policy Directive 80-8, *Development for Improving Operations and Services*
12. NWS Instruction 80-602, *Operational Development Project Plan*
13. NWS Instruction 80-603, *Requirements Specification*
14. ANSI-EIA-748-98, *Earned Value Management Systems*, June 1998

BUSINESS CASE EXAMPLE

National Weather Service

Business Case Analysis

Radar Product Generator (RPG) Processor Technology Refresh

Approved: Date:

Richard J . Vogt

Director, Radar Operations Center

Norman, Oklahoma

Business Case Analysis

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Business Case Analysis

Introduction:

The Tri-agency Doppler Weather Radar, WSR-88D, Radar Product Generator (RPG) is facing parts obsolescence with the 5 year-old host CPU assembly. The Original Equipment Manufacturer (OEM), SUN Microsystems, has declared this unit End of Production and End of Life. The National Reconditioning Center (NRC) is faced with dwindling third party sources and increasing dependence on refurbished parts. Failure to implement a replacement solution will subject the NEXRAD Program to radar outages due to spare parts shortages and the inability to add new science because of processor capacity limitations. The purpose of this Business Case Analysis (BCA) is to explore available alternatives and to propose the optimum solution to replace the obsolete hardware. The solution must be comprehensive; meeting today's needs in a cost-effective manner and providing expansion. This BCA examines alternatives against feasibility, associated schedule, costs, risks and ability to meet requirements.

Purpose and Scope:

This BCA is submitted with the intent to follow the Operations and Services Improvements (OSI) BCA format per National Weather Service (NWS) Policy Directive 80-6 as much as possible. However, this BCA must be approved by the triagency NEXRAD Program Management Committee (PMC), so the format has been modified as needed to accommodate triagency review and approval.

Program Product Standards:

The BCA is intended to be the basic document to gain PMC approval in order to move into the operational development phase of the OSI process. Each subsection below defines a component of the BCA. The basic requirements specification, the NEXRAD System Specification (SS), remains unchanged by this project. In the Operational Development Phase, the Radar Operations Center (ROC) will produce the Operational Development Project Plan. This plan will provide details on the acquisition and deployment philosophy.

Investment Description:

The general functions of the RPG are a weather radar product generator, an algorithm engine, and a real time communications manger. Weather data is archived for up to 6 hours, after which newer data over writes old data. The current host processor assembly, UD70A7, has been the backbone of the RPG functional area. It has proven itself to be a low cost, open alternative to the proprietary mainframe computer and operating system it replaced 5 years ago. Systems are owned by the NWS - 121 sites, the Department of Defense (DoD) - 26 sites, and Department of Transportation (DOT) for the Federal Aviation Administration (FAA) - 12 sites (each site includes 2 RPGs). The RPG provides accurate and timely data from the Radar Data Acquisition (RDA) unit in accordance with the primary goals of the NOAA/NWS Strategic Plan. Training and support sites facilitate education and system development (NWS - 8, DoD - 3, DOT/FAA – 2.) Users include: National Weather Service Weather Forecast Offices, the Office of Hydrology, the Storm Prediction Center, the National Climatic Data Center, the Air Weather Service, user commands at Air Force Bases and the FAA. Development and support organizations include the Radar Operations Center, the National Severe Storms Laboratory, the National Weather Service Training Center (NWSTC), the National Reconditioning Center (NRC), the National Logistics Support Center (NLSC) and the Air Educational and Training Command (at Keesler Air Force Base.)
Two trends are converging to force the replacement of the RPG.
Application software builds have accelerated from "every other year" to "twice a year." This allows rapid deployment of driver fixes, security upgrades, algorithm enhancements, and new science. New software has been added to the RPG processor without capital investment in new processor hardware. The existing RPG processor is rapidly reaching the maximum processing capacity. Testing confirms the existing processor will

not have the capability to support new science expected in RPG software Build 9. (Estimated release date of Build 9 is September 2006)

The OEM, SUN Microsystems, has declared the core component (SUN Ultra 10) of the existing RPG CPU "end of production" and identical SUN hardware is no longer available as a new item. Commercial resellers have limited numbers of hardware at high prices and the largest source of spare parts is the third party, refurbished parts industry.

The refresh RPG processor must address parts obsolescence, incorporate the lessons learned with the existing processor assembly, and have the ability to meet requirements beyond RPG software build 8. The initial focus is to ensure the replacement unit meets the existing NEXRAD SS. Part of that analysis is to examine the existing hardware to determine inherent weak points in the architecture and make cost effective improvements.

Justification:

Existing system hardware is no longer manufactured or offered by the OEM. Spare parts are becoming scarce and usually cost more than current, comparable and commercially available components. ROC testing of the Ultra 10 processor has shown that:

1. Implementation of new requirements force the existing CPU reserves to zero
2. Insufficient RAM memory triggers use of virtual memory, causing disk input/output (I/O) bandwidth to reach critical levels. Excessive disk I/O bandwidth usage has played a part in excessive hard drive failures.
3. The existing system lacks the resources to fully implement complex changes beyond build 8, such as the following:
    a. High-resolution and super resolution products
    b. Ingest or analysis of additional data streams such as Machine Intelligent Gust Front Algorithm (MIGFA) or Dual Polarization
    c. Faster or more comprehensive Volume Coverage Patterns (VCPs)

There is now a need for a high density, removable media storage device for security audit logs.

In addition to the above, NRC support must be considered. With OEM support for the Ultra 10 dwindling, the NRC is forced into the third party, refurbished market to find repair parts. This alone requires that each individual refurbished part be inspected and tested, vice testing a sample percentage as is done for new hardware procurements.

Due to the nature of the initial deployment, the RPG CPU is an assembly. The CPU assembly consists of the SUN Ultra 10 processor plus SUN and other third party SUN compatible cards installed by the NRC. After assembly, a SUN Ultra 10 must be retested as a final RPG CPU assembly before it can be placed into stock. The labor costs to purchase, inspect, manually test parts, assemble third party cards in the processor, re-test, re-inspect, and stock the entire assembly can exceed the cost of the components. The RPG CPU is the second highest failure item in the RPG, while the CPU hard drive has the third highest failure rate. The NRC staff impact of keeping RPG processors in stock is significant.

Performance Goals and Measures:

The ultimate goal is to deploy a simpler, faster processor that is more reliable and continues to meet the existing system specifications. The processor should increase system availability, providing faster and higher resolution weather information to the public, while lowering initial and overall ownership costs. The NRC repairs approximately 50 CPU assemblies per year at an estimated annual labor cost of $35,000. The NRC also performs extensive testing on RPG CPU hard drives (approximately 50 per year) at an annual labor cost of $30,000. The simpler design proposed for this project is expected to reduce NRC handling costs by 60 percent, making NRC staff hours available for other tasks.

The major measurable (technical) performance goal during research and analysis will be the CPU reserve available, as compared to the existing processor, using Build 8 as a baseline. Present estimates show a need for a 90% minimum increase in processor capacity. A faster processor, in turn, provides faster and better information, allowing forecasters to provide accurate, timely warnings during severe weather events.

Current State Assessment:

Paragraph 3.1 describes the current state of the operational and support environment.
A key issue in the selection criterion of a new RPG processor is that the current RPG CPU is a custom built assembly. It consists of the SUN Ultra 10, SUN cards, and other third party vendor cards manually installed inside the processor chassis. To reduce the processor to a true "Commercial Off the Shelf" solution requires the migration of the unique interface cards inside the CPU to other hardware on the RPG Local Area Network (LAN) outside the main processor chassis. This must be accomplished without change to the basic NEXRAD system level specifications.

Future State Assessment:

The current Concept of Operation for the RPG function remains unchanged with this hardware upgrade. The primary focus is parts obsolescence of the RPG processor. The simplification of the host CPU architecture and optimization of CPU size form factor will allow expansion for future technological innovations, if they are required. The optimized footprint provides additional rack space for expansion, or clustering of new RPG CPUs. Migrating "NEXRAD specific" hardware interfaces from inside the CPU chassis to an associated LAN device simplifies the CPU. The processor changes from being a depot level assembly to a true "Commercial Off The Shelf" solution, saving depot staff time that can be put to other mission uses. Connecting interface devices to the RPG LAN switch allows network control of those devices from any other CPU on the network, offloading processing requirements from the main processor. The CPUs are simpler, reducing maintenance and handling costs at both field and depot levels. Future CPU clustering, if needed for additional processing capacity, will allow individual machines to operate in a Redundant Array of Independent Disks (RAID) fashion. In a RAID configuration, additional CPUs can be added to handle resource intensive tasks in parallel with the primary, host CPU. As processor intensive new science application software is introduced, new CPUs can be added to meet additional processing requirements.

Project (Investment) Management:

The ROC has already managed the engineering and deployment of the ORPG processor and has the experience, training, education, organization, support structure, and capabilities to manage this technology refresh project. The scope of this project is less complicated than the original ORPG project.

Alternatives and Cost/Benefit Analysis:

The ROC has examined RPG functionality and investigated four replacement alternatives. Analysis included the lifecycle support of all three CPUs used in RPG operations, not just the primary RPG CPU. The actual RPG processor complement consists of the RPG CPU (UD70A7), the Base Data Distribution System (BDDS – UD70A1) and the Master System Control Function (MSCF – UD71A1.) All three processors interact with one another as part of the RPG functional area. The MSCF and BDDS are related SUN Ultra 5 products that also are nearing end of life.
The obsolescence issue is the driving force for this project. Additional considerations include the introduction of new science, code portability between the SUN UNIX and Pentium-based LINUX development environments, cost effectiveness, and security.
A true programmatic analysis must consider all three RPG processors. Each of the proposed alternatives was compared to other alternatives over a five-year period for lifecycle costs and the ability to satisfy the obsolescence and new requirements.
The alternatives are as follows. For a more detailed comparison of the options, please see Attachment "A".

1) Address Obsolescence Only – This option is the minimal change approach. The main RPG CPU will be replaced with a newer SUN Blade 150 processor, addressing only the hardware obsolescence issue. This option assumes there are no new requirements pending, but the Ultra 10 is no longer available and must be replaced. The replacement CPU will not exceed existing hardware as far as CPU speed, capacity, memory, or architecture connectivity. The replacement processor is a direct form, fit, and functional replacement. There

will be no change in the existing I/O structure, minimizing software change impacts. Existing third party hardware will be reused to minimize costs by moving that existing hardware into the Blade 150 processor chassis.

2) Go SOLARIS – Change out just the RPG CPU with a higher capacity SUN Sunfire 150 processor. Leave the BDDS and MSCF CPUs as Ultra 5 processors to be changed out with SUN processors within the next five years. A variation of this option (b) is to change out the BDDS and MSCF Ultra 5 units at the same time as the Ultra 10 with SUN Sunfire 150 and Blade 150 processors. The form factor of the Sunfire 150 is a rack-mounted unit taking up a single "u" rack space (1.7 inches), while the Blade 150 is a desktop configuration. The NEXRAD specific I/O interface cards installed in the existing SUN Ultra 10 chassis will be converted to Ethernet/LAN based devices. The driving consideration for this option is the ROC Software Engineering and Configuration Management recommendation to maintain a single operating system environment within the RPG functional area for ease of software maintenance. This option meets the expected RPG processing capacity requirements beyond Build 8.

3) Migrate to LINUX – Add an additional LINUX-based single "u" rack mounted CPU to assist the existing Ultra 10 processor. A variation of this option is to replace the entire RPG CPU assembly with an Intel-based LINUX processor. This option leaves the BDDS and MSCF CPUs as Solaris Ultra 5 processors that will be changed to Intel-based LINUX machines at a later date. This solution provides a low initial hardware cost and starts the migration to a Red Hat Enterprise, or similar, LINUX operating system. Leaving the Ultra 10 in place, if necessary, helps lower migration risk. This option complicates software development, security, documentation and training since two different operating systems must be supported within the RPG subsystem for several years. This option requires additional project funds to expedite software and documentation in the operating system conversion in the Build 9 timeframe.

4) Go LINUX for the entire RPG – Change out all three CPUs (RPG, BDDS, and MSCF) to Intel-based processors running Red Hat Enterprise, or similar, LINUX operating system. The form factor for the BDDS and RPG CPU processors will be rack-mounted processors taking up a single "u" rack space (1.7 inches) each. NEXRAD specific I/O interface hardware installed in the existing RPG SUN Ultra 10 processor will be converted to Ethernet/LAN based devices. The MSCF will be a standard, desktop design. ROC Software Engineering and Configuration Management personnel recommend maintaining a single operating system environment within the RPG function and the ORDA. The ORDA will be delivered with a LINUX operating system. This option means the RDA and RPG both will be running the same operating system and problems supporting two operating systems will be minimized. This option requires additional project funds to expedite software and documentation in the operating system conversion in the Build 9 timeframe.

RECOMENDATION

It is recommended Option 4 be adopted – Go LINUX. A programmatic Cost Benefit Analysis (Long-term) shows this option provides both life cycle cost avoidance and a reasonable path for future growth.
Option 4 meets the requirements objectives of replacing obsolete hardware and supporting new science. Replacing all three RPG processors with LINUX machines establishes an immediate and complete migration of RPG hardware at deployment without dependence on a single hardware vendor. The implementation of Option 4 means higher initial support costs to port and test software and to produce the additional manuals and training materials to introduce a LINUX operating system. However, once fielded, scientists will develop new software on the same operating system used in the field, making the new science software integration less complex and labor intensive. Running LINUX on Intel-based machines significantly simplifies future software test activities. Option 4 represents the best option over a five-year lifecycle as shown in Appendix "A".

Risk Inventory and Assessment:

The largest risk facing the project is the operating system change. The majority of NEXRAD application software has been ported to LINUX for external developer support, although that code has not been thoroughly tested in an operational environment. Infrastructure software, such as for communication and other interfaces, must still be ported and tested. To mitigate risk, the ROC Test Team will need to perform extensive testing of the ported software. This testing is expected to require that Build 9.0 take longer than 6 months to test and

release. To ensure the existing NEXRAD SS requirements are met, all the ROC test beds will be modified with new processors to test each possible NEXRAD configuration.

The current schedule calls for the hardware upgrade to coincide with Build 9 since the existing hardware will not be able to support the new science planned for that software build. Failure to meet the existing project schedule will delay Build 9 or cause planned improvements to be dropped.

Even though the MSCF and BDDS processors have been added to the project scope, the original Configuration Change Request (CCR) cost estimate for the processor replacement remains valid since the purchase of lower cost Intel-based hardware means the overall cost of three processors is the same as the original estimate for a single, SUN-based processor. Another scope change that does increase cost above the original CCR estimate is caused by an approved upgrade implemented on the RPG Ultra 10 after the original project CCR was approved. A console server is required to facilitate the maintenance of the associated RPG router, LAN switches, and other programmable hardware devices. This was not part of the original CCR scope, but now is a requirement. Another hardware costs increase over the initial estimate is the need to replace the KVM switch. The existing switch is designed for a SUN implementation. The suggested replacement design integrates the KVM function and the maintenance monitor CRT into a single 1 “u” rack mount LRU. This high density, low power solution is the same component used in the ORDA.

Implementation of Option 4 will avoid significant lifecycle costs. Higher initial acquisition and deployment support costs will be paid back by avoiding future problems supporting obsolete hardware and operating systems. The design is proactive and forward thinking. CPU clustering, if needed, provides a low cost method of increasing computing power. As processing requirements increase, additional processors can be inserted with minor configuration management impacts and costs. The Red Hat Enterprise, or similar, LINUX operating system is used in ORDA and has sufficient security features to meet existing RPG security requirements.

The CPU “building block” philosophy brings the WSR-88D one step closer to a true “Commercial off the shelf” solution, migrating closer to industry standards. This will allow more competition during hardware selection, driving unit and overall costs down.

Acquisition Strategy:

Hardware acquisition will be managed by the ROC. It is not anticipated that special tasking or external contractor support will be required. At this time, acquisition is expected in the beginning of FY 2006, using pre-competed contracts similar to those used for ORPG acquisition. ROC has the resources to manage this acquisition.

Deployment for the refresh solution is expected to be a kit, installed by local site personnel in accordance with an associated modification note. Further details will be provided in the Operational Deployment Plan.

Project (Investment) Lifecycle Schedule and Funding Plan:

Fundamental Earned Value Management System (EVMS) concepts will be followed. A work breakdown structure (WBS) will be used to control major milestones and to track progress. The ROC, including its contractors, will be responsible for accomplishing the system replacement in accordance with the WBS. The ROC will track budget and schedule and will report variances using existing ROC tracking, reporting, and project management tools. The ROC will gather data to permit cost and schedule performance measurement. Typically, this is documented in Attachment “S” of the Engineering Change Proposal (ECP).

Using EVMS, the ROC will provide a material or property accounting system for:

(1) Accurate cost accumulation and assignment of costs to control accounts in accordance with budget allocations.

(2) Cost performance measurement suitable for this project.

(3) Full accountability of all material or property purchased, at project completion.

Enterprise Architecture (EA):

The Clinger-Cohen Act of 1996 directs the Chief Information Officers (CIOs) of major Departments and Agencies to develop, maintain, and facilitate the implementation of an Information Technology (IT) Enterprise Architecture (EA) as a means of integrating agency goals and business processes with IT. The Clinger-Cohen

Act also gives the Office of Management and Budget the authority to ensure good IT performance at agencies by enforcing performance accountability.
The NWS EA shows the relationships between the organization's Strategic Goals/ Mission/Principles/Initiatives, the EA, and the IT Capital Planning and Investment Control Process. It provides management an understanding of the IT Capital Planning and Investment Control process and serves as the enterprise Life Cycle Model.
The NWS EA serves as a blueprint for WSR-88D IT aspects. The NWS EA will be followed in the RPG refresh project to identify differences between the current and target NWS architectures to provide transition guidance toward the final architecture.

Security and Privacy:

The security plan for the existing RPG system is current. The RPG refresh project will require that the existing security plan be revised to encompass the new operating system and related IT changes. The RPG will be re-certified and re-accredited per National, Federal, and agency policies. Accreditation will be per National Information Assurance Certification and Accreditation Process. A System Security Authorization Agreement (SSAA) will be developed, incorporating existing and new security requirements. The SSAA will be completed and the new system certified and accredited before it becomes operational.
A Privacy Impact Analysis is not required for the RPG Refresh Project. The RPG only collects, maintains, and disseminates information from agencies, instrumentalities, and employees of the Federal Government. It will not maintain any identifying information on individuals.

Government Paperwork Elimination Act (GPEA):

Not Applicable

Responsibilities:

The ROC, working under the approval and guidance of the PMC, shall lead the effort to develop and coordinate the BCA and communicate the work product elements to NWS headquarters offices, the DoD, and the FAA.

Attachment A - BCA Alternatives Considered

This section looks at four alternatives for the proposed system from a technical, programmatic, compliance, and management perspective. Initial project evaluation criteria are identified and weighted. In addition, life cycle costs, maintainability, and sustainability are identified and graded. The benefit of each proposed alternative is evaluated and a value or score is assigned. Finally, an evaluation is made of each alternative and the best overall alternative has been identified.

The four options address the four possible technical solutions, as summarized in Section 3.7 of the BCA. Each alternative evaluation balances the issues of technical performance against the program cost. Support costs for initial implementation are addressed, as well as hardware/software support costs over the next 5 years. The following table shows the weighting of evaluation criteria, with a maximum possible score of 160.

Evaluation Criterion

Technical	Does the solution provide a path or systematic approach for subsequent changes to follow?
Programmatic	What are the impacts of this change over the lifecycle of the system? Cost Benefit Analysis over time.
Compliance	How well does this change address the immediate system level requirements?
Management	Is this change a feasible, comprehensive solution?
Lifecycle Cost	The combination of hardware and support costs over the next 5 years.
Maintainability	The anticipated costs and availability of operational hardware
Sustainability	The anticipated costs and availability of support hardware

Evaluation Perspective/Criteria	Weight	Possible Scores
Technical	30	10, 20, or 30
Programmatic	20	5, 10, 15, or 20
Compliance	30	0, 10, 20, or 30
Management	20	5, 10, 15, or 20
Lifecycle Cost	20	5, 10, 15, or 20

Maintainability	20	5, 10, 15, or 20
Sustainability	20	5, 10, 15, or 20
Maximum Score	160	

Assumptions

1) The ROC will have Program Management responsibilities for the project, including development of the Engineering Change Proposal (ECP).
2) Hardware kits will be shipped and stocked by NRC and NLSC (with ROC Oversight).
3) CPU metrics are estimated, not benchmarked.
4) MSCF and BDDS must be replaced no later than FY 07 (End of Life)
5) A LINUX Solution forces creation of new manuals.
6) Compliance – the alternative meets existing NEXRAD SS requirements up to Build 9.
7) Lifecycle is projected to be for 5 years after deployment.

Option 1 – Address Obsolescence Only.

Operating System: Solaris

Technical Infrastructure: Unchanged

(Replace Ultra 10 with SUN Blade 150) Existing RPG CPU + 25% Reserve capacity

Description:
Option 1 does not account for new science. This option addresses hardware obsolescence only, making this a "short sighted" solution. No CPU capacity is added for new science and the architecture of the SUN Blade 150 can not be upgraded in a cost effective manner at a later date. The additional CPU capacity shown is due to the faster clock speed on the SUN Blade 150 when compared to the existing Sun Ultra 10 processor.
Of the three RPG Processors:

1) MSCF – Ultra 5 (Change to Blade 150 in 2007 timeframe)
2) BDDS – Ultra 5 (Change to Blade 150 in 2007 timeframe)
3) RPG CPU – Ultra 10 -changed to a SUN Blade 150
   - Add DVD-RW (to meet security logging requirements)
   - Reuse DIO Card (for FAA UD31 Control)
   - Reuse 8 Port Serial Card (for Console Server)

Option 1Deployment Hardware

SUN Blade 150 (512 RAM)	$1,995
DVD-RW	$700
Total	$2,695

Advantages

1) Lowest hardware cost option.

Disadvantages:

1) Does not meet requirements beyond Build 8
2) Deployed hardware is not readily upgradeable.
3) Uses same I/O as Ultra 10 today.

	Option 1 Total Life Cycle Costs-in thousands of dollars	**Staff Hours**	**Staff Hour Costs**	**Subtotal Cost**	**Totals**
a.	ROM Total Hardware Upgrade Cost (Fleet)			$640	
b.1	*Documentation Staff Hours*	*3210*	*$177*		
b.2	*Software Staff Hours*	*1500*	*$83*		
b.3	*ROT Testing Staff Hours*	*500*	*$28*		
b.4	*CM/RMT Staff Hours*	*0*	*$0*		
b.5	*Engineering Staff Hours*	*5000*	*$275*		
b.	Total Deployment Support Cost @ $55/Hr = First year support costs			$563	
	Total Deployment Costs				$1,203
	Lifecycle Costs (Continuing)				
c.	ROM Total Projected Support Costs (4 years beyond deployment year)				$1,484
d.	ROM Total Projected Hardware Costs (5 Year)				$1,466
	Option 1 Total Life Cycle Cost (a.+ b+ c + d.)				$4,153

Notes Total project cost = Lifecycle costs + initial hardware costs.
*ROC Staff Hours (no project funded staff needed for this option)
**Item b. = first year of five year life cycle costs. (part of item c.)

Projected Hardware needed in 2007 (Option 1)

SUN Blade 150 – MSCF	$1,995
DVD-RW (for Sunfire 150)	$ 700
SUN Blade 150 - BDDS	$1,995
DVD-RW (For Blade 150)	$ 700
MSCF Monitor	$400
Total	$7,795

Programmatic Concerns – High cost of MSCF and BDDS Ultra 5 CPU support in the out years, but lower initial support costs. (Documentation and Training costs are low, spare parts costs are high, performance is UNACCEPTABLE for any system growth beyond Build 9.)

Projected hardware posture in 2007

RPG CPU – Poor- SUN hardware product support available but processor capacity inadequate

BDDS Ultra 5 - Obsolete – Sparing expensive and scarce via refurbishment industry

MSCF Ultra 5 - Obsolete – Sparing expensive and scarce via refurbishment industry

Compliance - RPG not projected to handle the following new science associated with Build 9:

Full implementation of – High/Super resolution scan

New (Faster) VCPs

MIGFA ingest.

Management – Easy to kit, ship and support in the near term.

Software Impacts – NEXRAD will NOT have the CPU processing capability to support New Science beyond Build 8.

Documentation Impacts – Manuals will need minor updates to accommodate new SUN processor.

Deployment Issues

Hardware would still have Disk I/O issues associated with high hard drive failures.

**Ultra 5s (Originally purchased 2/00) will be end of life and no longer supported by the OEM.

NRC buying spare parts from the “Refurbish Market” in 2004 (Poor quality, limited quantities resulting in expensive support); Ultra 5s will be operating beyond the estimated lifecycle of the equipment, with failure rate increasing.

Replacement hardware in 2007 for Sun Ultra 5s will be higher cost than Intel-based processors. (See Lifecycle costs item d.)

Evaluation Perspective/Criteria	Weight	Option 1 Scores
Technical	30	10
Programmatic	20	10
Compliance	30	0
Management	20	5
Lifecycle Cost	20	5
Maintainability	20	5
Sustainability	20	5
Maximum Score	160	40

Option 2a – Go Solaris

Operating System: Solaris

Technical Infrastructure: Enhanced to Support Clustering

(Replace Ultra 10 only - with Sunfire 150) Existing RPG CPU + 90% Reserve Capacity

Description:

Option 2a is oriented to meet the requirements objectives of replacing obsolete hardware while supporting new science beyond Build 8. The initial deployment costs appear competitive to options 3 and 4. Deployment support costs are lower because there is no change in the operating system, meaning lower documentation costs. The higher cost is not apparent until the MSCF and BDDS are replaced in later years.
Support costs are low because the operating system will not change with the change in hardware. SUN hardware is projected to cost more than double the cost of Intel-based equivalent hardware.

1) MSCF – Ultra 5 (Change to Blade 150 in 2007 timeframe)
2) BDDS – Ultra 5 (Change to Sunfire 150 in 2007 timeframe)
3) RPG CPU – Ultra 10 changes to Sunfire 150 and adds a DVD-RW for security logging

Option 2a Deployment Hardware

SUNFire 150	$3,995
DVD-RW	$700
KVM/Monitor (UD70A4)	$1,500
Console Server	$1,500
Total	$7,695

Advantages:

1) Low Risk
2) Low startup support costs by continuing to use the existing SUN Solaris operating system.

Disadvantages:

1) Using SUN based architecture will cost $2 million over the lifecycle cost of Option 4.
2) The cost of ALL subsequent hardware upgrades will be double the cost of equivalent hardware in Option 4.

3) The effort to incorporate code generated in LINUX environments used by original developers of new science will require conversion and testing, at additional cost, to work in a SUN Solaris operating system environment.

	Option 2a Total Life Cycle Costs-in thousands of dollars	**Staff Hours**	**Staff Hour Costs**	**Subtotal Cost**	**Totals**
a.	ROM Total Hardware Upgrade Cost (Fleet)			$1,826	
b.1	*Documentation Staff Hours*	*3210*	*$177*		
b.2	*Software Staff Hours*	*1500*	*$83*		
b.3	*ROT Testing Staff Hours*	*500*	*$28*		
b.4	*CM/RMT Staff Hours*	*0*	*$0*		
b.5	*Engineering Staff Hours*	*5000*	*$275*		
b.	Total Deployment Support Cost @ $55/Hr = First year support costs			$563	
	Total Deployment Costs				$2,389
	Lifecycle Costs (Continuing)				
c.	ROM Total Projected Support Costs (4 years beyond deployment year)				$1,484
d.	ROM Total Projected Hardware Costs (5 Year)				$1,466
	Option 1 Total Life Cycle Cost (a.+ b+ c + d.)				$5,339

Notes Total project cost = Lifecycle costs + initial hardware costs.

*ROC Staff Hours (no project funded staff needed for this option)
**Item b. = first year of five year life cycle costs. (part of item c.)

Projected Hardware needed in 2007 (Option 2a)

SUNFire 150	$3,995
DVD-RW (for Sunfire 150)	$ 700
SUN Blade 150	$1995
DVD-RW (For Blade 150)	$700
MSCF Monitor	$400
Total	$7,795

Programmatic Concerns – Highest hardware costs over the lifecycle, Lower support costs. (Documentation and Training are lowest, spares are higher, and performance will meet anticipated requirements)

Projected hardware posture in 2007

RPG CPU - Good – SUN hardware product support available and an adequate processor capacity.

BDDS Ultra 5 - Obsolete to Good– Sparing expensive and scarce via refurbishment industry if not changed under this project

MSCF Ultra 5 - Obsolete – Sparing expensive and scarce via refurbishment industry if not changed under this project

Compliance - RPG would meet New Science requirements for Build 9.

Management – Easy to kit, ship and support in the near term.

Software Impacts – Internal functional changes will make subsequent changes easier.

Test Impacts – No impacts

Documentation Impacts – Advantage – Simpler initial documentation impacts during deployment.

**Ultra 5s (Originally purchased 2/00) will be end of life and no longer supported by the OEM.

NRC buying spare parts from the "Refurbish Market" in 2004 (Poor quality, limited quantities resulting in expensive support); Ultra 5s will be operating beyond the estimated lifecycle of the equipment, with failure rate increasing if not changed out under this project.

Replacement hardware in 2007 for Sun Ultra 5s will be higher cost than Intel-based processors. (See Lifecycle costs item d.)

Evaluation Perspective/Criteria	Weight	Option 2 Scores
Technical	30	30
Programmatic	20	15

Compliance	30	10
Management	20	20
Lifecycle Cost	20	10
Maintainability	20	10
Sustainability	20	10
Maximum Score	160	105

Option 2b – Go Solaris (Immediately)

Operating System: Solaris

Technical Infrastructure: Enhanced to Support Clustering

(Replace all 3 RPG processors with SUN processors) Existing RPG CPU + 90% Reserve Capacity

Description:

Option 2b is oriented to immediately meet the requirements objectives of replacing obsolete hardware while supporting new science beyond Build 8. Deployment support costs are low because there is no change in the operating system, meaning lower documentation costs. All three RPG processors are immediately replaced under this RPG refresh option. Replacing the three RPG processors up front has high deployment cost impacts on Option 2b. Support costs are low because the operating system will not change with the change in hardware. SUN hardware is projected to cost more than double the cost of Intel-based equivalent hardware.

1) MSCF – Ultra 5 (Change to Blade 150 at deployment under this project)
2) BDDS – Ultra 5 (Change to Sunfire 150 at deployment under this project)
3) RPG CPU – Ultra 10 changes to a Sunfire 150 and adds a DVD-RW for security logging

Option 2b Deployment Hardware

SUNFire 100	$ 3,995
DVD-RW (for 1st 100)	$700
KVM/Monitor (UD70A4)	$1,500
Console Server	$1,500
SUNFire (for 2nd 100)	$3,995
DVD-RW (for 100)	$ 700
SUN Blade 150	$1,995
DVD-RW (For Blade 150)	$700
Total	$15,085

Advantages:

1) Low Risk
2) Low startup support costs by continuing to use the existing SUN Solaris operating system.

Disadvantages:

1) Using SUN based architecture will cost $2 million over the lifecycle cost of Option 4.
2) The cost of ALL subsequent hardware upgrades will be double the cost of equivalent hardware in Option 4.
3) The effort to incorporate code generated in LINUX environments used by original developers of new science will require conversion and testing, at additional cost, to work in a SUN Solaris operating system environment.

	Option 2b Total Life Cycle Costs-in thousands of dollars	**Staff Hours**	**Staff Hour Costs**	**Subtotal Cost**	**Totals**
a.	ROM Total Hardware Upgrade Cost (Fleet)			$3,662	
b.1	*Documentation Staff Hours*	*3210*	*$177*		
b.2	*Software Staff Hours*	*1500*	*$83*		
b.3	*ROT Testing Staff Hours*	*500*	*$28*		
b.4	*CM/RMT Staff Hours*	*0*	*$0*		
b.5	*Engineering Staff Hours*	*5000*	*$275*		
b.	Total Deployment Support Cost @ $55/Hr = First year support costs			$563	
	Total Deployment Costs				$4,225
	Lifecycle Costs (Continuing)				
c.	ROM Total Projected Support Costs (4 years beyond deployment year)				$1,484
d.	ROM Total Projected Hardware Costs (5 Year)				$0
	Option 1 Total Life Cycle Cost (a.+ b+ c + d.)				$5,709

Notes Total project cost = Lifecycle costs + initial hardware costs.
*ROC Staff Hours (no project funded staff needed for this option)
**Item b. = first year of five year life cycle costs. (part of item c.)

Programmatic Concerns – Highest hardware costs over the lifecycle, Lower support costs. (Documentation and Training are lowest, spares are higher, and performance will meet anticipated requirements)

Projected hardware posture in 2007

RPG CPU Good – SUN hardware product support available and an adequate processor capacity.

BDDS Ultra 5 Good – SUN hardware product support available and an adequate processor capacity.

MSCF Ultra 5 Good – SUN hardware product support available and an adequate processor capacity.

Compliance - RPG would meet New Science requirements for Build 9.

Management – Easy to kit, ship and support in the near term.

Software Impacts – Internal functional changes will make subsequent changes easier.

Test Impacts – No impacts

Documentation Impacts – Advantage – Simpler initial documentation impacts during deployment.

Evaluation Perspective/Criteria	Weight	Option 2 Scores
Technical	30	30
Programmatic	20	15
Compliance	30	10
Management	20	20
Lifecycle Cost	20	10
Maintainability	20	10
Sustainability	20	10
Maximum Score	160	105

Option 3 – Migrate to LINUX

Technical Infrastructure: Enhanced to Support Clustering

(Replace Ultra 10 only - with 1u LINUX Server processor.)	Existing RPG CPU + 96% Reserve Capacity

Description:

Option 3 is oriented to meet the objectives of replacing obsolete hardware and supporting new science beyond Build 8. This option is a compromise of lower hardware costs and risk. In Option 3, the RPG manuals and training must support LINUX and Solaris until the MSCF and BDDS are replaced. The initial deployment support costs are higher, reflecting the development of additional manuals and training materials to introduce the Red Hat Enterprise, or similar, LINUX operating system. Software, configuration management, and security support for two operating systems in the RPG significantly increases support and lifecycle costs. Higher deployment costs will be incurred each time a RPG processor is converted from Solaris to LINUX because complete manual reviews are required to verify large-scale migration of material from one operating system to another. Once all the hardware is converted to LINUX, support costs will be the equivalent of Option 4.

1) MSCF – (Change to LINUX processor in 2007 timeframe)
2) BDDS – (Change to LINUX processor in 2007 timeframe)
3) RPG CPU (LINUX processor)

Option 3 Deployment Hardware

Linux on PC1 RPG CPU	$ 2,177
Console Server	$ 1,500
KVM/Monitor (UD70A4)	$ 1,500
Total	$ 5,177

Advantages:

1) Lower Technical risk than Option 4.
2) Starts migration path to LINUX

Disadvantages:

1) Highest support costs to maintain 2 sets of operating system manuals for transition to LINUX.
2) The cost of subsequent support will be double that of Option 4 for each processor transition to LINUX.

	Option 3 Total Life Cycle Costs-in thousands of dollars	**Staff Hours**	**Staff Hour Costs**	**Subtotal Cost**	**Totals**
a.	ROM Total Hardware Upgrade Cost (Fleet)			$1,224	
b.1	*Documentation Staff Hours*	*8100*	*$446*		
b.2	*Software Staff Hours*	*14860*	*$817*		
b.3	*ROT Testing Staff Hours*	*2000*	*$110*		
b.4	*CM/RMT Staff Hours*	*0*	*$0*		
b.5	*Engineering Staff Hours*	*15000*	*$825*		
b.	Total Deployment Support Cost @ $55/Hr = First year support costs			$2,198	
	Total Deployment Costs				$3,422
	Lifecycle Costs (Continuing)				
c.	ROM Total Projected Support Costs (4 years beyond deployment year)				$3,768
d.	ROM Total Projected Hardware Costs (5 Year)				$799
	Option 1 Total Life Cycle Cost (a.+ b+ c + d.)				$7,989

Notes Total project cost = Lifecycle costs + initial hardware costs.
*ROC Staff Hours (6000 project funded staff hours needed for this option) $330 K
****Item b. = first year of five year life cycle costs. (part of item c.)**

Projected Hardware needed in 2007 (Option 3)

Linux on PC2 BDDS	$ 2,177
Linux on PC0 MSCF	$ 800
MSCF Monitor	$ 400
Total	$ 3,377

Programmatic Concerns – Lowest acquisition costs, Highest support costs. (Documentation and Training are worst case, new spares are less expensive, CPU performance will exceed known requirements.) Subsequent upgrades are assumed to be on LINUX processors, so hardware acquisition costs will go down over time.

Projected hardware posture in 2007

RPG CPU– Good - CPU hardware product support and processor capacity available

Ultra 10 (If used) - Obsolete – Sparing expensive and sparse via refurbished market

BDDS Ultra 5 - Obsolete – Sparing expensive and sparse via refurbished market

MSCF Ultra 5 - Obsolete – Sparing expensive and sparse via refurbished market

Compliance - RPG CPU will meet New Science requirements for Build 9.

Management – Front loads the work effort to convert to LINUX without gaining the full benefit. RPG redesign and support take place in the near term.

Software Impacts – Dual operating systems will require additional internal and external training on each operating system until all the hardware and operating systems are fully converted.

Test Impacts – Disadvantage – Testing must support dual operating systems until the remainder of the hardware is converted to LINUX platforms. Test procedures must change to account for each hardware iteration and to verify functionality.

Documentation Impacts – Disadvantage – Documentation must support dual operating systems until the remainder of the hardware is converted to LINUX. Documentation must change with each hardware conversion.

**Ultra 5s (Originally purchased 2/00) will be end of life and no longer supported by the OEM.

NRC buying spare parts from the “Refurbish Market” in 2004 (Poor quality, limited quantities resulting in expensive support); Ultra 5s will be operating beyond the estimated lifecycle of the equipment, with failure rate increasing.

Evaluation Perspective/Criteria	Weight	Option 3 Scores
Technical	30	20
Programmatic	20	5
Compliance	30	20
Management	20	10
Lifecycle Cost	20	15
Maintainability	20	15
Sustainability	20	15
Maximum Score	160	110

Option 4 – LINUX Conversion

Technical Infrastructure: Enhanced to Support Clustering

(Replace Ultra 10 and Ultra 5 with LINUX processors.)	Existing RPG CPU + 240% Reserve Capacity

Description:

Option 4 is oriented to meet the objectives of replacing obsolete hardware and supporting new science beyond Build 8. This option offers an immediate and complete migration of all new hardware at project deployment. The implementation of this option means higher initial support costs to reflect the development of software, additional manuals and training materials in year one (deployment) to introduce the Red Hat Enterprise, or similar, LINUX Operating System.

1) MSCF CPU – Pentium 4 Desktop
2) BDDS CPU - Rack Mounted Pentium 4 Processor
3) RPG CPU - Rack Mounted Pentium 4 Processor

Option 4 Deployment Hardware

Linux on PC1 RPG CPU	$ 2,177
Linux on PC2 BDDS	$ 2,177
Linux on PC0 MSCF	$ 800
MSCF Monitor	$ 400
KVM/Monitor (UD70A4)	$ 1,500
Console Server	$ 1,500
Total	$ 8,554

Advantages:

1) Meets Requirements beyond Build 8.
2) Lowest lifecycle costs of all 4 options.
3) All new CPUs must be purchased up front, higher probability of having interchangeable parts for support in later years.

Disadvantages:

1) Larger up front deployment support costs due to addition of LINUX manuals.
2) Build 9 test cycle will have to be extended to perform testing on new operating system.

	Option 4 Total Life Cycle Costs-in thousands of dollars	**Staff Hours**	**Staff Hour Costs**	**Subtotal Cost**	**Totals**
a.	ROM Total Hardware Upgrade Cost (Fleet)			$2,030	
b.1	*Documentation Staff Hours*	*8100*	*$446*		
b.2	*Software Staff Hours*	*14860*	*$817*		
b.3	*ROT Testing Staff Hours*	*1680*	*$92*		
b.4	*CM/RMT Staff Hours*	*0*	*$0*		
b.5	*Engineering Staff Hours*	*15000*	*$825*		
b.	Total Deployment Support Cost @ $55/Hr = First year support costs			$2,180	
	Total Deployment Costs				$4,210
	Lifecycle Costs (Continuing)				
c.	ROM Total Projected Support Costs (4 years beyond deployment year)				$919
d.	ROM Total Projected Hardware Costs (5 Year)				$0
	Option 1 Total Life Cycle Cost (a.+ b+ c + d.)				$5,129

Notes Total project cost = Lifecycle costs + initial hardware costs.
*ROC Staff Hours (6000 project funded staff hours needed for this option) $330 K
****Item b. = first year of five year life cycle costs. (part of item c.)**

Programmatic Concerns – This option has the highest up-front costs (All new CPUs, Documentation, and Training need to convert to new operating system). Lifecycle costs, including spares are lowest cost. CPU performance will exceed known requirements. Subsequent upgrades are assumed to continue with LINUX, so lifecycle costs will lower the Total Cost Of Ownership over time.

Projected hardware posture in 2007

RPG CPU: - Good – Multi vendor product support and processor capacity available

BDDS CPU:- Good – Multi vendor product support and processor capacity available

MSCF CPU: - Good – Multi vendor product support and processor capacity available

Compliance - RPG Core CPU will meet New Science requirements for Build 9.

Management – Front loads the work but benefits gained immediately and through the lifecycle.

Software Impacts – Must code application software to be hosted on new operating system.

Test Impacts – Must go back to CI Level Testing (One Time) for associated deployment build to ensure all operating system conversions have been done properly.

Documentation Impacts – Large upfront costs of converting to new Operating System

Evaluation Perspective/Criteria	Weight	Option 4 Scores
Technical	30	30
Programmatic	20	20
Compliance	30	30
Management	20	15
Lifecycle Cost	20	20
Maintainability	20	20
Sustainability	20	20
Maximum Score	160	155

SUMMARY OF OPTION COMPARISON

Option 4 is the preferred option as demonstrated by the scores in the following table:

Evaluation Criteria	Weight	Score	Option 1	Option 2	Option 3	Option 4
Technical	30	10, 20, or 30	10	30	20	30
Programmatic	20	5, 10, 15, or 20	10	15	5	20
Compliance	30	0, 10, 20, or 30	0	10	20	30
Management	20	5, 10, 15, or 20	5	20	10	15
Totals (Short Term)	**100**		**25**	**75**	**55**	**95**
Lifecycle Cost	20	5, 10, 15, or 20	5	10	15	20
Maintainability	20	5, 10, 15, or 20	5	10	15	20
Sustainability	20	5, 10, 15, or 20	5	10	15	20
Total (Long Term)	**160**		**40**	**105**	**110**	**155**

Option 4 is the best option over the lifecycle. Higher up front costs, both in hardware and support staffing, are recovered by lower costs during the lifecycle. Over time, Option 3 has a lower lifecycle cost than Option 2 because of the lower hardware costs.

Option 1 does not meet future requirements and is the least preferred option.

Option 4 will facilitate future growth. As new requirements are identified, additional CPU hardware (ideally the same hardware) can be added to the RPG Processor in a "cluster" configuration with minimal impact to drawing packages or other life cycle support documentation.

Department **Support Staff Hours (Total)**		Option 1	Option 2	Option 3	Option 4
Documentation		3210	3210	8100*	8100*
Software		1500	1500	14860**	14860**
ROT Testing		500	500	2000	1680
CM/RMT		0	0	0	0

Engineering		5000	5000	15000	15000
Total Hours		10210	10210	39960	39640
Total Cost @ $55/Hr		**$562 K**	**$562 K**	**$2.198 M**	**$2.180 M**

*Note: 2000 additional documentation staff hours Required above ROC Base hours.

**Note: 4000 additional software staff hours are required above ROC Base Hours.

I – Hardware Upgrade Costs (Field Hardware kits)

Based on Operational Site **Kits per Agency**	**Option 1**	**Option 2a**	**Option 2b**	**Option 3**	**Option 4**
NWS (Department Of Commerce)	$359 K	$1.024 M	$2.061 M	$689 K	$1.139 M
DOD (Department of Defense)	$77 K	$220 K	$443 K	$148 K	$246 K
FAA (Department of Transportation)	$71 K	$203 K	$408 K	$137 K	$227 K
Totals	**$507 K**	**$1.447 M**	**$2.912 M**	**$974 K**	**$1.612 M**

II – Hardware Upgrade Costs (Support System Hardware kits)

Training and Non-Operational Site **Kits per Agency**	**Option 1**	**Option 2a**	**Option 2b**	**Option 3**	**Option 4**
NWS (Department Of Commerce)	$38 K	$110 K	$221 K	$74 K	$123 K
DOD (Department of Defense)	$3 K	$8 K	$17 K	$6 K	$10 K
FAA (Department of Transportation)	$6 K	$17 K	$34 K	$11 K	$20 K
Totals	**$47 K**	**$135 K**	**$ 272 K**	**$ 91 K**	**$153 K**

III- Deployment Costs (Spare Hardware kits)

Spares Kits per Agency	**Option 1**	**Option 2a**	**Option 2b**	**Option 3**	**Option 4**
NWS (Department Of Commerce)	$47 K	$135 K	$272 K	$91 K	$152 K
DOD (Department of Defense)	$18 K	$51 K	$102 K	$34 K	$57 K
FAA (Department of Transportation)	$18 K	$51 K	$102 K	$34 K	$57 K
Totals	**$83 K**	**$237 K**	**$476 K**	**$159 K**	**$266 K**

IV – Total Cost By Agency (Deployment)

Total Cost (I, II, III, and V) **Kits per Agency**	**Option 1**	**Option 2a**	**Option 2b**	**Option 3**	**Option 4**
NWS (Department Of Commerce)	$445 K	$1.271 M	$2.555 M	$964 K	$1.524 M
DOD (Department of Defense)	$99 K	$281 K	$562 K	$298 K	$423 K
FAA (Department of Transportation)	$96 K	$273 K	$545 K	$292 K	$413 K
Totals	**$640 K**	**$1.776 M**	**$3.662 M**	**$1.554 M**	**$2.360 M**

V – Project Funds Required for Development by Agency

Based on Equal Hour Distribution	**Option 1**	**Option 2a**	**Option 2b**	**Option 3**	**Option 4**
NWS (Department Of Commerce)	0	0	0	$110 K	$110 K
DOD (Department of Defense)	0	0	0	$110 K	$110 K
FAA (Department of Transportation	0	0	0	$110 K	$110 K
Total Cost				**$330 K**	**$330 K**

Appendix E - ECP ATTACHMENT C

ECP ATTACHMENT C

Project Cost Estimates

Hard Costs

FACTOR	Non-Recurring	Recurring			Total	Total
		Unit	Quantity	Total (recurring)		
a. PRODUCTION COSTS						
(1) CONFIGURATION ITEM/CSCI				$0.00	$0.00	
(2) FACTORY TEST EQUIPMENT				$0.00	$0.00	
(3) SPECIAL FACTORY TOOLING				$0.00	$0.00	
(4) SCRAP				$0.00	$0.00	
(5) ENGINEERING, ENGINEERING DATA REVISION				$0.00	$0.00	
(6) REVISION OF TEST PROCEDURES				$0.00	$0.00	
(7) QUALIFICATION OF NEW ITEMS				$0.00	$0.00	
Subtotal	**$0.00**			**$0.00**	**$0.00**	

b. RETROFIT COSTS					
(1) ENGINEERING DATA REVISION				$0.00	$0.00
(2) PROTOTYPE TESTING				$0.00	$0.00
(3) KIT PROOF TESTING				$0.00	$0.00
(4) RETROFIT KITS FOR OPERATIONAL SYSTEMS				$0.00	$0.00
(5) PREP. OF MWO/TCTO/SC/ALT/TD				$0.00	$0.00
(6) SPECIAL TOOLS FOR RETROFIT				$0.00	$0.00
(7) INSTALLATION - CONTRACTOR PERSONNEL				$0.00	$0.00
(8) INSTALLATION - GOVERNMENT PERSONNEL				$0.00	$0.00
(9) TESTING AFTER RETROFIT				$0.00	$0.00
(10) MODIFICATION OF GFE/GFP				$0.00	$0.00
(11) QUALIFICATION OF GFE/GFP				$0.00	$0.00
Subtotal	**$0.00**			**$0.00**	**$0.00**
c. INTEGRATED LOGISTICS SUPPORT COSTS					
(1) SPARES/REPAIR PARTS REWORK				$0.00	$0.00
(2) NEW SPARES AND REPAIR PARTS				$0.00	$0.00

(3) SUPPLY/PROVISIONING DATA				$0.00	$0.00
(4) SUPPORT EQUIPMENT				$0.00	$0.00
(5) RETROFIT KITS FOR SPARES				$0.00	$0.00
(6) OPERATOR TRAINING COURSES				$0.00	$0.00
(7) MAINTENANCE TRAINING COURSES				$0.00	$0.00
(8) REVISION OF TECH MANUALS				$0.00	$0.00
(9) NEW TECH MANUALS				$0.00	$0.00
(10) TRAINING/TRAINERS				$0.00	$0.00
(11) INTERIM SUPPORT				$0.00	$0.00
(12) MAINTENANCE MANPOWER				$0.00	$0.00
Subtotal	**$0.00**			**$0.00**	**$0.00**
d. OTHER COSTS				**$0.00**	**$0.00**
				$0.00	$0.00
				$0.00	$0.00
Subtotal	**$0.00**			**$0.00**	**$0.00**
ESTIMATED TOTAL COSTS	**$0.00**			**$0.00**	**$0.00**

e. SAVINGS		Unit	Quantity	total (recurring)		SAVINGS
				$0.00		
				$0.00		
				$0.00		
				$0.00		
				$0.00		
				$0.00		
Subtotal	$0.00			$0.00		$0.00
ESTIMATED TOTAL SAVINGS	$0.00			$0.00		$0.00

	Costs	Savings
ESTIMATED TOTAL COSTS/SAVINGS	$0.00	$0.00

Soft Costs (ROC Staff Hours)

a. Team Members	Hours		Total
			0
			0
			0
			0
			0
			0
			0
			0
			0
			0
Estimated Total ROC Staff Hours			0

Appendix F - ECP ATTACHMENT M

ECP ATTACHMENT M

WSR-88D Modification/Retrofit Plan

Block 1 - Date Prepared:

Block 2 - ECP Number: *(Same as Agile Cover page)*

Block 3 - Title of Change: *(Same as Agile Cover page)*

Block 4 - Part Numbers/Drawings Impacted: *note: Agile Affected Items Tab does not show "From" CAGE and P/N*

From CAGE	From P/N	Item Name	To P/N	To CAGE

Block 5 - Software Requirements:

Block 6 - Related Retrofit Requirements:

Retrofit No./Dependency (indicate before or after)	ECP No.	Date Approved

Block 7 - Implementation Recommended:
(Check one)
Contractor
Government

Block 8 - Summary of Retrofit Approach:

Block 9 - Manhours per Unit to Install Retrofit Kit:

Site Level / Depot Level (indicate one or the other)	_____ hours
Manhours to Conduct System Tests After Retrofit:	_____ hours
Total Retrofit Time:	_____ hours
Total Out of Service Time	_____ hours

Block 10 - Existing Material Disposition Requirements:

Block 11 - Support Equipment Recommendation Data (SERD) Requirements:

Block 12 - National Stock Number Assignment Required:

Item Name	NSN/ASN	P/N	NSI #

Block 13 - Stock Item Changes Required:

Item Name	NSN/ASN	P/N	Action	SIC #

Block 14 - Kit Identification Number:
Quantity Required:
Kit Cost:
Consists of:

Qty	Item name	P/N	NSN	ASN

Kit Identification Number:
Quantity Required:
Kit Cost:
Consists of:

Qty	Item name	P/N	NSN	ASN

Block 15 - ECP Item Purchase Requirements:

NSN: **ASN:** **P/N:**	**Item Name**	**1st Article Qty:** **Production Qty:** **Spares Qty:** **Total Qty:**	**Unit Cost:** **Total Cost:**
NSN: **ASN:** **P/N:**	**Item Name**	**1st Article Qty:** **Production Qty:** **Spares Qty:** **Total Qty:**	**Unit Cost:** **Total Cost:**
NSN: **ASN:** **P/N:**	**Item Name**	**1st Article Qty:** **Production Qty:** **Spares Qty:** **Total Qty:**	**Unit Cost:** **Total Cost:**

Block 16 - Modification Test and Evaluation Status:

First Article Receipt Date:	**Part Number**	**T&E Completion Date:**	**Evaluation Results:**

Block 17 - Retrofit Effectivity Summary:

Kits Required	DOD -	DOT -	DOC -	Total
On Site (ISSL)				
NRC				
NLSC Spares				
TOTAL				

Block 18 - Retrofit Effectivity List By Agency:

DOC Sites: *(Sort by NWS Region, then NEXRAD Site Name)*

NEXRAD Site Name	City, State	Equipment	SID	Org Code

DOD Sites:

NEXRAD Site Name	City, State	Equipment	SID	Org Code

DOT Redundant Sites:

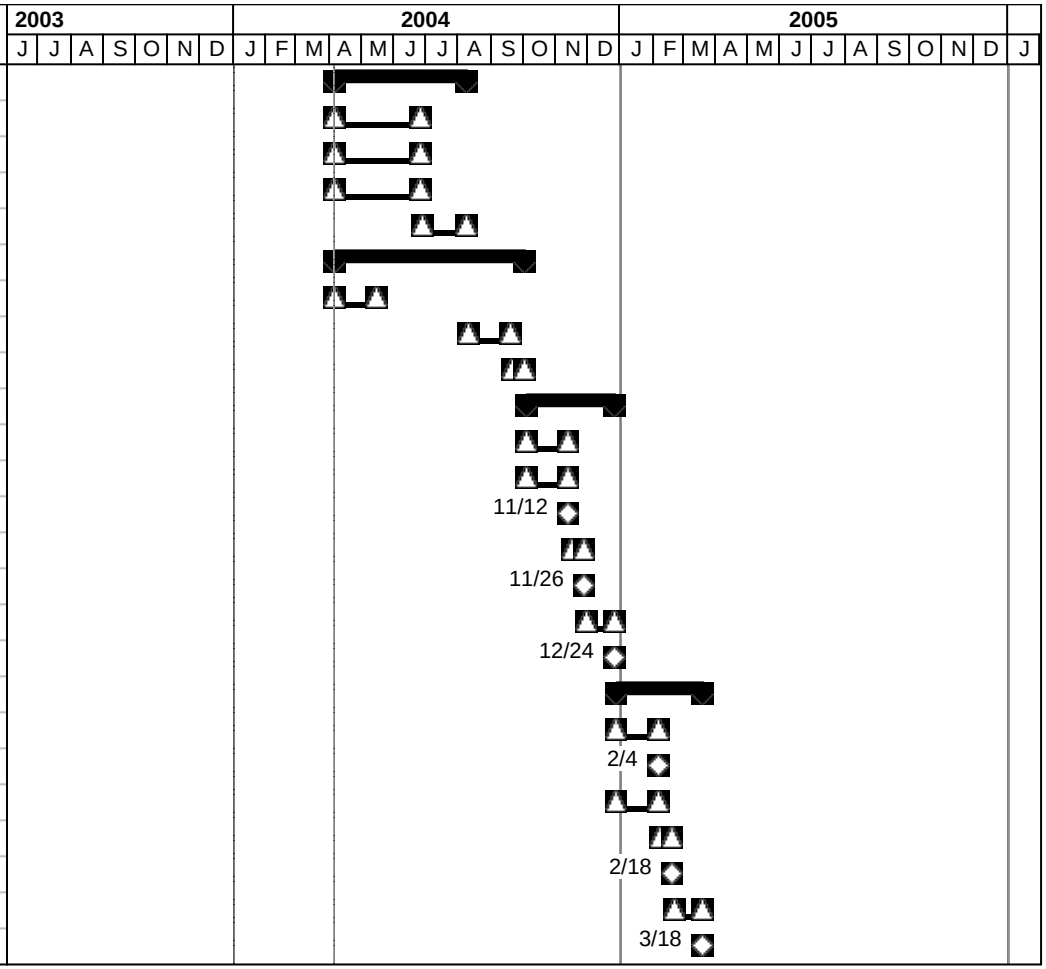
NEXRAD Site Name	City, State	Equipment	SID	Org Code

Appendix G - ECP ATTACHMENT S

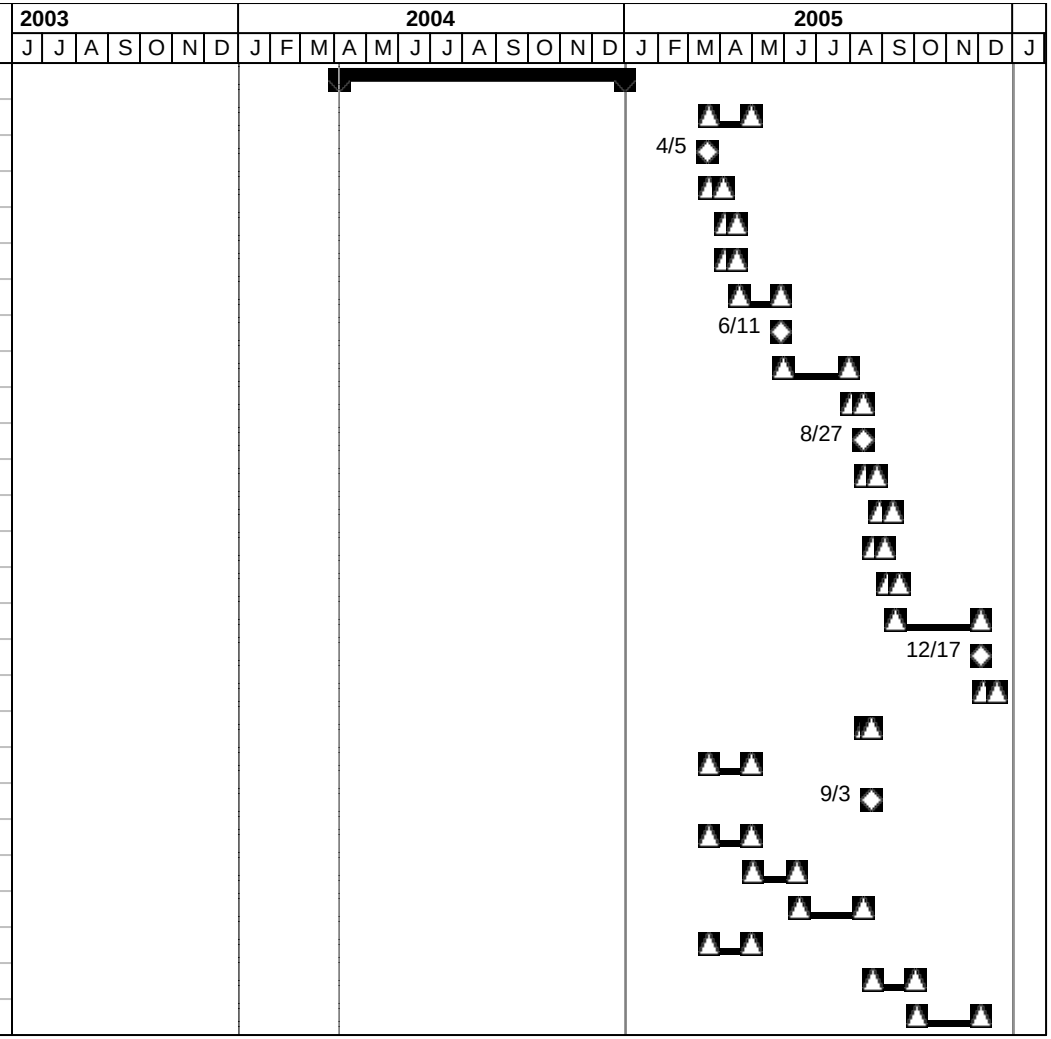
ECP ATTACHMENT S

Project Schedule

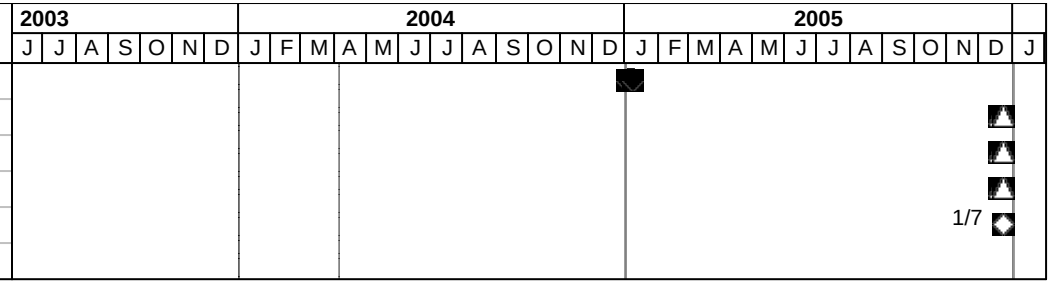
ID	Task Name
1	**Engineering Investigation**
2	Develop Design Alterations
3	Develop Prototype Solutions
4	Develop Parts List
5	Acquire Test Assets
6	**Testing**
7	Produce test Plan
8	Perform Test
9	Produce test report
10	**Develop Preliminary ECP**
11	Documentation/Procedure Markups
12	Engineering Redline Drawings
13	PDR
14	PECP Review: OSF
15	TRC Decision For Continuation
16	PECP Review: Agencies
17	PECP Approval
18	**Develop Formal ECP**
19	Documentation/Procedure Markups
20	CDR
21	Engineering Redline Drawings
22	Formal ECP Review: OSF
23	TRC Decision For Continuation
24	FECP Review: Agencies
25	FECP Approval



ID	Task Name
26	**Implementation**
27	Data Code Assignment
28	Submit Engineering Drawings
29	Update Drawings
30	Submit Purchase Order
31	Order Initial Spares
32	PR/Contract Process
33	Contract Award
34	First Article Received
35	First Article Evaluation
36	First Article Approval
37	Submit DCN
38	Catalog Parts
39	Submit NSI For Kit
40	Establish CLS Due In Kit
41	Ship Production Parts To NLSC
42	Official Notification For Kit Assembly
43	Assemble Kits
44	Ship Kit Proof Assets
45	Set up Kit Proof
46	Kit Proof
47	Submit TM Changes
48	Incorporate/Verify TM Changes
49	Publish TM Changes
50	Submit Installation Procedures
51	Develop Mod Document
52	Publish Mod Document



ID	Task Name
53	**Deployment**
54	Deploy to DOC
55	Deploy to DOD
56	Deploy to DOT
57	**Complete**

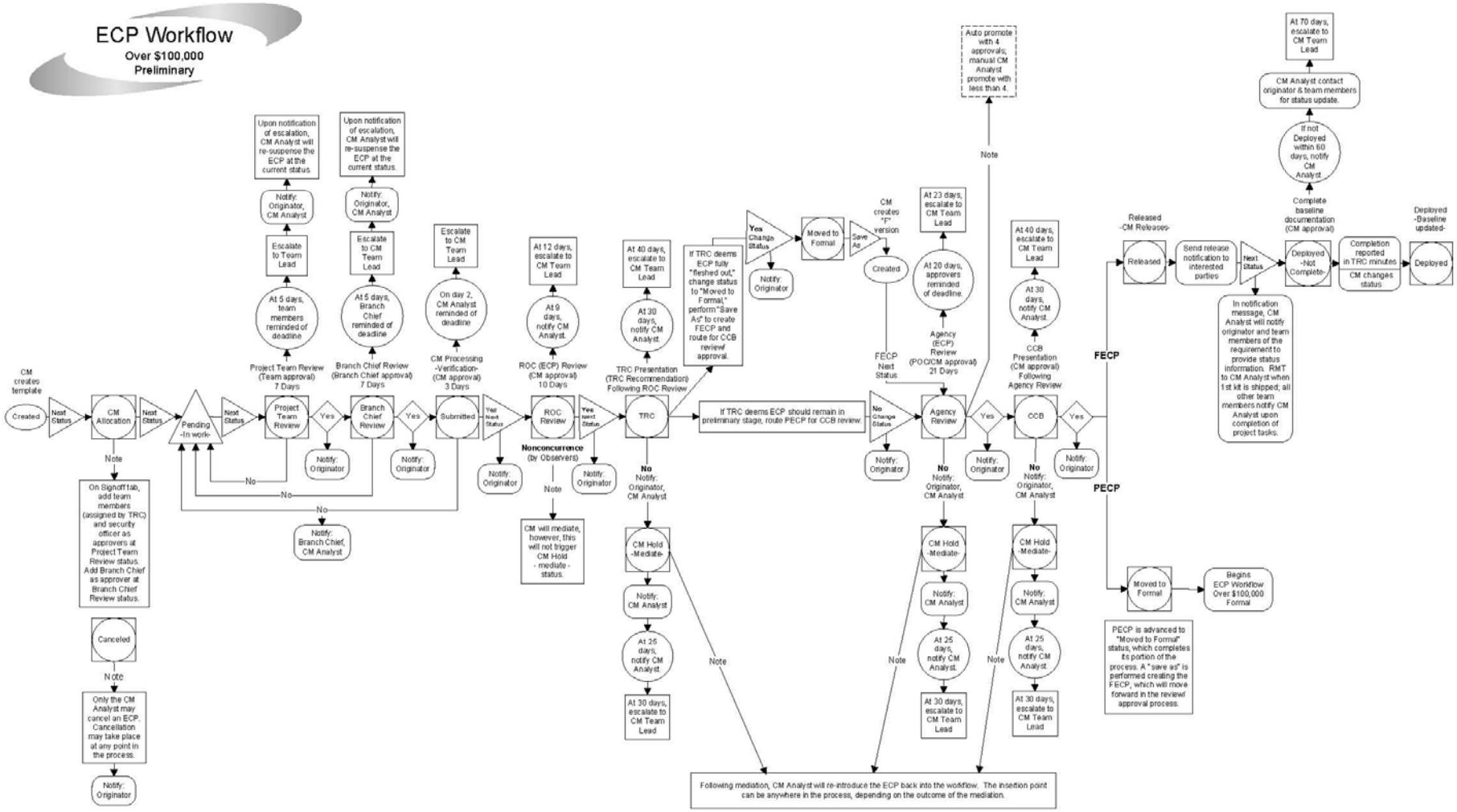
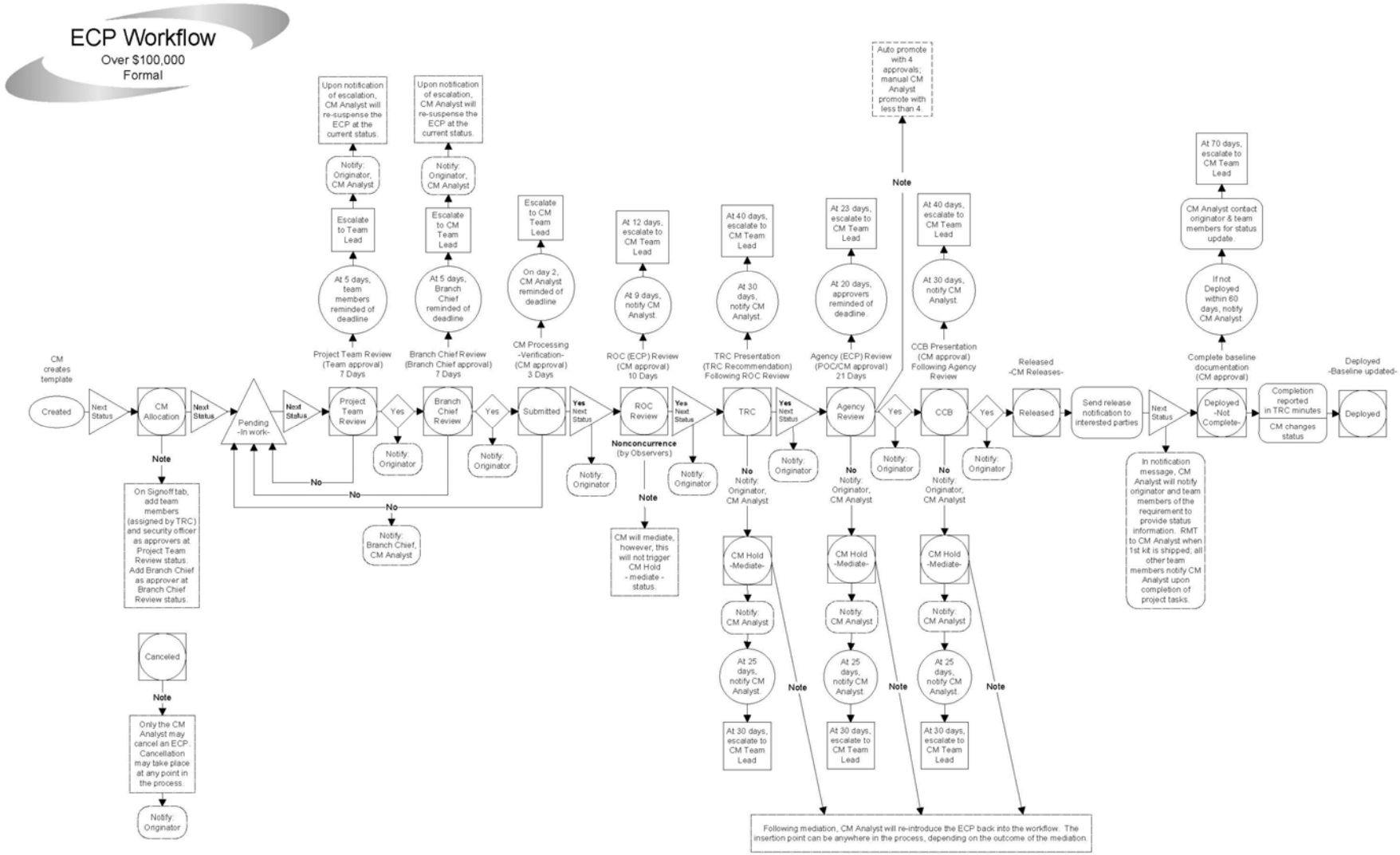


Appendix H – ECP Revision and Change Requirements

The table below describes circumstances in which an ECP would require a revision or a change.

If the change is:	Implementation requires:
Removing baseline items; **Procurement;** **Tech Manual changes;** **Drawing changes (baseline);** **Large number of drawings affected;** **Altered items;** **Software changes.**	Class I ECP.
ECP: **Kit changes;** **Effectivity changes;** **Cost changes over $2,500 or moving total cost of project over $100,000 limit;** **Changing implementation approach.**	Revision to the Class I ECP.
ECP: **Scheduling changes;** **Cost changes under $2,500.**	Change to the Class I ECP.

Appendix I - ECP Workflow – ECPs Over 100K (Preliminary)



Appendix J - ECP Workflow – ECPs Over 100K (Formal)