PART I: CAPITAL ASSET PLAN AND BUSINESS CASE (All Assets)

Agency : **Department of Energy**
Bureau: **Department of Energy**
Account Title: **Science**
Account Identification Code: **019-20-0222**
Program Activity**: Fusion Energy Sciences**
Name of Project: **National Compact Stellarator Experiment (NCSX)**
Unique Project Identifier: **MIE-02**
Project Initiation Date: **April 2003**
Project Planned Completion Date: **May 2008**
This Project is: Initial Concept ____ Planning ____ Full Acquisition __**X**__ Steady State ____
Mixed Life Cycle ____

Project/useful segment is funded:	Incrementally **X**	Fully ___
Was this project approved by OMB for previous Year Budget Cycle?	Yes **_X**	No ___
Did the Executive/Investment Review Committee approve funding for this project this year?	Yes __X_	No __
Did the CFO review the cost goal?	Yes __X_	No _
Did the Procurement Executive review the acquisition strategy?	Yes _X__	No __
Is this investment included in your agency's annual performance plan or multiple agency annual performance plans?	Yes X	No
Does the project support homeland security goals and objectives, i.e., 1) improve border and transportation security, 2) combat bio-terrorism, 3) enhance first responder programs; 4) improve information sharing to decrease response times for actions and improve the quality of decision making?	Yes ___	No **_X_**
Is this project information technology? (See section 300.4 for definition)	Yes ___	No **_X_**

SUMMARY OF SPENDING FOR PROJECT STAGES
(In Millions) PY: Previous Year; CY: Current Year; BY: Budget Year
(Estimates for BY+1 and beyond are for planning purposes only and do not represent budget decisions)

	PY-1 & Earlier	PY 2003	CY 2004	BY 2005	BY+1 2006	BY+2 2007	BY+3 2008	BY+4& Beyond	Total
Planning:*									
Budgetary Resources	6.76	2.81							9.57
Outlays	6.76	2.68	.13						9.57
Acquisition:**									
Budgetary Resources		7.9	15.9	15.9	22.1	19.4	5.1		86.3
Outlays		5.9	17.0	15.3	21.9	19.2	7.0		86.3
Total, sum of stages:									
Budgetary Resources									
Outlays									
Maintenance:									
Budgetary Resources									
Outlays									
Total, All Stages:									
Budgetary Resources	6.76	10.71	15.9	15.9	22.1	19.4	5.1		95.87
Outlays	6.76	8.58	17.13	15.3	21.9	19.2	7.0		95.87
Government FTE Costs			.2	.2	.2	.2	.2		1.0

*** Planning. This includes all costs from FY-2001 to Project Start. CD-0 was approved during FY-2001. CD-1 was approved in November, 2002; Project Start was delayed to April 1, 2003. Conceptual design activities that continued after project Start are included in Planning Outlays.**

**** Acquisition. This includes all costs from Project Start to CD-4 to include start-up testing. Acquisition would include costs for preliminary and final design, construction, and start-up activities.**

I. A. Project Description

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The National Compact Stellarator Experiment (NCSX) is an experimental facility that is to be fabricated at the Department of Energy's (DOE) Princeton Plasma Physics Laboratory (PPPL). The project is led by PPPL with the Oak Ridge National Laboratory (ORNL) providing major leadership and support as a partner. The NCSX facility will be capable of producing magnetized plasmas with a well-defined set of configuration properties, such as size, shape, magnetic field strength, and pressure, which in turn determine its physics properties. The DOE has identified the NCSX Project as a Major Item of Equipment (MIE) Project.

At the heart of the facility is the plasma confinement device, or stellarator core. This will be an assembly of several magnet systems that surround a highly shaped plasma. Coils provide the magnetic field for plasma shape control, inductive current drive, and field error correction. The vacuum vessel produces a high vacuum plasma environment with access for heating, pumping, diagnostics, and maintenance. The entire system is surrounded by a cryostat to permit cooling of the magnets at cryogenic temperature. The NCSX device will be assembled in the C-Site test cell at PPPL. It will be equipped with magnet power supplies, pumps, fueling systems, diagnostics, control systems, and data acquisition systems. Site infrastructure such as cryogenic systems and utility services will be included. Existing control rooms, which are contiguous to the test cell, will be refurbished and utilized. Power supplies located at D-site will be used.

The NCSX is designed to provide a plasma major radius of 1.4 m and a magnetic field strength of at least 1.6 T. The CD-4 First Plasma milestone will demonstrate a level of system performance sufficient for the start of research operations. At CD-4, the facility will support First Plasma operation with a magnetic field strength of 0.5 T, and vacuum field-line mapping operation with a magnetic field strength of 0.1 T and no plasma. Refurbishment and testing of equipment for 1.5 MW of Neutral Beam Injection (NBI) heating will be performed as part of the NCSX MIE project. The NCSX will provide the initial set of equipment necessary to achieve the CD-4 First Plasma milestone and to begin the research program. It will be able to accommodate later upgrades, to meet the needs of the research program.

I.B. Justification [All Assets]

The National Compact Stellarator Experiment (NCSX) is an integral part of the Department's Fusion Energy Sciences (FES) Program. The mission of the NCSX is to acquire the physics knowledge needed to evaluate compact stellarators as a fusion concept, and to advance the physics understanding of three-dimensional plasmas for fusion and basic science. This mission of the NCSX supports one of the three long-term performance measures for FES, namely:

- **Configuration Optimization**: Demonstrate enhanced fundamental understanding of magnetic confinement and improved basis for future burning plasma experiments through research on magnetic confinement configuration optimization.

The mission also supports two of the program's goals as documented in the Report of the Integrated Program Planning Activity (December, 2000), namely:
- Goal 2: Resolve outstanding scientific issues and establish reduced-cost paths to more attractive fusion energy systems by investigating a broad range of innovative magnetic confinement configurations.
- Goal 1: Advance understanding of plasma, the fourth state of matter, and enhance predictive capabilities through comparison of well-diagnosed experiments, theory, and simulation.

Relationship to the Office of Fusion Energy Science's Strategic Goals

The compact stellarator (CS) is one of the innovative magnetic confinement configurations being investigated by the FES Program. The Program has a ten-year objective for the CS, namely "Determine the attractiveness of a compact stellarator by assessing resistance to disruption at high beta without instability feedback control or significant current

drive, assessing confinement at high temperature, and investigating 3-D divertor operation." The potential of the compact stellarator as an attractive concept lies in its possibility to eliminate disruptions and operate steady-state with minimal recirculating power. In order to assess it quantitatively, the physics of compact stellarators must be further developed. A stellarator proof-of-principle (PoP) program consisting of theory, experiment, international collaboration, and design has been established for this purpose. The NCSX, as the PoP program's lead element, has the primary responsibility to test the physics understanding and develop the physics knowledge base needed to determine the concept's attractiveness. Accordingly, the NCSX technical objectives in support of FES's configuration optimization goal are to:

- Demonstrate conditions for high-beta disruption-free operation, compatible with bootstrap current and external transform in a compact stellarator configuration.
- Understand beta limits and limiting mechanisms in a low-aspect-ratio current-carrying stellarator.
- Understand reduction of neoclassical transport by quasi-axisymmetric design.
- Understand confinement scaling and reduction of anomalous transport by flow-shear control.
- Understand equilibrium islands and stabilization of neoclassical tearing-modes by choice of magnetic shear.
- Understand compatibility between power and particle exhaust methods and good core performance in a compact stellarator.

The more generalized FES Program Goal aims to advance understanding and predictive capability in fusion plasma physics, including turbulence and transport, macroscopic stability, wave-particle interactions, plasma-wall interactions, and general plasma science. The NCSX technical objective in support of this goal is to understand three-dimensional plasma effects important to toroidal magnetic configurations generally. Critical questions to be answered using the NCSX facility include:

- Can pulse-length-limiting instabilities, such as external kinks and neoclassical tearing modes, be stabilized by external transform and 3D shaping?
- How do externally-generated transform and 3D shaping affect disruptions and their occurrence?
- Can the collisionless orbit losses typically associated with 3D fields be reduced by designing the magnetic field to be quasi-axisymmetric? Is flow damping reduced?
- Do anomalous transport control and reduction mechanisms that work in tokamaks transfer to quasi-axisymmetric stellarators? How does the transport scale in a compact stellarator?
- How do stellarator field characteristics such as islands and stochasticity affect the boundary plasma and plasma-material interactions? Are 3D methods for controlling particle and power exhaust compatible with good core confinement?

A program of experimental research will be carried out to accomplish the NCSX mission and technical objectives. The critical physics issues to be addressed– stability at high beta, confinement at high temperature, and divertor operation– set minimum plasma performance requirements. These considerations defined the scale and scope of facility that is being fabricated. They set the requirements on plasma size, magnetic field strength, plasma control, plasma heating, diagnostic access, and flexibility that the facility will satisfy. In the fusion program's concept development hierarchy, NCSX is in a class of facilities called proof-of-principle (PoP) experiments. The National Spherical Torus Experiment (NSTX) at PPPL, which is of a scale similar to NCSX, is another PoP example.

Relationship to the President's Management Agenda

The NCSX Project supports the government-wide initiatives set forth in the President's Management Agenda

Strategic Management of Human Capital: The performing organizations, Princeton Plasma Physics Laboratory and Oak Ridge National Laboratory, are carrying out the project as partners. This partnership strategically combines the majority of the country's most experienced stellarator scientists and engineers to the benefit of the NCSX project. The two institutions have formed an integrated team with clearly-defined responsibilities and management relationships, to carry out the project in the most effective way possible. Manpower forecasting and planning is done jointly, and the human resources of both institutions are made available to optimally match the skill mix to the needs of the project as a function of time.

Competitive Sourcing: For each of the major high-risk component procurements, the project is qualifying two suppliers in order to maintain competition for the production program. The selection of suppliers for production will

be based on performance in the development phase and their firm fixed-price and –schedule proposals. For conventional systems, commercial off-the-shelf hardware, competitively procured, is used wherever possible.

Improved Financial Performance: The project is using the PPPL project control system to integrate technical and financial planning, work authorization, cost accounting, and reporting. This system has been developed over twenty years and several successfully managed projects. Consistent with the integrated-team approach, all financial planning and tracking of the work at both of the partner institutions is integrated in a single project control system.

Expanded Electronic Government: The NCSX project has taken large steps toward web-based document management and communication. A web-based filing system has reduced the need for paper hard-copy files and their associated document processing and handling costs. The combination of web-based and teleconference communication has made it possible to run a highly integrated collaboration between the partner laboratories with practically no travel. The design is developed using a single computer-aided design (CAD) model, which is accessible to all participants. Data from this model are efficiently transferred to suppliers for use in manufacture and inspection.

Budget and Performance Integration: The project uses the PPPL project control system, described above, for earned-value tracking and reporting. Cost and schedule performance results are entered into the Project Analysis and Reporting System (PARS) system. High-level milestones for this project are folded into the Joule milestones in the Department's Annual Performance Plan. The project has supported the Department's efforts to improve project management by embracing the new project management manual M413.3-1 and applying its provisions (e.g., risk management, having an effective Integrated Project Team) since its issue.

I.C. Performance Goals and Measures [All Assets]

The NCSX Major Item of Equipment, when completed, will be used by physicists to advance the understanding of fusion and plasma science in support of the Department's strategic goals, as follows:

Relationship to the Department's Strategic Plan

The NCSX project supports the Department's Strategic Goals for Science (#5).

Under Strategic Goal #5, World-Class Scientific Research Capacity, the NCSX supports two of the eight strategies. It supports Strategy #2, "Advance the theoretical and experimental understanding of plasma and fusion science, including a close collaboration with international partners in identifying and exploring plasma and fusion physics issues through specialized facilities." As explained above, the NCSX is a confinement experiment which will advance the physics understanding of three-dimensional plasmas for fusion and basic science and validate theoretical models of plasma behavior. It has been planned in close collaboration with stellarator programs in Germany, Japan, and several other countries to be a unique specialized facility to address critical issues that are not otherwise addressed in the world program, while relying on other countries' programs to resolve other issues such as divertors, steady-state magnetics, and helical-axis plasmas. The NCSX also supports Strategy #7, "Provide the Nation's science community access to world-class research facilities, including … plasma and fusion laboratories,… that advance the physical sciences and enable the study of complex, interdisciplinary science questions." The NCSX is planned as a national facility that will be accessible to the Nation's scientists to enable the study of complex basic questions in the physics of three-dimensional plasmas.

The fabrication project milestones and performance metrics in the following table are consistent with the Joule Milestones included in the Department's Annual Performance Plan for FY-04 and that proposed for FY-05.

Fiscal Year	Strategic Goal(s) Supported (See above)	Existing Baseline	Planned Performance Improvement Goal	Actual Performance Improvement Results	Planned Perform. Metric	Actual Perform. Metric Results
2003	5	Begin Project Begin Title 1 April 2003			Authorization to begin MIE project from DOE.	Accomplished
2004	5	Begin Fabrication Activities Complete the Final Design of the NCSX and Begin Fabrication, October 2004			Complete FDRs for the modular coil and vacuum vessel and complete preparations for a CD-3 determination	Status: Preliminary Design Review completed; CD-2 approved.
2005	5	Award Major Contracts (1) Award, through a competitive process, production contracts for the following major National Compact Stellarator Experiment (NCSX) systems: Modular Coil Winding Forms, Conductor, and Vacuum Vessel.			Contracts awarded for these systems	
2006	5	Award Major Contracts (2) Award, through a competitive process, production contracts for the following major National Compact Stellarator Experiment (NCSX) systems: Toroidal Field Coils and Poloidal Field Coils.			Contracts awarded for these systems	
2007						
2008	5	Transition to operations. Technical: First plasma- An Ohmically heated stellarator discharge produced with a magnetic field of ≥ 0.5 T, a plasma current of ≥25kA, and at least 50% of the rotational transform provided by stellarator fields. Schedule: Complete May, 2008.			Achieve technical, schedule, and cost baselines.	

I.D. Program Management [All Assets]

The DOE Program Manager is Gene Nardella OFES (301) 903-4956
The DOE Federal Project Director for this project is Greg Pitonak (609) 243-3713 of Princeton Area Office (PAO), NCSX Integrated Project Team (IPT) Chair.
The DOE contracting officer for this project is Jerry Faul, Manager of the PAO.
The PPPL Project Manager is G. H. Neilson.
IPT established-skill set represented - DOE & Lab project management, Project engineering, Project physics, Environmental, Safety, & Health (NEPA), Procurement, Project control, Quality Assurance.
The NCSX project is led by the Princeton Plasma Physics Laboratory (PPPL) with the Oak Ridge National Laboratory (ORNL) providing major leadership and support as a partner. The partners have formed an integrated team to carry out the NCSX project, where engineers and scientists from PPPL and ORNL work together to bring the necessary expertise to the project.
Sponsor/owner – N. Anne Davies, Associate Director for the DOE Office of Fusion Energy Sciences (OFES) at (301) 903-4941

I.E. Alternatives analysis [All Assets]

The DOE decided to site the NCSX device at PPPL to maximize the use of existing fusion energy program infrastructure, facilities, and resources. NCSX will use major subsystems already on site at PPPL such as the PBX-M neutral beams, the Tokamak Fusion Test Reactor power supplies, and the PBX-M/Princeton Large Torus (PLT) test cell and associated facilities. Use of the PPPL site takes advantage of the lab's decades of experience in designing and operating fusion experiments like NCSX. This long history of fusion experience has produced a knowledgeable organization, procedures, and the human resources well suited to carry out the NCSX Project.

I.F. Risk Inventory and Assessment [All Assets]

Although technically challenging, the risks associated with the project are manageable and are being addressed through various risk mitigation approaches. From the standpoint of safety, environment, and safeguards and security perspective, there are no unusual risks. Previous projects with scopes similar to NCSX, such as the NSTX, have been determined to offer no significant ES&H risk. As a result, NCSX has followed an Environmental Assessment model similar to the one successfully implemented for NSTX and received a Finding of No Significant Impact. The existing Integrated Safety Management (ISM) Program in place at PPPL will be applied in the design and fabrication of NCSX. NCSX Project management is responsible for the safe execution of the NCSX Project. Likewise Safeguards and Security will be covered by the Laboratory's integrated safeguards and security plans.

The main risks of NCSX are the cost and schedule risks associated with the manufacturing of major components with unique shapes and precise tolerance requirements, and the possibility of a future operational failure requiring a major effort to recover from it. To mitigate these risks, the project opted for early involvement of industrial suppliers in ten manufacturing studies as part of the conceptual design process. The suppliers analyzed potential fabrication techniques for the highest risk items in the stellarator core, namely the modular coils and the vacuum vessel. Valuable fabrication and costing information was developed through these efforts and these data were factored into the Project's plans. The involvement of industry has continued through the preliminary and final design phases. Contracts were awarded to four industry teams for manufacturing development and prototype fabrication, two teams for the modular coil winding forms and two for the vacuum vessel. They developed detailed processing plans and cost estimates to support the CD-2 baseline, and are building full-scale prototypes to demonstrate the processes. The dual-supplier approach maintains competition and potential fallback options for the

production of these components. Close oversight of the supplier activities by Laboratory design engineers and quality assurance specialists ensures that the manufacturing development is adhering to the project's requirements.

An in-house program is being carried out to develop the processes and to qualify staff for winding the coils. Again, ample engineering and QA oversight are provided to ensure rigorous adherence to specifications and to avoid the introduction of manufacturing defects that could cause problems during operation. In addition, the modular coils will be individually tested as part of the manufacturing process. The Project further mitigates risks by conducting reviews of various aspects of the design, maintaining technical assurance oversight of analysis and testing activities, and maintaining a system engineering program to ensure good project integration through control of interfaces, changes, and technical documentation.

PPPL has a DOE-approved procurement system that will be used to procure manufacturing development prototypes, and final components fabrication. The capability and experience to handle all types of procurement activity, including equipment purchases and any necessary design and fabrication work is in place. For example, many of the procurement risks for fabrication services and supply contracts will be mitigated by allowing NCSX to enjoy the savings earned on basic ordering agreement contracts already in place at PPPL; e.g., electrical power services, engineering design services, etc.

Financial, acquisition and technical risks were identified as part of the conceptual design process and mitigation strategies as well as a formal approach to setting cost and schedule contingencies were incorporated into the project plans to address the identified risks. The risk assessment and mitigation planning is documented in the project Risk Management Plan.

The fabrication project started with Title I Design in April, 2003. Through detailed design, manufacturing development, and equipment testing activities, the project's technical basis advanced to a high level of design maturity and self-consistency. Project risk mitigation plans were developed and incorporated in the project estimates. The value engineering methodology was used to assure that the system design provided the required functions at the lowest cost. The project cost and schedule estimates were updated at the end of FY-03. At the beginning of FY-04, three reviews were conducted by outside committees to examine the project baseline and its technical basis. These included a site Preliminary Design Review, an Office of Science Performance Baseline Review, and an Office of Engineering and Construction Management (OECM) External Independent Review for baseline validation. The reviews unanimously concluded that the project was ready to be baselined. The recommendations from these reviews, many of which were measures to reduce risks, were incorporated into the project baseline. After updating the plans in response to all review recommendations, the DOE established a baseline budget of $86.3 million with project completion scheduled for May 2008. The baseline was validated by OECM in January, 2004 and CD-2 was approved in February, 2004. A mature technical basis, combined with ample peer review, provide high confidence that the CD-2 baseline will be a sound, reliable roadmap for the project.

I.G. Acquisition Strategy

This project is to fabricate an experiment to support the mission and strategic goals and objectives of OFES. A pre-conceptual design for this experiment was developed by the project and reviewed as part of a Physics Validation Review in March 2001. The NCSX has been endorsed as a proof of principle experiment by the FES Advisory Committee (FESAC) as part of balancing priorities among alternatives within the fusion program. A Conceptual Design Review was conducted in May 2002 to review the project's technical plans, cost/schedule baselines, adequacy of contingency, project management plans as well as Environmental, Safety, & Health (ES&H) aspects of the project. Both the Physics Validation Review and Conceptual Design Review were independent reviews conducted by personnel outside of the

Project. A conclusion reached by the Conceptual Design Review team recommended proceeding to Critical Decision-1 (CD-1). This conceptual design was optimized to achieve the objectives established for proof of principle experiments at a minimum cost.

The NCSX project is led by PPPL with ORNL providing major leadership and support as a partner. The partners have formed an integrated team to carry out the NCSX project, where engineers and scientists from PPPL and ORNL work together to bring the necessary expertise to the project. Within a line management organization the management responsibilities are clearly assigned to one partner or the other, and PPPL has overall responsibility for the project. The design of the NCSX facility is being performed by fusion experts, with industrial concerns providing manufacturing input and developing manufacturing processes.

To date, two contracts each have been awarded for the vacuum vessel and modular coil winding form manufacturing development to provide input to the final design and to minimize the risk associated with manufacture of these critical components. At the end of this phase, each supplier will submit a proposal for the respective production program. A best-value evaluation will be made to down-select the suppliers for the production phase. The production articles will be fabricated under phased-funded fixed-price contracts.

The fabrication of the balance of the main components of the equipment will be accomplished through a number of competitive procurements. The primary contract form will be fixed price with some incentive fee elements. Major actions upcoming include;

	Scheduled Award	Est Contract Value ($K)
Prototype modular coil conductor	July 2004	$260
DC transmission line support towers	Oct 2004	$312
Modular coil winding forms	Nov 2004	$4,839
Vacuum vessels	Dec 2004	$2,729
TF coils	April 2005	$1,129
PF coils	June 2006	$938

I.H. Project and Funding Plan

I.H.1. Description of performance-based management system (PBMS):

PPPL's Project Control System (PCS), which includes earned value reporting, is being utilized in the management of the NCSX project. NCSX implementation of PCS was reviewed and accepted by DOE in March 2003. The primary management software being used is Primavera's Project Planner.

I.H.2. Original baseline (OMB-approved at project outset):

The NCSX project established its formal technical, cost and schedule baseline with the approval of CD-2 in February, 2004, and began formal performance tracking and baseline control. The Total Estimated Cost is $86.3M. Project milestones are shown below;

Milestone	Schedule (A=Actual)
Physics Validation Review Completed	March 2001A
Conceptual Design Review Completed	May 2002 A
Establish Preliminary Baseline Range (CD-1)	November 2002 A
Start Preliminary Design (Title I) **	April 2003 A
Preliminary Design Review	October 2003 A
Approve Performance Baseline (CD-2)	February 2004 A
Authorization to Begin Fabrication Activities: (CD-3)	October, 2004
Vacuum Vessel Pumpdown	September 2007
Complete Operational Readiness Review (ORR)	November 2007
First Plasma – transition to Operations (CD-4)	May 2008

I.H.3. Proposed baseline/current baseline (applicable *only* if OMB-approved the changes):
N/A.

I.H.4 Actual performance and variance from OMB-approved baseline (original or current):

Comparison of OMB-Approved Baseline and Actual Outcome for Phase/Segment/Module of a Project									
Description of Milestone	OMB-Approved Baseline					Actual Outcome			
	Schedule					Schedule			
	Start Date	End Date	Duration (in days)	Planned Cost	Funding Agency	Start Date	End Date	Percent Complete	Actual Cost
1. Design, construct and Begin NCSX operations	April 2003	May 2008	1886	$86.3m	OFES	April 2003			
Completion date: May 2008						Estimated completion date: May 2008			
Total cost: $86.3m						Estimate at completion: $86.3m			

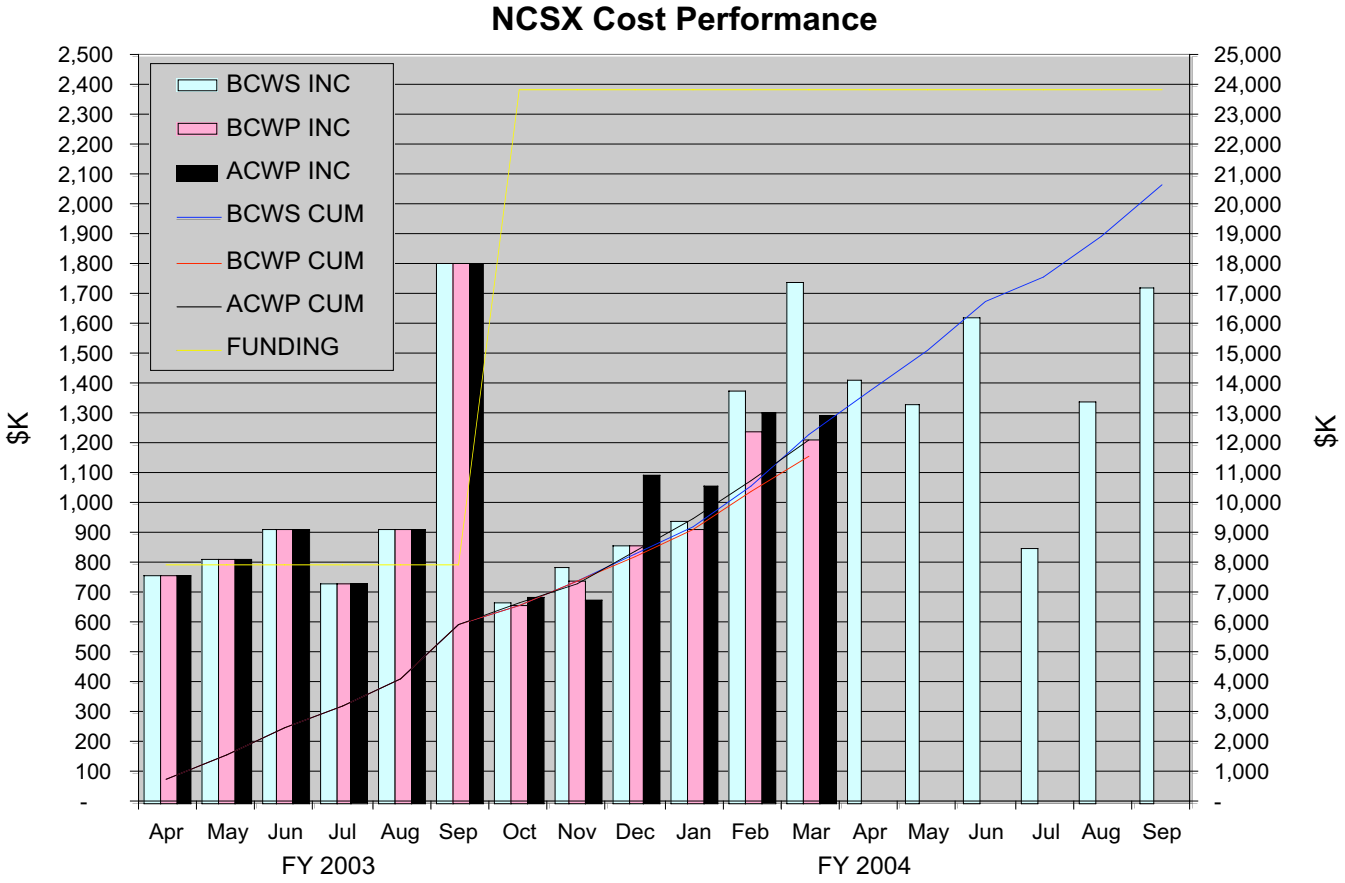
B. EVMS status: As of : **March 31,2004**

B.1. Budgeted (planned) cost of work scheduled (BCWS): $ **12,329**

B.2. Budgeted (planned) cost of work performed (BCWP): $ **11,597**

B.3. Actual cost of work performed (ACWP): $ **12,078**

B.4. Cost Performance



PROJECT SUMMARY (CUMULATIVE)	
	Value ($k)
Cost Variance = (BCWP-ACWP) =	**-$481**
Cost Variance % = (CV/BCWP) x 100% =	**4.2%**
Cost Performance Index (CPI) = (BCWP/ACWP) =	**0.96**
Schedule Variance = (BCWP-BCWS) =	**-$733**
Schedule Variance % = (SV/BCWS) x 100% =	**5.9%**
Schedule Performance Index (SPI) = (BCWP/BCWS) =	**0.94**
Estimates at Completion 1(EAC_1) = ACWPcum + (Performance Factor (PF_1) X(BAC - BCWPcum)) where PF_1 = 1/CPI,	**$73,956**
Estimates at Completion 2 (EAC_2) = ACWPcum + (Performance Factor (PF_2) X(BAC - BCWPcum)) where PF_2 = 1/CPI x SPI	**$77,906**
Variance at Completion 1(VAC)1 = (BAC - EAC1)	**$2,956**
Variance at Completion 2(VAC)2 = (BAC - EAC2)	**$6,906**
Variance at Completion % 1= (VAC/BAC)1 x 100% for both EACs above =	**4.2%**
Variance at Completion % 2= (VAC/BAC)2 x 100% for both EACs above =	**9.7%**
Expected Funds to Completion (ETC*) = EAC-ACWP	**$59,829**
Expected Completion Date =	**May 2008**

* ETC as reported in PARS. Includes known change proposals through April 2004.

Definitions for Earned Value Management System:

ACWP – Actual Cost for Work Performed – What you paid.
BAC – Budget At Completion – The baseline (planned) budget for the project.
BCWP – Budgeted Cost for Work Performed – The earned value.
BCWS – Budgeted Cost for Work Scheduled – The planned costs.
CPI – Cost Performance Index – The ratio of the budgeted to actual cost of work performed.
CV – Cost Variance – The difference between planned and actual cost of work performed.
EAC – Estimate At Completion – The latest estimated cost at completion.
ETC – Estimate to Completion – Funds needed to complete the project.
PF – Performance Factor – The cost to earn a dollar of value, or ACWP/BCWP, or 1/CPI.
SPI – Schedule Performance Index – The percent of the project that has been completed.
SV – Schedule Variance – The variance between the actual and planned schedules.
VAC – Variance at Completion – The variance between the baseline and actual budget at completion.

C. If cost and/or schedule variance are a negative 10 percent or more at the time of this report or EAC is projected to be 10 percent or more, explain the reason(s) for the variance(s).
N/A

D. Provide performance variance. Explain based on work accomplished to date, whether or not you still expect to achieve your performance goals. If not, explain the reasons for the variance. For steady state projects, in addition to a discussion on whether or not the system is meeting the program objectives, discuss whether the needs of the owners and users are still being met.
Project still planned to meet technical performance goals, complete on or before May 2008, and cost under the total project budget of $86.3m

E. For investments using EVMS, discuss the contractor, government, and at least the two EAC index formulas in I.H.4.B, current estimates at completion. Explain the differences and the IPT's selected EAC for budgeting purposes. This paragraph is not applicable to operations/steady state investments.
The project received CD-2 and established the baseline In February 2004. Procurement activities are only 8% complete with nearly 99% of Fabrication/Assembly tasks to follow. In consideration of this early phase of the project it may be premature to suggest a lesser cost estimate than the $86.3m baseline budget.

F. Discuss the corrective actions that will be taken to correct the variances, the risk associated with the actions, and how close the planned actions will bring the investment to the original baseline. Define proposed baseline changes, if necessary.
No major corrective actions are planned at this time. Cost variances experienced to date are largely the result of design evolution. However, the project will be continuously monitored for adherence to technical, cost and schedule baselines.

G. If the investment cost, schedule or performance variances are 10% or greater, has the Agency Head concurred in the need to continue the program at the new baseline? *N/A*

Part II: Additional Business Case Criteria for Information Technology
Not Applicable