

**NCSX Preliminary Design Cost Estimate Summary Form
(Attachment 1a)**

SUMMARY DESCRIPTION

WBS Number: 33	Title: Impurity Diagnostics
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<u>Description</u>	
<p>This WBS element consists of all diagnostics required for measurement of the types and concentrations of impurities in the NCSX plasmas. Since plasma performance typically degrades with increasing amounts of impurities, such diagnostics help to assess the readiness of the machine for experiments, most of which require good performance. They provide critical information supporting decisions on whether to use wall conditioning procedures, like bake-out and glow discharge cleaning, to reduce impurities. They also provide early warning on problems with the plasma facing components, with air leaks, etc. These diagnostics typically consist of a vacuum interface providing the view for an array of sightlines through the plasma, optics (in some case pinhole optics) for imaging the light, fiber optical cables, to relay the light to sensors, dispersive elements to analyze particular wavelengths, detectors and electronics to convert the light signal to a voltage, and associated data acquisition electronics and digitizers. If vacuum windows are used, shutters will be needed to prevent coating during wall conditioning procedures. This WBS is responsible for the vacuum interface, the shutters, the collection optics and associated support system, the fiber optics, the spectrometers, as well as the detectors and associated electronics and rack. Other WBS units are responsible for field cabling, rack terminal blocks, rack AC power and grounding, and data acquisition hardware.</p> <p>For Phases 1 and 2, there are no diagnostics planned in this category.</p> <p><u>Description of Existing Equipment/Facilities to be Reused:</u> None.</p> <p><u>Description of Major Modifications Required to Existing Equipment/Facilities:</u> None.</p>	