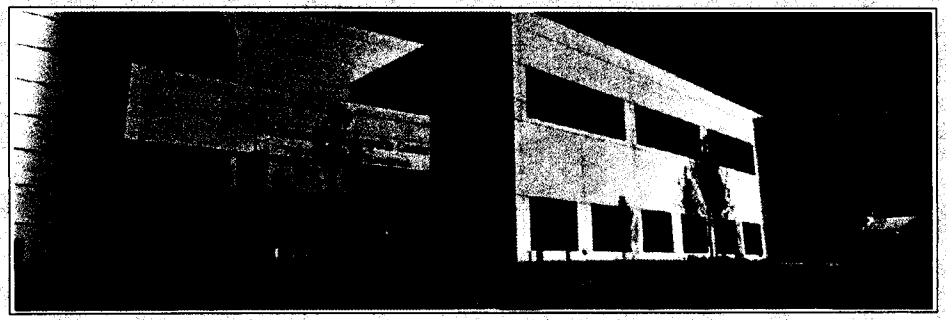
Nicholas C. Metropolis Center for Modeling and Simulation

The Nicholas C. Metropolis Center for Modeling and Simulation (the Metropolis Center) will be analyzed in the S-SWEIS as a potential new "Key Facility." The Metropolis Center (formerly called the Strategic Computing Complex) is a three-story, 303,000-square-foot structure built to house "Q" one of the world's largest and most capable computers (initially 30 trillion floating point operations per second or 30 teraOps). The "Q" machine fills about half of the one-acre computer room. DOE proposes to expand the computing platform from 30 TeraOps to 100 TeraOps within the next 5 years.

LANL's Advanced Simulation and Computing (ASC) program supercomputers, such as the "Q" Machine, run three-dimensional codes that simulate the physics of a nuclear detonation. These ASC computers allow researchers to integrate past weapons test data, materials studies, and current experiments in simulations of unprecedented size. A capability of 100 teraOps is essential for running these high fidelity, 3-dimensional, full-system weapon simulations.

The Metropolis Center is an integrated part of the National Nuclear Security Administration's tri-lab (Los Alamos, Lawrence Livermore and Sandia) mission to maintain, monitor, and assure the performance of the nation's nuclear weapons through the Advanced Simulation and Computing program. All three laboratories will share the "Q" computer resource.



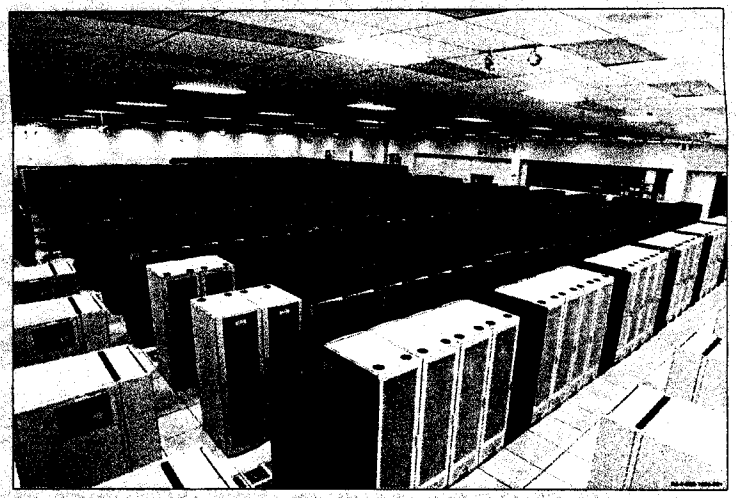
The Nicholas C. Metropolis Center for Modeling and Simulation, the most capable simulation facility in the world.

An Environmental Assessment for the Proposed Strategic Computing Complex (SCC) (DOE/EA-1250) was completed in 1998 for the construction and operation of the SCC. The purpose and need for the SCC (now called the Nicholas C. Metropolis Center for Modeling and Simulation) is to provide an integrated system of computer processors to support the Stockpile Stewardship and Management Program.

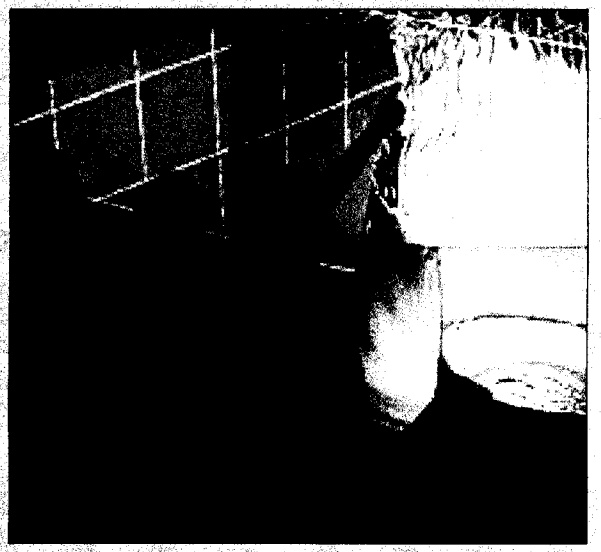
Comparison of Operations

Existing Platform	Proposed Platform
30 TeraOps	100 TeraOps
3 cooling towers (2 running; 1 backup)	4 cooling towers (3 running; 1 backup)
19,345,000 gallons of water* per year	32,271,840 gallons of water* per year
5.1 Megawatts (MW) electricity per year (3.2 MW for the computers; 0.7 MW for the chillers; 1.2 MW for the building)	9.0 Megawatts electricity per year (6.4 MW for computers; 1.4 MW for chillers; 1.2 MW for the building)
About 350 occupants	About 350 occupants

*Water is proposed to come from treated waters from the sewage facility that is expected to produce more than 100 million gallons annually.



As requirements increase to support a 100-TeraOps level capability, mechanical and electrical equipment — including chiller, cooling towers, air-conditioning units, substations, power conditioners, and transformers — can be added in increments without expanding the building.



The enormous calculations performed by the "Q" machine require new methods of understanding and seeing the data generated. The Metropolis Center provides this visual capability. The Metropolis Center's visualization environment consists of two 3-dimensional visualization theaters along with a 200-seat auditorium.

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