NIST building facility for hydrogen pipeline testing

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Efforts to create a “hydrogen economy” to reduce U.S. oil imports will get a boost from a new laboratory at the National Institute of Standards and Technology that will evaluate tests, materials, mechanical properties and standards for hydrogen pipelines.

Construction is just beginning on the 750-square-foot laboratory on the site of a former hydrogen test facility at the NIST campus in Boulder, Colo. The laboratory—including a control room in a separate, existing building—is expected to be operational by mid-2008.

Widely used in industrial processing, hydrogen is attractive as a fuel because it burns cleanly without carbon emissions and can be derived from domestic sources. But long-term exposure to hydrogen can embrittle existing pipelines, increasing the potential for dangerous failures. NIST researchers will use the hydrogen laboratory to develop long-term service tests and apply them to study pipeline materials and mechanical effects. NIST is coordinating its research and safety plans with other national laboratories and industry groups working with hydrogen.

Experiments will involve immersing pipeline materials in pressurized hydrogen gas contained in steel alloy test chambers. The largest of these—about the size of a small automobile gas tank—will be the nation’s biggest hydrogen test chamber. Studies will be conducted using hydraulic machines to test mechanical fatigue, large frames for applying pressure to pipeline materials and equipment for testing properties such

as tensile and residual strength and fracture toughness.

Tom Siewert, the NIST metallurgist who will manage the new laboratory, says the initial research will involve collecting fatigue and fracture data for existing pipelines as a baseline and conducting “round robin” exercises to assess the consistency of tests among various hydrogen laboratories. In the future, the focus will expand to new pipeline materials such as composites.

Source: National Institute of Standards and Technology