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Subject: Yellow Alert- 8 Inch UF6 Cylinder with Larger Dimensions than Calculated for in NCSE/NCSA

The following Bechtel Jacobs Company, LLC Lesson Learned is provided for sharing across DOE facilities. If you have any questions, please contact Joanne Schutt at (423)483-0554, e-mail=s6u@ornl.gov.
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TITLE: Yellow Alert- 8 Inch UF6 Cylinder with Larger Dimensions than Calculated for in NCSE/NCSA

IDENTIFIER L-1999-OR-BJCPORT-1101 DATE 11/11/1999

LESSONS LEARNED STATEMENT: Some older style UF6 containers may not meet manufacturing design specifications. This condition has the potential of placing such a container outside its calculated nuclear criticality safety approval (NCSA) and thus losing one Nuclear Criticality Safety contingency (geometry). The rigor and quality assurance associated with the manufacturing of UF6 containers is much more stringent today than in the early days of uranium enrichment. Personnel must be vigilant when checking/inspecting older cylinders and bring any suspected abnormalities to the attention of supervision for immediate analysis.

DISCUSSION: An 8 inch UF6 Cylinder shipped from X-345 South Vault to X-705 for cleaning was found by a subcontractor to be a larger outside diameter and inside diameter than expected. Cylinder inside diameter of 8.773 inches exceeded the inside diameter allowable for 8 inch cylinders as calculated in the X-345 South Vault NCSA. NCS review determined loss of one contingency.

ANALYSIS: During the early days of uranium enrichment, some containers were manufactured in on site machine shops. Design specifications were developed and NCSA's were calculated based on the design criteria. The containers would require the use of a specified type and size of pipe for the construction of the container body. Caps would then be welded on to the cut section of pipe, valves/plugs placed on the top cap of the manufactured cylinder, and the cylinder would then be hydrostatically tested and certified. The 8" cylinder in question was manufactured in this way; however, when dimensions were checked, the ends of the pipe used to make the cylinder were checked dimensionally, but not the center of pipe. This center portion had a greater inside diameter dimension than the design criteria dictated. This was the error in manufacturing of the cylinder that caused the NCSA violation. This deficiency was not noted until the cylinder, which had been filled and stored for years, was being made ready for cylinder cleaning. Even though recalculations for nuclear safety showed that there was no criticality potential for the larger dimension of the affected cylinder, there was a violation of the manufacturing design criteria and the calculated NCSE/NCSA.

RESOLUTION/RECOMMENDED ACTIONS: The NCSA was revised to allow storage of the cylinder in the X-345 South Vault and the cylinder was returned. When accepting UF6 containers, especially those from early program days, perform visual inspections noting any unusual observations (in this case, it could visually be seen that the middle portion of the cylinder appeared to be larger than the top or bottom portions of the cylinder. Although it is unlikely that UF6 containers will be manufactured locally again, it is possible there will be contracts for providing containers. Quality assurance checks of any new cylinders should be implemented such that more dimensional checks are taken along the length of the cylinder and to verify design criteria are met and if not, the cylinder should be rejected.

PRIORITY DESCRIPTOR Blue/Information
DOE FUNCTIONAL CATEGORIES Environmental Restoration and Waste Management;Conduct of Operations
BJC FUNCTIONAL CATEGORIES OP - Conduct of Operations, PC - Planning & Controls
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HAZARDS Hazardous Material
WORK ACTIVITY Material Storage

FOLLOW-UP ACTION: Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report please notify Joanne E. Schutt at (423)574-1248, e-mail at s6u@ornl.gov of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated