4.2.5.1.5 Survey Monitoring

LRA provided weekly survey monitoring under contract to OPPD from late August through late December 2011. A total of 264 survey points associated with 40 structures and site features across the FCS site were included in this weekly monitoring. Of these, 49 survey points associated with 9 structures/site features were reviewed for this KDI #2 forensic investigation to evaluate movement in structures in the Paved Access Area. These structures included the Auxiliary Building, [redacted]F2, Condensate Storage Tank, Intake Structure, Maintenance Shop, Security Building, Service Building, Turbine Building South Switchyard, and Manhole MH-25.

4.2.5.2 Results

Forensic investigation results, including field observations, SCP test results, SPT test results, and inclinometer and survey monitoring results, are summarized below. Test reports by Thiele Geotech and survey monitoring results from LRA are included in Attachments 6A and 6E, respectively.

4.2.5.2.1 Excavation and Subgrade Testing

No piping voids or ground subsidence were identified through visual observation, T-handle probing, or SCP tests in any of the locations exposed through test holes, trench excavations, or concrete pavement removals. The small void observed during initial field assessments below the broken concrete pavement just north of the Security Building and west of the Condensate Storage Tank was measured to extend laterally beneath the concrete pavement to the east and south about 30 in. or less. Pavement removal north and east of the void indicated that about the same amount of undercutting occurred during the flood. Vertical and horizontal probing beyond the void limits indicted about 6 to 8 in. of very soft soil followed by firm soil that could not be penetrated with hand pressure. No evidence of piping beneath the concrete pavement related to the void was observed.

Field SCP testing indicated that stiff to very stiff clayey silt to silty clay fill soils were generally encountered in the upper 3 ft below the ground surface or pavement. Occasionally, soft to medium stiff soils were encountered at the 3-ft depth. Some very soft to soft soil was encountered and was generally limited to the uppermost 6 to 12 in. and appeared associated with relatively high moisture content soils (very moist to wet) associated with concrete pavement expansion joints (joints between adjacent panels) and surface run-on from adjacent pavements related to precipitation (rain and snow) that occurred during the work.

The top and southeast side of the monolithic concrete Main Underground Cable Bank were exposed and observed in Trench T-2. The top of the structural concrete Circulating Water Tunnel structure was exposed at a few locations by hand excavations completed in the subgrade exposed in the South Panels Area. The fill exposed at both of these concrete features was compact fine-grained cohesive material and showed no evidence of piping erosion or excessive moisture.