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We discuss the radical structures of Specht modules lying in the principal block of $F\Sigma_{3p}$, where F is a field of characteristic $p \geq 5$. We see that the Loewy length of any Specht module in the block is at most four. Furthermore, we state precisely which Specht modules have Loewy length one, two, three, or four. We also see that the second radical layer of a Specht module in the block is determined by the Ext¹-quiver of the block. Finally, we show that if a Specht module in the block has Loewy length three then its socle and third radical layer coincide. (Received September 15, 2015)