1° Let $\overline{X}_n$ denote the sample mean of the annual salaries.

then the confidence interal takes the form

$$\left[\overline{X}_n - z_{\alpha/2}\, sd(\overline{X}_n),\ \overline{X}_n + z_{\alpha/2}\, sd(\overline{X}_n)\right],$$

which is

$$\left[\overline{X}_n - z_{0.005} \frac{15000}{\sqrt{n}},\ \overline{X}_n + z_{0.005} \frac{15000}{\sqrt{n}}\right]$$

2°

The interval length is

$$2 \cdot z_{0.005} \frac{15000}{\sqrt{n}} \leq 5000$$

$$2 \cdot 2.57 \cdot \frac{15000}{\sqrt{n}} \leq 5000$$

$$\sqrt{n} \geq 15.42$$

$$n \geq 237.78$$

So the mininum value of n

is $n = 238$.

3) $n = 50$

$\overline{X_n} = 52000$.

The one-side confidence interval is

$$\left(-\infty, \ \overline{X_n} + \frac{6}{\sqrt{n}} \cdot Z_{0.01}\right]$$

Thus

$$b = \overline{X_n} + \frac{6}{\sqrt{n}} Z_{0.01}$$

$$= 52000 + \frac{15000}{\sqrt{50}} \cdot 2.33$$

$$= 56942.68$$

Thus the one side confidence interval is

$$(-\infty, 56942.68]$$