CONTROL OF DISPERSION'S POLLUTION FOR WATER SUPPLY AND RE-USE IN CONDITION OF UNCERTAINTY INFORMATION

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A methodology for dispersion's pollution control under condition of uncertainty information has been created for water supply and re-use. The controlling algorithm has been stated with the aid of new scientific law for estimations of an environmental protection against disperse pollutants. It is shown how the controlling algorithm is used for environmental protection under condition of uncertainty information in water supply and re-use.

We will use the new scientific law of estimations of the environment protection against dispersed pollutants for dispersion's pollution control for water supply and reuse. This law stated that:

The sum of the ratio of the particle dispersive characteristic to the uniform modified measure of the separation action on disperse particles and the dimensionless parameter of those uniform measure bounds from above all possible values of relative entrainment and lets to execute a point estimation of separation degree with they a priori estimation error. Furthermore, an individual estimation may be improved at the expense of complementary information with the aid of an auxiliary coefficient. The coefficient's indeterminacy equals a degree of imcompleting of the initial data (Sokolov, 1999). We will use this law for creation a methodology of control of dispersion's pollution in condition of uncertainty information.

The scientific law shows that the results of purification of air from dust particles or water from disperse pollutant can be assessed with the following inequality

$$C^- / C_0^+ \le \psi_\alpha^{\sup}(I)\left[\alpha + (1-\alpha) r_{S\alpha}^n(t)\overline{r^{-n}}\right] \qquad (1)$$

Were C_0^+ and C^- are the incoming and outgoing dispersed phase concentration, $\psi_\alpha^{\sup}$ *(I)* is a upper bound of the auxiliary coefficient under definite informational level, $r_{s\alpha}(t)$ is a quasi-size at separation of disperse systems, α is a parameter of the quasi-size at separation, α equals a given probability, $\overline{r^{-n}}$ is -n -th order moment of the random particle radius, $n>0$. We define a quantity quasi-size at separation with the aid of following three conditions: **1)** $P(r_*,t)=\alpha$ **2)** The probability **P(r,t)** must be $\le \alpha$ for all $r > r_*$

3) A quantity quasi-size at separation is the minimize value of all r_* that are corresponding the first and second conditions. **P(r,t)** is the probability of passing of a substance that was in a disperse particle with the initial size **r** (at the time when a system was introduced into a zone of separation).

. The value of $r_{s\alpha}(t)$ may be found by calculation or by experiment.

To employ this expression in practice, it is necessary to determine the value of $\overline{r^{-n}}$ for any positive value of n. We can find the relationship between general characteristic $\overline{r^{-n}}$

of disperse systems under parameter ***n*** equals 1, 2,3 .

A case may be when a probability of passing ***P(r,t)*** is the known function and a particle size distribution is unknown function.

An equation $C^- / C^+ = \int_0^\infty P(r,t) dF(r)$ is transformed by using the integration by the parts. Last, the equation takes the form:

$$C^- / C^+ = P(r_{\max}, t) - \int_0^{r_{\max}} F(r) \frac{\partial P(r,t)}{\partial r} dr \qquad (2)$$

Then, we take into account that the probability function ***P(r,t)*** could have local maximal and minima. (A possibility of they existing connects with influence of the coagulation, particle fragmentation, variation of the size, diffusion and non-slip condition for particles).

So, the separator capacity or precipitator throughput is then in turn expressed in terms of the inverse functions:

$$Q = \varphi_{s\alpha}^{linv}(r_{S\alpha}(t)) \qquad (3)$$

and

$$Q = \psi_{e\alpha}^{linv}(r_{e\alpha}(t)) \qquad (4)$$

Were $\varphi_{s\alpha}^{linv}(r_{S\alpha}(t))$ and $\psi_{e\alpha}^{linv}(r_{e\alpha}(t))$ are the functions inverse to $\varphi_{S\alpha}$ (Q) and $\psi_{e\alpha}$ (Q), t is residence time.

If the quasi-size at separation is a nondecriasing monotone function of throughput, then Q_{unk} i.e., precipitator throughput at which the concentration C_0^+ outgoing dispersed phase concentration equals the C_p permissible dust concentration, satisfies the inequality

$$Q_{unk} \geq \varphi_{s\alpha}^{inv}\left(\sqrt[n]{\frac{C_p / C_0^+ - \alpha}{(1-\alpha)\overline{r^{-n}}}} \right) \qquad (5)$$

It follows from the inequality that, when $r_{e\alpha}$ is a nondecreasing function of throughput,

$$Q_{unk} \leq \psi_{e\alpha}^{inv}\left(\sqrt[n]{\frac{(1-\alpha)\overline{r^{n}}}{1 - C_p / C_0^+ - \alpha}} \right) \qquad (6)$$

The unknown throughput Q_{unk} at with the concentration equals the specified value consequently lies between the values Q_{inf} and Q_{sup} determined by expressions (5) and (6).

The experimental data have been shown as a new controlling algorithm may be used under condition of uncertainty information for water supply and re-use.