OPTIMALISASI DEPOSISI SILIKA MELALUI PENURUNAN TEMPERATUR SEBAGAI UPAYA PENCEGAHAN *OVERFLOW* DI WELL-PAD 30 PT GEO DIPA ENERGI (PERSERO) UNIT DIENG

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INTISARI

Proses *flashing brine* di AFT (*Atmospheric Flash Tank*) menyebabkan *brine* menjadi bertekanan rendah dan kadar silika terlarut bertambah di atas kurva saturasinya. Dalam kondisi *brine* yang pekat memungkinkan deposisi silika apabila terjadi penurunan temperatur secara drastis, sehingga dapat berakibat *scaling* pada fasilitas hingga *overflow* karena pendangkalan pada *cooling system.* Jenis dampak yang ditimbulkan berupa penurunan kualitas air permukaan dan penurunan indeks keanekaragaman biota air akibat adanya kandungan nitrat (NO_3-N) dan ammonia (NH_3-N) dalam *brine.* Beberapa kejadian kematian tanaman disebabkan oleh kadar NaCl yang tinggi dalam *brine* sehingga tanaman menjadi kering. Oleh sebab itu diperlukan penangan terhadap deposisi silika melalui optimalisasi dan pemeliharaan di *cooling system* untuk mencegah *scaling* pada fasilitas injeksi dan menghindari *overflow brine*. Tujuan penelitian adalah untuk mengetahui laju deposisi silika sehingga dapat diketahui tingkat efektivitasnya yang kemudian dapat ditentukan arahan teknis pengelolaannya.

Metode pengumpulan data dilakukan dengan survei dan pemetaan terhadap rona lingkungan eksisting, pengambilan sampel dilakukan melalui teknik *grab sampling* dan pengukuran temperatur di lapangan. Uji laboratorium dilakukan terhadap konsentrasi silika terlarut, pH, dan sifat fisik tanah, serta dilakukan pengumpulan data sekunder. Data-data yang telah dihasilkan selanjutnya akan diolah dan dianalisis secara matematis atas dasar perhitungan dan analisis secara deskriptif sehingga akan diketahui laju deposisi silika dan efektivitasnya berdasarkan pembobotan nilai SSI-nya.

Rata-rata laju deposisi silika secara keseluruhan pada *open canal* yaitu 83.822,89 cc/jam dan pada *cooling pond* yaitu 13.438,98 cc/jam. Nilai SSI pada inlet *open canal* menunjukkan kurva nilai >1 sebesar 1,43; sedangkan outlet *open canal* dan *cooling pond* menunjukkan kurva nilai di bawah dari 1 dengan rata-rata secara berurutan yaitu 0,98 dan 0,86. Efektivitas pengelolaan terhadap deposisi silika berdasarkan nilai SSI-nya didapatkan sebesar 39,86 %. Dapat disimpulkan bahwa *cooling system* pada area Well-PAD 30 belum cukup efektif dalam mendeposisikan silika. Arahan pengelolaan secara teknis yang direkomendasikan berupa modifikasi *waterfall* eksisting menjadi berbentuk *cascade* & penambahan besi grating; pemasangan *water level control*; rekomendasi perkiraan jadwal pembersihan silika; serta pemberdayaan masyarakat melalui program *community development* perusahaan dengan sosialisasi pemanfaatan limbah silika menjadi *paving block.*

Kata Kunci: Deposisi Silika, *Brine Water, Open Canal*, *Cooling Pond*, Temperatur

OPTIMIZATION OF SILICA DEPOSITION THROUGH TEMPERATURE DECREASE AS AN OVERFLOW PREVENTION EFFORT AT WELL-PAD 30 PT GEO DIPA ENERGI (PERSERO) UNIT DIENG

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ABSTRACT

The brine flashing process in the AFT (Atmospheric Flash Tank) causes the brine to become under pressure and the dissolved silica content increases above its saturation curve. In dense brine conditions, it is possible for silica deposition if there is a drastic temperature drop, which can result in scaling of the facility to overflow due to silting of the cooling system. The type of impact caused is a decrease in surface water quality and a decrease in the diversity index of aquatic biota due to the presence of nitrate (NO_3-N) and ammonia (NH_3-N) in the brine. Several incidents of plant death were caused by high NaCl levels in the brine so that the plants became dry. Therefore, it is necessary to handle silica deposition through optimizing and maintaining the cooling system to prevent scaling in injection facilities and avoid brine overflow. The aim of the research was to determine the deposition rate of silica so that its level of effectiveness could be determined, which could then be determined by the technical direction for its management.

The data collection method was carried out by surveying and mapping the existing environmental baseline, sampling was carried out through grab sampling techniques and temperature measurements in the field. Laboratory tests were carried out on the concentration of dissolved silica, pH, and physical properties of the soil, and secondary data were collected. The data that has been generated will then be processed and analyzed mathematically on the basis of descriptive calculations and analysis so that the silica deposition rate and its effectiveness will be known based on the weighting of the SSI value.

The overall average deposition rate of silica in the open canal is 83,822.89 cc/hour and in the cooling pond is 13,438.98 cc/hour. The SSI value at the open canal inlet shows a value curve > 1 of 1.43; while the open canal and cooling pond outlets show a value curve below 1 with an average of 0.98 and 0.86. The management effectiveness of silica deposition based on the SSI value was 39.86 %. It can be concluded that the cooling system in the Well-PAD 30 area is not effective enough in depositing silica. The recommended technical management directives are in the form of modification of the existing waterfall to a cascade shape & the addition of iron grating; installation of water level control; recommendations for estimated silica cleaning schedules; as well as community empowerment through the company's community development program by socializing the utilization of silica waste into paving blocks.

Keywords: *Silica Deposition, Brine Water, Open Canal, Cooling Pond, Temperature*