

## ABSTRAK

### **RELOKASI HIPOSENTER MENGGUNAKAN METODE *JOINT HYPOCENTER DETERMINATION (JHD)* DALAM MENENTUKAN ZONA PERMEABILITAS RESERVOIR (STUDI KASUS LAPANGAN PANAS BUMI “SAW”)**

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Lapangan panas bumi "SAW" terletak di Provinsi Jawa Barat yang memiliki potensi panas bumi sebesar 400 MWe. Kegiatan produksi maupun injeksi pada lapangan panas bumi dapat menimbulkan gempa mikro akibat adanya pergerakan lokal dibawah permukaan. Kejadian gempa mikro yang ditimbulkan terekam pada 8 stasiun seismometer dan digunakan untuk mengamati seismisitas di bawah permukaan. Hasil perekaman gempa mikro yang dilakukan selama 20 hari terhitung sejak 10 - 29 Oktober 2019 memperoleh 286 event dengan melakukan *picking* manual menggunakan *Software Seisgram2K70*. Dari 286 kejadian gempa mikro, diperoleh 267 *event* yang digunakan dalam menentukan lokasi hiposenter awal menggunakan metode *Geiger Adaptive Damping (GAD)*. Setelah itu dilanjutkan dengan penentuan lokasi hiposenter akhir menggunakan metode *Double Difference* berupa *Joint Hypocenter Determination (JHD)* pada program *Velost* sehingga menghasilkan lokasi hiposenter serta model kecepatan yang baru. Hasil menunjukkan persebaran hiposenter sebelum direlokasi lebih menyebar dengan elevasi dominan berada pada rentang -5 - (-509) mdpl dibandingkan dengan persebaran hiposenter hasil relokasi yang terlihat jelas lebih rapat dan terklaster menjadi dua bagian dengan rentang elevasi dominan 300 - (-200) mdpl. Selain itu, aktivitas gempa mikro yang teridentifikasi menunjukkan klaster secara dominan berasal dari aktivitas seismik yang terekam pada tanggal 23 dan 25 Oktober 2019 secara berturut-turut memiliki jumlah *event* sebanyak 60 dan 68 *event*. Hasil relokasi menunjukkan bahwa zona permeabilitas tinggi berasal dari reservoir yang didominasi oleh *liquid* pada lapangan panas bumi “SAW” yang berhubungan erat dengan Gunung Urug dimana *Top of Reservoir (TOR) liquid* berada pada elevasi 500 mdpl dan *Bottom of Reservoir (BOR) liquid* pada elevasi -1000 mdpl.

Kata kunci: Gempa mikro, lapangan panas bumi, hiposenter, relokasi, zona permeabilitas

## **ABSTRACT**

### **HYPOCENTER RELOCATION USING JOINT HYPOCENTER DETERMINATION (JHD) METHOD IN DETERMINING RESERVOIR PERMEABILITY ZONE (CASE STUDY OF “SAW” GEOTHERMAL FIELD)**

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*The “SAW” geothermal field is located in West Java Province and has a geothermal potential of 400 MWe. Production and injection activities in the geothermal field can cause micro-earthquakes due to local movements below the surface. The micro-earthquakes generated were recorded at 8 seismometer stations and used to observe the seismicity in the subsurface. The results of micro-earthquake recording carried out for 20 days from October 10-29, 2019 obtained 286 events by manually picking using Seisgram2K70 software. Of the 286 micro-earthquake events, 267 events were used in determining the location of the initial hypocenter using the Geiger Adaptive Damping (GAD) method. After that, it is continued with the determination of the final hypocenter location using the Double Difference method in the form of Joint Hypocenter Determination (JHD) in the Velest program so as to produce a new hypocenter location and velocity model. The results show that the distribution of hypocenters before relocation is more spread out with the dominant elevation in the range of -5 - (-509) masl compared to the distribution of hypocenters resulting from relocation which is clearly denser and clustered into two parts with a dominant elevation range of 300 - (-200) masl. In addition, the micro-earthquake activity identified shows that the cluster is dominantly derived from seismic activity recorded on October 23 and 25, 2019 which has a total of 60 and 68 events, respectively. The relocation results show that the high permeability zone comes from a reservoir dominated by liquid in the “SAW” geothermal field which is closely related to Mount Urug where the Top of Reservoir (TOR) liquid is at an elevation of 500 meters above sea level and the Bottom of Reservoir (BOR) liquid at an elevation of -1000 meters above sea level.*

**Keywords:** Micro-earthquake, geothermal field, hypocenter, relocation, permeability zone