$\mathcal{O}_M$- modules. ⌈ By the property 4 on P700, $\mathcal{G}$ is coherent. ⌋

Multiplying a section of $\mathcal{G}$ by σ gives zero, since $\sigma \cdot \mathcal{O}_H = 0$, and so $\mathcal{G} = \mathcal{G}_H$ is a coherent sheaf of $\mathcal{O}_H$-modules.

⌈ $\mathcal{O}_H$ is not a $\mathcal{O}_M$- free module. but a $\mathcal{O}_M$ - module. From the exact sequence

$$0 \to \underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F}) \longrightarrow \mathcal{F}(-1) \xrightarrow{\otimes\sigma} \mathcal{F} \longrightarrow \mathcal{F}_H \to 0$$

$\sigma \cdot \underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F}) = 0$. Given a section $\tau \in \underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F})$, $\sigma \cdot \tau = 0$. $\Rightarrow$ For any $x \notin H$, $\sigma_x \tau_x = 0$ $\Rightarrow$ Since σ_x is a unit in $\mathcal{O}_x$ ($\because$ $x \notin H$), $\tau_x = 0$. $\Rightarrow$ $\tau = 0$ on $M-H$. $\Rightarrow$ τ can be considered as a section defined on H. $\Rightarrow$ $\underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F})$ may be considered as a sheaf of $\mathcal{O}_H$-modules, since $\mathcal{O}_H \hookrightarrow \mathcal{O}_M$ at stalk level, (remember H is a smooth hyperplane section of M). $\Rightarrow$ $\underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F})$ sheaf on H. $\Rightarrow$ Let $\mathcal{G}_H = \underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F})$ ⌋ see P37
" $\underline{Tor}_1^{\mathcal{O}}(\mathcal{O}_H, \mathcal{F})$ may be considered as a sheaf extended by zero from H."

Now apply $\otimes^k \mathcal{L}$ to this sequence. Since locally $\mathcal{L} \cong \mathcal{O}$, exactness is preserved and we obtain

$$(**) \qquad 0 \longrightarrow \mathcal{G}_H(k) \longrightarrow \mathcal{F}(k-1) \longrightarrow \mathcal{F}(k) \longrightarrow \mathcal{F}_H(k) \to 0.$$

⌈ $0 \longrightarrow \mathcal{G}_H \otimes \mathcal{L}^k \longrightarrow \mathcal{F}(k-1) \longrightarrow \mathcal{F}(k) \longrightarrow \mathcal{F}_H(k) \longrightarrow 0$ ⌋