Environmental Monitoring Report

Project Number: 52282-001
Semestral Report
July to December 2022
May 2023

Indonesia: Geothermal Power Generation Project

Prepared by PT Geo Dipa Energi (Persero) for the Asian Development Bank

Semi-Annual Environmental Monitoring Report

INDONESIA

PT Geo Dipa Energi (Persero)

Loan No. 3928 and Loan No. 8380-INO
Geothermal Power Generation Project

Reporting Period: *1 July 2022 to 31 December 2022*
Date*: 11 May 2023*
SEMR Report Number: *04*

● TABLE OF CONTENT

● LIST OF TABLES

● LIST OF APPENDICES

Appendix 1 PMU & PMC Joint Site Inspection to Dieng & Patuha Well Site
Appendix 2 Environmental Quality Laboratory Testing Results
Appendix 3 Photolog
Appendix 4 H_2S Dispersion and Noise Modelling of Well Testing Activity at Well SLR-T-9C
Appendix 5 H_2S Modelling of Proposed Dieng 2 Power Plant
Appendix 6 Land Slide Incident at Wellpad-9
Appendix 7 Preliminary Biodiversity Assessment of Pad 12

1 ENVIRONMENTAL SAFEGUARDS SUMMARY

1.1 Summary of Project Progress

The Second of Semi-annual Environmental Monitoring Report (SEMR) 2022 covers the working period from 1st July to 31st December 2022 for ADB Loan No.33928 INO: Geothermal Power Generation Project.

The SEMR was prepared to fulfil the safeguard policy requirement of ADB by PMU (PT Geo Dipa Energi or GDE) and PMC (PT AECOM Indonesia or AECOM).

Table 1 briefly summarises the project progress for contract award, construction, and critical activities in this reporting period.

Table 1. Project Progress Summary

Safeguards Category	Environment	B	
Reporting Period:	July to December 2022	**Date Last Report Issued:**	January to June 2022
Contracts Awarded to Date:			

No	Work Contract	Contractor	Instruction to Perform	End of Contract
1	Civil Work for Dieng and Patuha	PT Supraco	27 July 2021	19 February 2023
2	Rig Bundling Dieng	PT Plumpang Raya Anugrah	11 October 2021	02 April 2024
3	Rig Bundling Patuha	JV PT Air Drilling – PT Asia Petrocom Services	07 September 2021	07 September 2023
4	Cementing Dieng	PT Halliburton LSI	15 October 2021	21 May 2024
5	Cementing Patuha	PT Halliburton LSI	15 October 2021	21 November 2023
6	Directional Drilling Dieng	PT Halliburton LSI	15 October 2021	21 May 2024
7	Directional Drilling Patuha	PT Halliburton LSI	15 October 2021	21 November 2023
8	Mud Engineering Dieng	PT Baker Hughes Ind.	29 October 2021	14 May 2024
9	Mud Engineering Patuha	PT Prima Hidrokarbon Indonesia	29 October 2021	22 November 2023
10	Aerated Drilling	PT Aerated Drilling	1 October 2021	25 March 2024
11	Fishing and Milling	PT Baker Hughes Ind.	NA	05 May 2024
12	Wireline Logging	JV Tiger and NPS Bahrain	03 November 2021	05 March 2024
13	Well Testing	PT Depriwangga	15 October 2021	1 April 2024

<table>
<tr><td></td><td>
<table>
<tr><td>14</td><td>PMC Sub Surface</td><td>PT Jacobs Group Indonesia</td><td>30 September 2021</td><td>01 November 2024</td></tr>
<tr><td>15</td><td>PMC General</td><td>PT AECOM Indonesia</td><td>05 July 2021</td><td>05 October 2025</td></tr>
</table>
</td></tr>
<tr><td>Construction Progress to Date</td><td>
As of 31 December 2022, during this reporting period, construction activities covered six main activities in Dieng and Patuha sites included:
1. Field Activities in Dieng (Civil Work): Well Pad 7 and 29 preparations
2. Drilling in Dieng: SLR-Q-31A (Work Over) SLR-T-09 D, SLR-J-07 D, SLR-J-07 E, and SLR-J-29 B (on-going)
3. Well Testing in Dieng: Well SLR-Q-31A (postponed) and SLR-T-9C well (on-going)
4. Field Activities in Patuha (Civil Work): Pad 4 and Pad BB preparation (on-going)
5. Drilling in Patuha: Well PTH-G-4C, Well PTH-G-4D and Well PTH-H-2B (on-going)
6. Well Testing in Patuha: PTH-V-7B, and Well PTH-G-4B (on-going)
Project progress as of December 2022 was 26.90% for Dieng which was ahead of the re-baseline progress by 0.01%, while for Patuha was 27.99% which was ahead of the re-baseline progress by 0.09%, and the overall progress of Dieng & Patuha was 27.43%.
</td></tr>
<tr><td>Key Sub-project Activities in this Reporting Period:</td><td>
Dieng-2
1. Dieng Field Activities
The ongoing field activities conducted in Dieng were mainly to support drilling activities and well pad preparation i.e, operation & maintenance supporting drilling, landslide barrier wall of silica pond in Pad 29, rerouting D1 pipeline & new well pad preparation and geomembrane installation works at Pad 29.
The activities for well pad preparation at Pad 29 in Dieng which was conducted by PT SUPRACO were completed. Meanwhile, physical work being in Pad 30 has not started yet due to social issues.
The following table describes key progress achievements every month during the second semester of 2022.
<table>
<tr><th>Month</th><th>Key Progress Achievement</th></tr>
<tr><td>July 2022</td><td>● Well testing at well 31A had started, but was currently postponed, due to workovers at this well. The next well test will be conducted at well SLR-T-9C.
● Earthworks in pad 7 was still in progress and almost finish at this time, compacting the subgrade was ongoing now, which was planned to be completed early August 2022.</td></tr>
</table>
</td></tr>
</table>

		• On Pad 29 there was no physical work at this time, waiting for the results of the MOC process.
	August 2022	• Well testing at well 31A had not yet started. The next well test will be conducted at well SLR-T-9C. • Earthworks in Pad 7 had been completed enabling rig mobilization from Pad 9 to commence. • On Pad 29, installation of 2 casing conductors was completed, 1 casing conductor was still in progress. MOC was still processing.
	September 2022	• Preparation for well testing at well SLR-T-9C, which was yet to commence. • On Pad 29, Re-route Dieng 1 steam pipe and brine water channel of Dieng 1 were still in preparation for working. MOC was still progressing. • 3 cellars in pad 29 were under construction, and also earthwork of mud pond, • Installation of casing conductor at pad 30 cannot be done, because of the social community issue.
	October 2022	• Preparation for well testing at well SLR-T-9C, which was yet to commence. • On Pad 29 Re-route Dieng 1 steam pipe and brine water channel of Dieng 1 were still in preparation for working. MOC was still progressing. • 3 cellars in pad 29 were under construction, and also earthwork of mud pond, • Installation of casing conductor at pad 30 cannot be done, because of the social community issue.
	November 2022	• Preparation for well testing at well SLR-T-9C almost completed, well testing planned to start in first week of December. • On pad 29, re-routing of Dieng1 steam pipe and brine water channel of Dieng 1 were still in progress. The well pad was planned to be completed in early Dec, included reroute steam pipeline. MOC was still progressing. • Three (3) cellars in pad 29 have been completed, and also earthwork of mud pond has been completed. The remaining works were welding pipe and well pad pavement, which was planned will be completed at early December 2022. • Installation of casing conductor at pad 30 cannot be done due to the social issue.

December 2022	• Wellpad SLR-G-29 preparation. • Drilling rig mobilization from SLR-J-7 on 12 December 2022 and 1st spud at SLR-G-29 on 22 December 2022. • As of 31 December 2022, the drilling program achieving 1043 MD from plan of 3000 MD which counted as 10th days from spud-in. • Well-testing of SLR-T-9C started

2. Drilling Activities in Dieng

Well Pad preparation activity (including pipeline relocation) at well pad SLR-G-29 by SUPRACO completed by 12 December 2022 and allow the drilling rig to start mobilized from SLR-J-7D.

The social issue concerning the schedule was related to the accessibility of Well Pad 30, which was specifically requested by the local community (APs) to ensure that no activity of equipment mobilization until 4 January 2023. This issue has an impact to hold the mobilization of SUPRACO from Well Pad 29 to Well Pad 30, which also has the potential to delay the readiness of Well Pad 30 for the Drilling Campaign.

The drilling rig started to mobilize from SLR-J-7D on 12 December 2022 and 1st spud at SLR-G-29 on 22 December 2022. The total rig mobilization duration from Well Pad 7 to Well Pad 29 was 22 calendar days.

As of 31 December 2022, the drilling program achieved 1043 MD from the plan of 3000 MD which counted as 10th days from spud-in.

The duration of the drilling program was updated to 51 days per well (refer to average actual drilling duration / see below table) for the remaining 4 wells with estimated drilling operations to complete by August 2023 and complete rig demobilization by October 2023.**Description**	**Assumptions**		
	Optimistic	Realistic	Pessimistic
Drilling duration (Dieng)	35 days	51 days	65 days

Reference	Actual operation days of SLR-J-7D	Average	Actual operation days of SLR-Q-31A

The completed work of drilling activity up to the end of December was as follows:

No	Description	Start	Finish	Days	Depth
1	Mobilization	11 Oct 21	24 Nov 21	43.0	-
2	SLR-Q-31A	24 Nov 21	28 Jan 22	65.0	2,620
3	SLR-Q-31B	2 Feb 22	29 Mar 22	55.0	2,328
4	SLR-T-9C	23 Apr 22	22 Jun 22	60.1	2,844
5	SLR-T-9D	25 Jun 22	05 Aug 22	40.8	2,810
6	SLR-Q-31A WO	18 Aug 22	04 Sep 22	17.0	2,620
7	SLR-J-7D	16 Sep 22	18 Oct 22	32.0	3,009
8	SLR-J-7E	21 Oct 22	30 Nov 22	39.8	3,004

3. Well Testing in Dieng

At the beginning of December 2022, EBTKE has released the approval to start the bleeding of gas at SLR-T-9C. The bleeding of gas successfully commenced on 6 December 2022. There was no significant different of well-testing method that has been applied during the previous well-testing at SLR-Q-31B. A sound barrier around LECM, James Tube, and Flow Control Valve (FCV) has been installed to reduce the noise generated by the well-testing activity. Baseline sampling has also been conducted before well testing commenced. The parameter sampled were; air quality, odour, and noise. Modeling of H2S dispersion and noise carried out before well testing to predict H2S and noise impact generated by the well testing activity.

As of 31 December 2022, the FCV opening at SLR-T-9C was held and maintain at 7%. This was regarding due to significant silica scaling at the LECM, mist pads and brine manifold. Until further notice, the well testing at SLR-T-9C was not fully commenced. This will impact the well-test commencement of the successor well pad at SLR-Q-31B.

PMU-SS, PMC-SS, PMU and PMC-Safeguard were involved in discussions and planning during the preparation of environmental and social mitigation plan of well testing in Pad 9. Socializations were conducted prior to well testing and local community involvement in environmental and social impact monitoring during well testing were also conducted. Four reports relevant to nuisance due to vibration & noise were received. In the other side, four reports relevant to impacted crops were also received.
Concern of community during socialization before well testing were:

1. GDE was to response to any complaint from the community as soon as possible and provide compensation if any damage happens caused by well-testing activity.
2. GDE to assess crop condition before well testing.
3. GDE to provide a communication channel between GDE and the community.
4. Concern on steam impact due to GDE activity

Patuha-2

4. Patuha Field Activities

As of the end of December 2022 cumulative progress on well pad and access road preparation works at Pad BB was 93%. The cellars box including pipe drainage was completed. The remaining works were the control box and was expected to be completed on 2nd week of January 2023. It was expected the rig mobilization from Pad 2 to Pad BB will be in mid to late January 2023.

After completing the works at Pad BB, SUPRACO will continue to complete the cellar box installation at Pad 7 (contingency) and expected to be complete by the end of January 2023.

The following table describes key progress achievement every month during second semester of 2022.

Month	Key Progress Achievement
July 2022	• Installation of Gabion Structure was estimated at 20% and followed with Crushed Limestone (Aras) well compacted per layer with geogrid installation. • Excavator (1 unit) already crossed the river and rock hill and continued with clearing grubbing +removal of stumps from STA 0+200 – STA 0+480 [up to the entrance of Pad BB]
August 2022	• Installation of Gabion Structure was estimated at 70% and following with Crushed Limestone [Aras] well compacted per layer with geogrid installation. Tree cutting and Land clearing was done. Gabion Structure + Crushed Limestone embankment plan to be done – end of Sep 2022 • Two (2) units of excavator and 1 unit of dozer already on the Well Pad BB and had good progress for land clearing – topsoil removal across the whole area for scope access and location. One unit of vibro roller arrived as an addition to catch up on progress and waiting for change of spare part to continue. Re-Survey IPPKH Boundary as part of the compliance including existing creek that was needed for civil engineer to re-validate the overall design. Section STA 0+200 to STA 0+280 at the right side, the space was limited and was a construction challenge. It was planned to propose additional area shift to the left side to have a better piping arrangement.
September 2022	• Installation of gabion structure was estimated at 90% complete and following with crushed limestone (Aras) well compacted per layer with geogrid installation. Tree cutting and land clearing was done total tree cutting were 172,622. Tree replanting not yet commencing still in preparation of the plan for replanting in coordination with Perum Perhutani in compliance with MOEF No. 7/2021. Gabion structure and crushed limestone embankment plan to be done by the end of October 2022.

	● Re-survey IPPKH boundary as part of the compliance including the existing creek that was needed by the civil engineer to re-validate the overall design. Section STA 0+200 to STA 0+280 shoulder on the Right-Hand Side; the space was limited, and constructability was challenging. It was planned to propose an additional area shift to the left so the piping arrangement will be in a good shape. The alignment needs to be shifted slightly to the left side of the road was still inside the IPPKH boundary.
October 2022	● Installation of gabion structure was almost complete and following with crushed limestone (Aras) well compacted per layer with geogrid installation. Tree cutting and Land clearing was done total tree cutting were 172,622. Tree replanting not yet commencing still in preparation of the Plan for replanting in coordination with Perum Perhutani in compliance with MOEF No. 7/2021.. crushed limestone embankment has been done by the end of Oct 2022 ● The alignment between STA 0+200 to STA 0+280 has been shifted slightly to the left side and it was still inside the IPPKH boundary, and the earthworks in this section have been done. • Earthworks of Pad BB access road was almost complete, some location has already done by CBR tests and ready to be paved. Earthworks of Pad BB was almost complete also, the remaining works was at the pond area.
November 2022	Construction activity has focused on Pad BB (Pad 09) as described below: • Installation of gabion structure at river crossing has been completed. • Earthworks of Pad BB access road has been completed, some location has already done by CBR tests and pavement has been done. Earthworks and pavement of Pad BB were almost complete, the remaining works was at the pond area and at the north side of main platform.
December 2022	● 93% wellpad and access road preparation works at Pad BB. ● The remaining works were the control box and cellar box installation at Pad 7 (contingency).

5. Drilling Activities in Patuha

By the end of December, the rig had been moved and rigged-up on Well Pad PPL 2 to Well PTH-H-2B (8 days delay for moved and rig up due to problems with engine rig and top drive) and had drilled to a depth of 1,500m.

The duration of the drilling program was updated to 60 days (refer to average actual drilling duration / see below table) per well for the remaining 6 wells, estimated drilling operations complete by March 2024 and complete rig demobilization by May 2024.

Description	Assumptions		
	Optimistic	Realistic	Pessimistic
Drilling duration (Patuha)	45 days	60 days	78 days
Reference	Initial plan / PTH-G-4D (47 days)	Average	PTH-G-4B (ST)

The completed drilling works up to the end of December 2022 was as follows:

No.	Description	Start	Finish	Days	Depth
1	Mobilization	7 Sep 21	22 Nov 21	75	-
2	PTH-V-7A	23 Nov 21	14 Jan 22	52.1	1,864
3	PTH-V-7B	14 Jan 22	10 Mar 22	49.0	1,733
4	PTH-G-4B	29 Mar 22	17 Jun 22	79.5	2,036
5	PTH-G-4C	25 Jun 22	7 Sep 22	73.8	1,905
6	PTH-G-4D	21 Sep 22	7Nov 22	47.7	2,107

6. Well Testing Activities in Patuha

By the 3rd week of December 2022, surface facilities for well testing have been completed (include radiography test) and EBTKE has released the approval. Testing of well PTH-G-4B commenced on 28 December 2022.

1.2 Summary of EMP Implementation

P.T. Geodipa Energi (GDE) has established an Environmental Management Plan (EMP) as an instrument to mitigate the risk and impact that may be generated by Dieng 2 and Patuha 2 (D2P2) project development. EMP of Dieng 2 and Patuha 2 project was documented in the Initial Environmental Examination (IEE) document, as a required document to fulfil ADB Safeguard Policy Statement requirement.

Based on the EMP, then Contractors develop their own EMP which was called as Construction Environmental Management Plan (CEMP) as a document detailing the EMP and the reference or guidance for implementing environmental impact and risk mitigations in the site.

GDE continuously monitors CEMP implementation by the contractor through site inspection, regular reporting (daily, weekly, and monthly) by the contractor to PMU and PMC and consultation with affected people.

1.2.1 Dieng-2 Sub-Project

During this reporting period from July to December 2022, activities have been carried out in Dieng site were well drilling, field activities include civil works of well pad preparation and well testing. Following the completion of civil works (Dieng 1 pipeline rerouting and well pad preparation) at Pad 29, drilling activity at Well SLR-G-29B was started. Meanwhile, the well testing at SLR-T-9C was ongoing.

In general, the most elements in CEMP were implemented appropriately. Several corrective actions were suggested to improve contractors' performance in implementing EMP. Those were improvement of PPE enforcement, Job Safety Analysis (JSA) improvement, waste segregation, drilling cuttings management, and domestic waste management.

The other potential significant impacts were covered in EMP were H_2S dispersion, noise and vibration during drilling and well testing activity. Given the settlement area being very close to the drilling site, it was unavoidable that the settlement area was impacted by drilling and well testing activity. However, mitigation measures were already in place and beyond the requirements stated in the EMP. H_2S stationary detectors were installed at several spots surrounding Well SLR-T-9C. Regarding the noise from well testing activity, GDE has installed noise barrier surrounding Low Emission Compact Muffler (LECM), James Tube and Flow Control Valve to reduce noise level. Noise barrier consisted of acoustic foam, geotextile and iron sheet. Furthermore, the intensive monitoring involving local community were also undertaken during well testing.

Another issue to be anticipated was water use for drilling activity during the dry season (August – October). As stated in the water use permit, it was not allowed to extract water from surface water during the dry season. Therefore, GDE has prepared master ponds consisting of condensate water in Pad 14, 15 and 17 to be used for drilling activity during the dry season. This management of surface water utilization has been disclosed to the residents' representative of Dieng Wetan, Bakal (Buntu Sub-village), Sikunang (Ngandam Sub-village) and Karang Tengah Village on 26 October 2022.

To provide input for Front End Engineering Design (FEED) of Dieng 2 Power Plant at Pad 38, H_2S and noise dispersion modelling was conducted. The modelling results advised that it was necessary to install a H_2S abatement for reducing H_2S emission rate from 12.222 g/s to 0,1 g/s (réduction of 99%) and install noise barrier during the future operation of Dieng 2 Power Plant as part of environmental impact mitigation measures.

Given the location of Pad 38 and existing settlement at Pawuhan Village was very close, the 99% reduction of H_2S emission rate will be challenging to achieve. It would be very costly operation and maintenance in project finance point of view. Concerning to this issue, GDE considered to relocate the proposed Unit 2 Power Plant to Pad 12. Similar H_2S and noise dispersion modelling using AERMOD was conducted to provide inputs for FEED of Dieng 2 Power Plant at Pad 12. The modelling results advised that an abatement plant was not necessary to be included in the plant design. A provision might be made for an abatement plant and only install an abatement plant if subsequent AMDAL monitoring shows non-compliance during plant operation. Detailed report can be seen in **Appendix 4**.

1.2.2 Patuha-2 Sub-Project

Similar with Dieng 2 Sub Project, Patuha 2 Sub Project's activity were including civil works, drilling works and well testing. All contractors have consistently implemented CEMP in the project sites. Several improvements in waste management were undertaken by contractors compared to last semester. Those were including waste segregation and hazardous management. The Rig Bundling Contractor (PT ADA-APS JV) has transported total of 29.6 tones hazardous waste at temporary storage in Pad PPL 6 to the waste treatment facility in Jakarta managed by their waste management contractor (PT Enviromate Technology International - ETI) in August and September 2022. PT Environmate Technology International – ETI is a third party hazardous waste transporter with licensed from MOEF that is valid until June 2025. While hazardous waste treater was PT Sinergi Prima Sejahtera with licensed from MOEF that is valid until February 2027. New hazardous waste produced by drilling activity is still stored onsite and within the allowable storage period (180 days). It was planning to be transported to designated approved disposal sites in March and April 2023.

However, there were corrective actions based several findings that the contractors shall carry out:

1. Hazardous waste storage needs to be improved to prevent leak and pollution to the environment and fulfil applicable regulation. The contractor has been instructed to provide secondary containment and to post the hazardous waste manifests at the site containing information on types, quantities of hazardous waste stored and collected for offsite treatment and disposal. Compliance will be closely monitored.
2. Based on regular monitoring exceeding noise levels were recorded at the certain locations such as at air drilling engines area (90-102 dBA), rig engines (95- 105 dBA), minicamp (68 dBA). Contractor to ensure that relevant occupational health requirements were in place and well implemented.
3. Documentation of regular vehicle maintenance shall be properly documented to prevent air pollution from vehicle emission and to keep vehicles performance in optimum condition.
4. Waste segregation need to be implemented in rig site area to segregate between organic waste and inorganic waste and to ensure secondary containment were installed in all hazardous waste storage location.

The progress of Biodiversity Action Plan implementation at Pad BB advised that the Civil Works Contractor implemented their CEMP appropriately. None of incident involving wildlife or natural plants was reported during this semester. A join survey with the Aspinal Foundation's primatologist was conducted on 28 November 2022. The main objective of this survey was to select the locations of canopy bridges and its designs (type and materials). Recommendations given were:

1. Canopy bridge location at access road BB STA 0+190 and BB STA 0+ 320
2. Canopy material for canopy bridge consist of; hawser 1,5 – 2 inch, clamp, bridge dimension and span distance between tree crowns

PMU and PMC have carried out joint inspections at drilling sites; findings and a corrective action list can be seen in **Appendix 1**. PMU regularly supervises this drilling activity, and the drilling contractor regularly reports on CEMP implementation every month.

In general, the contractor's performance in implementing the CEMP can be accepted; however, the contractor was expected to continue to improve their performance on CEMP implementation. Details of CEMP implementation were discussed in **Chapter 3**.

1.3 Summary of EMP Monitoring

Completed EMP monitoring program was summarised in Table 2 for this reporting period

Table 2. Summary of EMP Monitoring

No	Criteria	Dieng	Patuha
1	Number of a visit by PMC and PMU	4	5
2	Number of a visit by PMU staff on sites	Daily	Daily
3	Number of the visit by GDE management	-	-
4	Number of air quality samples tested	16	18
5	Number of odour samples tested	22	18
6	Number of noise measurement	34	15
7	Number of surface water samples tested	22	11
8	Number of groundwater samples tested	6 (Unit 1)	1
9	Number of domestic wastewater tested	6	18
10	Number of drainage water tested	8	-
11	Number of produced waters tested	12	2
12	Number of emissions tested	9	-
13	Number of solid waste monitoring (location)	8	2
14	Number of erosion and landslide monitoring (location)	2	2
15	Number of traffic monitoring (location)	6	4

Note: number of samples tested was including monitoring of Unit 1 and Small Scale in Dieng

1.4 Summary of Complaints, Issues and Corrective Action

1.4.1 Dieng-2 Sub Project

Table 3 summarises complaints and issues received for Dieng-2 Sub Project; detailed complaints and grievances were presented in Chapter 5.

Table 3. Summary of Complaint and Issue Dieng-2 Sub Project

Complaint/ Grievance Topic(s)	Number of Complaint/ Grievance Received	Status of Grievance(s) Resolution		
	Number of complaints received within this monitoring period	Resolved	Ongoing	Remark
Water pollution	2	1	1	Ongoing complaint was still assessed to calculate estimation for compensation. Current status was GDE and affected people had agreement for

Complaint/ Grievance Topic(s)	Number of Complaint/ Grievance Received	Status of Grievance(s) Resolution		
	Number of complaints received within this monitoring period	Resolved	Ongoing	Remark
				compensation. GDE will transfer compensation to affected people soon
Noise	-	-	-	
Air pollution	-	-	-	
Others (Compensation)	7	4	3	Ongoing complaint was related to well testing activity at Pad 9 Current status was GDE and affected people had agreement for compensation. GDE will transfer compensation to affected people soon

1.4.2 Patuha-2 Sub Project

There was no complaints and issues relevant to environmental impact for Patuha 2 Sub Project in this reporting period.

Table 4. Summary of Complaint and Issue Patuha-2 Sub Project

Complaint/ Grievance Topic(s)	Number of Complaint/ Grievance Received	Status of Grievance(s)		
		Resolved	Ongoing	Remark
Water pollution	-	-	-	-
Noise	-	-	-	-
Air pollution	-	-	-	-
Others	-	-	-	-

2 SAFEGUARDS STAFF, TRAINING AND DOCUMENTATION

2.1 Implementation Arrangements

The EMP defines the Environmental Safeguards roles and responsibilities during implementation; the status of key roles was indicated in Table 5.

Table 5. Status of Environmental Safeguard Roles

<table>
<tr><th>Safeguards Role</th><th colspan="4">Status and Comment</th></tr>
<tr><td rowspan="2">GDE PMU – HSE</td><td>Date Started:</td><td>Various</td><td>Full Time/ Part Time</td><td>11 FT</td></tr>
<tr><td>Comment</td><td colspan="3">A. PMU Head Office
1. HSE and Safeguards Manager - Ray Armand
2. Plt. Health and Safety Assistant Manager - Aditya Rahman
3. Health and Safety Staff - Sannita Debora Ambaritha
4. Environment Safeguards Assistant Manager - Sari Ramadhani Putri
5. Environmental Staff – Helmy Hasan
B. PMU Dieng-2
6. HSE and Safeguard Superintendent – Sigit Dwi Pamungkas
7. Health and Safety Supervisor – Solimin
8. Environment Safeguards Supervisor – Dian Nur Fibrianto
C. PMU Patuha-2
9. HSE and Safeguard Superintendent - Aditya Rahman
10. Health and Safety Supervisor - Bambang Umbara
11. Environment Safeguard Supervisor - Rista Jayanti</td></tr>
<tr><td rowspan="2">PMC Environmental Safeguards Team</td><td>Date Started:</td><td>5 August 2021/ 1 November 2022</td><td>Full Time/ Part Time</td><td>3 FT</td></tr>
<tr><td>Comment</td><td colspan="3">1. Health, Safety, Environmental and Safeguard Specialist – Wahyu Setyawan Minarto
2. Environmental Specialist - Hasbullah Hasan
3. Biodiversity Specialist - Novianto Hadi Suwito</td></tr>
<tr><td rowspan="2">Environmental Monitoring Firm (Sucofindo)</td><td>Date Started:</td><td>January 2021</td><td>Full Time/ Part-Time</td><td>18 PT</td></tr>
<tr><td>Comment</td><td colspan="3">1. Sucofindo Bandung - 9 Staff
2. Sucofindo Semarang - 9 Staff</td></tr>
</table>

<table>
<tr><th>Safeguards Role</th><th colspan="4">Status and Comment</th></tr>
<tr><td rowspan="2">PMU GRM Focal Point</td><td>Date Started:</td><td>Various</td><td>Full Time/ Part Time</td><td>4 FT</td></tr>
<tr><td>Comment</td><td colspan="3">1. Dieng-2 – Slamet Riyadi
2. Dieng-2 – Himawan
3. Patuha-2 – Ananda Riana
4. Patuha-2 – Viosy Tederickbrata</td></tr>
<tr><td rowspan="2">Contractor Environment Health and Safety Staff at Dieng Unit 2 (each company will appoint one staff for GRM representative)</td><td>Date Started:</td><td>March 2021</td><td>Full Time/ Part-Time</td><td>4 FT</td></tr>
<tr><td>Comment</td><td colspan="3">• PT. PRA - 1 HSE Staff
• PT. Depriwangga - 1 HSE Staff
• PT. Halliburton Indonesia - 1 HSE Staff
• PT Supraco - 1 HSE Staff
• PT Air Drilling - 0 HSE Staff
• PT. Prima Hidrokarbon Indonesia - 0 HSE Staff
• PT Baker Hughes Indonesia - 0 HSE Staff
• JV-Tiger-NESR - 0 HSE Staff
• PT. NMS - 0 HSE Staff</td></tr>
<tr><td rowspan="2">Contractor Environment Health and Safety Staff at Patuha Unit 2</td><td>Date Started:</td><td>March 2021</td><td>Full Time/ Part-Time</td><td>4 FT</td></tr>
<tr><td>Comment</td><td colspan="3">1. JV ADA APS - 1 HSE Staff
2. PT. Depriwangga - 1 HSE Staff
3. PT. Halliburton Indonesia - 1 HSE Staff
4. PT Supraco - 1 HSE Staff
5. PT Air Drilling - 0 HSE Staff
6. PT. Prima Hidrokarbon Indonesia - 0 HSE Staff
7. PT Baker Hughes Indonesia - 0 HSE Staff
8. JV-Tiger-NESR - 0 HSE Staff
9. PT. NMS - 0 HSE Staff</td></tr>
</table>

The project concludes that the environmental safeguards roles were provide sufficient staff members and specialists.

2.2 Training and Capacity Building

The following table gives the environmental safeguards training courses that have been completed during this reporting period and the planned training courses for the next six months:

Table 6. Environmental Safeguards Training Provided and Planned

Name	Training Course Title	Training Date	Provider	Method	Total Hours	Remarks
Dian Nur Fibrianto	H2S and CO2 Removal	29 – 30 November 2022	Jogja Smart Indotama	Lectures, sharing	16 hours	Completed

Name	Training Course Title	Training Date	Provider	Method	Total Hours	Remarks
				and discussion, final test		
Rista Jayanti and Helmy Hasan	Environmental, Social and Governance	28 – 29 December 2022	Karisman Consulting	Lectures, sharing and discussion, final test	16 Hours	Completed
To be named	Introduction to AMDAL and ESIA	June 2023	PSLH UGM	Lectures, sharing and discussion, final test		Plan
To be named	Preparing AMDAL	June 2023	PSLH UGM	Lectures, sharing and discussion, final test		Plan
To be named	Water Pollution Control (P3A Certification)	October 2023	PSLH UGM	Lectures, sharing and discussion, final test		Plan
To be named	Hazardous Material and Waste Management	November 2023	PSLH UGM	Lectures, sharing and discussion, final test		Plan

2.3 ADB Approvals

There was no document to be approved and disclosed by ADB during this semester. The information on the latest status of the safeguards documents was presented in Table 7.

Table 7. Status of Environmental Safeguard Documents

Safeguards Documents	Update Issued (Latest Version)	Disclosure date	Remarks
Geothermal Power Generation Project: Dieng Unit 2 Project Component Draft Initial Environmental Examination https://www.adb.org/projects/documents/ino-52282-001-iee	November 2019	November 2019	To be updated due to change of project description and additional project component to be added It was expected that IEE Updated completed in six month after contract awarded. Currently GDE in process to select Consultant to execute IEE Updated.

Safeguards Documents	Update Issued (Latest Version)	Disclosure date	Remarks
			Target completion of updated IEE: before August 2023
Geothermal Power Generation Project: Patuha Unit 2 Project Component Draft Initial Environmental Examination https://www.adb.org/sites/default/files/project-documents/52282/52282-001-iee-en_0.pdf	October 2019	October 2019	On going process to be updated due to change of project description and additional project component to be added Current status of Patuha IEE updating was Final Draft has been submitted to ADB for review and approval. Target completion of updated IEE: before August 2023
EMP for Dieng-2 https://www.adb.org/sites/default/files/project-documents/52282/52282-001-iee-en_1.pdf	November 2019	November 2019	To be updated due to change of project description and additional project component to be added Target completion of updated IEE: before August 2023
EMP for Patuha-2 https://www.adb.org/sites/default/files/project-documents/52282/52282-001-iee-en_2.pdf	October 2019	October 2019	On-going process to be updated due to change of project description and additional project component to be added. Target completion of updated EMP: before August 2023

2.4 National Approvals

There was no environmental document to be approved during this semester. Referring to GDE's decision to relocate proposed D2 power plant from Pad 38 to Pad 12, an addendum AMDAL documents of
Dieng 2 was on-going since November 2022 and will be completed in July 2023. Table 8 summarized the latest national approvals required for the project which have been proceed.

Table 8. Status of National Approvals for Environmental Documents

Documents	Submitted to MoEF	Approved By MoEF	Status – if not approved	Comment
SIPPA (Water Extraction Permit) Dieng-2	N.A.	N.A.	Approved	Approved for Sidolok River by Ministry of Public Work and Public Housing May 24, 2021
AMDAL Addendum for Dieng-2	Revised Document was submitted, and MOEF was held	December 2021	Completed and approved	GDE has received approval letter of AMDAL Addendum of Dieng 1, 2, 3 and 4 and its Feasibility Letter from Ministry of Environment & Forestry
Borrowing and Use of Forest Area Permits (IPPKH) – Patuha-2	April 2020	18 January 2021	Approved	Izin Pemanfaatan Kawasan Hutan was granted.
SIPPA (Water Extraction Permit) Patuha-2	N.A.	N.A.	Approved	Completed In 2020, extended in 27 April 2022 valid until May 3 2024
AMDAL Addendum for Patuha-2	November 2009	17 February 2010	Approved	The scope of this AMDAL Addendum covered units 1 to 7 and was still valid for development; therefore, GDE did not apply new Amdal.
AMDAL Addendum for Dieng-2	N.A	N.A	N.A	Currently, GDE has sent a letter to MoEF on 19 December 2022 for having their guidance on the type of environmental document was required for Dieng-2 and scope of assessment need to be covered in the document related to the relocation of D2 power plant from Pad 38 to Pad 12.

2.5 Construction Environmental Management Plan (CEMP) Approvals

There was no change of CEMP to be approved during this semester. CEMP approval status and implemented during this semester was summarized in Table 9.

Table 9. CEMP Approval Status

No	Contractor	Work Contract	CEMP Status
1	PT Plumpang Raya Anugrah	Rig Bundling (Lot Dieng)	Dieng: Approved by GDE - 17 October 2021
2	JV PT Air Drilling Associate - PT Asia Petrocom Services	Rig Bundling (Lot Patuha)	Patuha: Approved by GDE- 8 November 2021
3	PT Air Drilling	Aerated	Patuha and Dieng: Approved by GDE - 3 November 2021
4	PT Halliburton Logging Services Indonesia	Cementing and Casing (lot Dieng)	Dieng: Approved by GDE- 8 November 2021
5	PT Halliburton Logging Services Indonesia	Cementing and Casing (lot Patuha)	Patuha: Approved by GDE- 8 November 2021
6	PT Halliburton Logging Services Indonesia	Directional Drilling (Lot Dieng)	Dieng: Approved by GDE- 9 November 2021
7	PT Halliburton Logging Services Indonesia	Directional Drilling (Lot Patuha)	Patuha: Approved by GDE- 9 November 2021
8	JV PT Tiger Energy Services and NPS Bahrain for Oil and Gas Well Services	Wireline Logging Services	Patuha: Approved by GDE - 3 November 2021 Dieng: Approved by GDE - 3 November 2021
9	PT Baker Hughes Indonesia	Fishing Milling	Patuha and Dieng: Approved by GDE - 19 November 2021
10	PT Baker Hughes Indonesia	Mud Engineering (Lot Dieng)	Dieng: Approved by GDE - 19 November 2021
11	PT Prima Hidrokarbon Internusa	Mud Engineering (Lot Patuha)	Patuha: Approved by GDE- 3 November 2021
12	PT Depriwangga	Well testing	Patuha and Dieng: Document has been approved (Patuha 18 February 2022, Dieng 5 April 2022
13	PT Supraco Indonesia	Civil Work	Patuha: Approved by GDE- 9 November 2021
			Dieng: Approved by GDE 22 November 2021
14	NMS	Wellhead	Patuha and Dieng: The document has been approved February 2022

3 EMP IMPLEMENTATION

Description of EMP implementation during this period consists of civil work (access road and well pad preparation both for Dieng and Patuha) and drilling activity (including well testing activity). Reporting structure of Environmental Health and Safety performance was divided into environmental performance and health and safety performance as recommended in the ADB report template.

Table 10 to table 15 provide detailed information on implementation of **environmental** impact mitigation measures outlined in EMP and the correlated CEMP during the July – December 2022 period.

Table 16 – table 19 provide detailed information on implementation of **health & safety** risk/impact mitigation measures outlined in EMP and the correlated CEMP during the July – December 2022 period

Meanwhile, mitigation measures defined in the Biodiversity Action Plan (BAP) were detailed in a separate Table 20.

3.1 Environmental Performance

Environmental performance as mentioned above was described in the table 10 – 15. In that table, mitigation measures from the EMP document were marked with capital C with number (for example C 11), while mitigation measures from Contractor CEMP document were marked with capital CC with number (for example CC 12).

Mitigation measures that already implemented during the mobilisation stage, had been reported in the previous semi-annual report, therefore it was not reported any more in this report. Mitigation measures in the EMP related to EPC construction were not included in the report due to the activity not starting yet.

The evidence for the compliance of EMP implementation was through a combination of:

- Site visits/inspection to observe site practices;
- Consultation with affected people;
- Regular environmental reporting form;
- Documentation

EMP of the project (GDE) has been utilised as a reference to develop the Contractor's specific CEMP. As a part of their commitment, all contractors shall make a CEMP implementation report to PMU and PMC every month. PMC and PMU have made a regular schedule to inspect CEMP implementation by contractors. The latest inspection was conducted on 28 and 30 September 2022 for Patuha Unit 2 and 27 October 2022 for Dieng Unit 2. The report of the joint site inspection was attached in **Appendix 1**.

3.1.1 Environmental Performance of Dieng-2 Sub Project

The monitoring of environmental performance of Dieng-2 Sub Project was conducted based on quarterly and semesterly monitoring conducted by third party (PT Sucofindo) and join site inspection by PMU and PMC. The following table shows summary of environmental performance of Dieng-2 Sub Projects.

Table 10. Status of EMP Compliance in Dieng-2

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
1	**Civil Works: Preparation of Well Pad 09 and Pad 07 including its access road**				
1A. Mobilization and Demobilization					
1	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.1 Truck that will deliver dust-generating construction materials will be covered with canvas or other suitable material to minimize dust dispersion	Yes	Delivery trucks (basecourse) were covered with a tarpaulin.	None
2	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.2 Contractor will ensure regular maintenance and inspection of construction vehicles, including emissions testing certificate	Yes	No further comments.	None
3	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.3. Use multi-passenger vehicles to transport workers to and from the well sites	Yes	No further comments.	None
4	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.4. Stockyard will be covered during the non-working period	Not applicable	Not applicable	None
5	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.5 Vehicles and equipment will not be allowed to sit and idle for more than 30 minutes	Yes	Briefing for drivers and co-drivers before the commencement of work. Discussion not allowing the vehicle to idle for 30 minutes was included in the briefing.	None
1B Waste Management					
1	Generation of waste	C.23. Provide garbage bins at basecamp	Yes	The garbage bins were available at the drilling site. Contractor to provide segregated garbage bins	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
				once site office was installed.	
2	Generation of waste	C.24. Contractor to prepare waste management plan (as part of CEMP), approved by PMC	Yes	Waste Management Sub-Plan has been developed and attached as a supplementary document in the SPC CEMP. PMU has approved waste MPS.	None
1C Access Road work and Preparation Well Pad (Cut and Fill Activity)					
1	Water contamination due to erosion and sedimentation	CC 1. Construction of temporary ditch at the surrounding of well pad working area to accommodate runoff	Yes	No further comments.	None
2	Displacement of species due to noise from normal traffic, operation or maintenance activities.	CC 2. Should any wildlife encounter during the land clearing process, wildlife shepherding refers to Biodiversity Action Plan	Yes	GDE has established a form to record any encounter with wildlife during the work. Supraco has reported zero case of wildlife encounter during the July to December 2022 period.	None
2	**Rig Mobilization from Pad 31 to Pad 09 to Pad 7then to Pad 29**				
	Generation of dust and vehicular emissions from earthworks and movement of vehicles to and from the construction sites.	C.6. Regularly inspect and maintain heavy equipment C.7. Use of high-occupancy service vehicles to transport workers C.8. Emissions testing certificate of service vehicles will be required and monitored by PMU	Yes Yes Yes		

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.9. Install temporary fencing and/or enclosures at least 3-m high at construction sites	Yes		
		C.10. Water will be sprayed daily in opened land areas or in other areas where dust was generated	Yes		
		C.11. Stockyard will be covered during non-working hours	Yes		
		C.12. Vehicles and equipment will not be allowed to sit and idle for more than 30 minutes	Yes	Idle was allowed at designated place only that would not affect the public traffic	
		C.13. Cover trucks that deliver dust-generating construction materials	Yes		
		C.14. No burning of solid or liquid wastes and other combustible materials will be allowed within the construction sites and labor camps	Yes		
		C.15. Provide PPE to operators of heavy equipment	Yes		
		C.16. Limit noise-generating activities during daytime and provide temporary enclosures to stationary noise sources	Yes		
		C.17. Drivers and operators must strictly follow road regulations particularly speed and excessive blowing of horns will not be allowed	Yes		
		C.18. Provide ear plugs/muffs to workers exposed to high-level noise and rotate schedule of these workers every two hours	Yes		

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
3	**Well Development**				
1	Generation of waste - Improper handling and disposal of waste generated may affect water quality and cause soil contamination	C.22. Contractor to prepare waste management plan, to be approved by PMC (as part of CEMP)	Partial	Improve current waste management plan in particularly domestic waste management, according to existing Waste Management Plan	Domestic waste management was not fully implemented according to CEMP Sub Plan 4
		C.23. Contractor to provide adequate garbage bins to all construction sites and workers' camps	Partial		Some oil contaminated wastes (i.e. after used gloves, rags) were placed in non-hazardous waste bins
		C.24. Heavy equipment and machinery workshops will be bunded or lined with impermeable material to prevent spills directly on land	Not Applicable		No heavy equipment and machinery workshops on site
		C.25. Contractor to provide oil-water separator for oily washings	Not applicable		No washing facility of drilling equipment and heavy equipment on site
2	Impact on biodiversity and precious ecology	C.26. Revegetate to improve aesthetics and create green buffer	NA	Not applicable	

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.27. Land clearance and sourcing of construction materials will not take place within the IBA C.28. Sourcing of all construction materials such as wood, sand or gravel should be from outside of the IBA. C.29. Use of underground cable transmission line to completely avoid collision risks to migrating birds, showing GDE world-leading best-practice.			
3	Release of H_2S during well testing	C.39. Provide workers with masks C.40. Conduct ambient air quality monitoring quarterly C.41. Provide adequate ventilation in confined spaces	Yes Yes Yes	Ambient air quality monitoring by third party (Sucofindo)	
4	Operation of drilling rig and equipment generating noise	C.42. Use of mobile rock muffler or silencer during well venting C.43.Provide workers with earplug/muffs C.44. Rotate workers every two hours to prevent discomfort C.45. Inform nearby communities of well drilling schedule	Yes Yes Yes Yes		
5	Generation of waste	C.46. Construct sump to hold produced water and waste drilling fluids	Yes Yes		

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.47. The sumps should be lined with impermeable material to prevent soil and water contamination. C.48. Oil-water separator shall be provided for oily washings in the drilling equipment and trucks C.49. Provide garbage bins at basecamp C.50. Contractor to prepare waste management plan (as part of CEMP), approved by PMC	NA ` Yes Yes	Not applicable	
6	Water requirements for drilling	C.51. Use of condensate from Unit 1 during dry season as primary source with an average flow rate of 30 L/s C.52. Use existing pipelines in Sikidang area to convey the condensate to Pad 24 where pond of about 1,800 m3 capacity was available but requires rehabilitation C.53. Reuse water-bentonite based mud to reduce water requirement C.54. Use aerated fluid drilling (clay-free) for the production-zone of the wells C.55. No water extraction during the dry season (July to September) so that irrigation of agricultural	Yes Yes Yes Yes Yes	Implemented during dry season In progress, the pond will be utilized during operation phase and plan to be constructed during EPC Extraction of existing stream was conducted according to applicable	

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		land by farmers will not be affected		permit	
		C.56. Construction of additional reservoir at new power plant site (Unit 2) of 5,000 m3 to supply peak water demand (including construction of power plant)	Yes	Not applicable	New power plant will be constructed at Pad 12
		C.57. Drilling services contractors to keep a record of daily operations to include volume of water used segregated by source of water	Yes		
		C.58. Drill only 1 well at once (only 1 rig will be installed)	Yes		
		C.59. Ensure sufficient flows (e-flows) remain in any stream where water abstraction occurs to minimize impacts to the freshwater snail, (*Gyraulus terraesacrae*). A flow meter was installed to measure water abstraction.	Yes		
7	Discharge of steam during well testing - release of H_2S higher than the occupational limit of 150 µg/m^3 set by WHO. Elevated noise may affect hearing of workers during well testing	C.60. Workers assigned will be provided with PPE such as earplugs, mask and H_2S detector, and personal H_2S dosimeter with alarm system	Yes		
		C.61. Install mobile rock muffler as silencer	NA		Used LECM (Low Emission Compact Muffler) instead of rock muffler

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.62. Use of SCBA's in the immediate area of well testing	Yes		
		C.63. Conduct regular calibration of monitoring equipment to ensure accurate readings of H_2S	Yes		
		C.64. Safety and medical personnel will be available on-site.	Yes		
8	Change in work plan	CC 3. The CEMP shall be updated in line with changes of work plans. All workers shall be advised of changes to the sub-plans and procedures. Any additional works outside the IEE/EMP shall require additional environmental impact assessment and approval;		No change work plan	
9	CEMP Implementation	CC 4. All construction workers shall be inducted onto the CEMP, associated sub-plans, site environmental conditions and sensitive areas as identified in this IEE/EMP and receive training, as appropriate. Induction and training records shall be kept and maintained;	Yes		
10	Hazardous Material Register and Safety Data Sheet	CC 5. A Hazardous Material Register and respective Safety Data Sheets (SDSs) shall be kept on site at all times and regularly maintained;	Yes		

For all ‘Partial’ or ‘No’ compliance issues in the table above, the actions needed to solve the compliance issues were summarized in Table 11.

Table 11. EMP Actions Needed for Compliance – Dieng-2

No	EMP Requirement	Further Action to Take	Date for Action	Who will Implement Action
01	C.22. Contractor to prepare waste management plan, to be approved by PMC (as part of CEMP)	Contractor to brief their local sub-contractor (CV Kembang Jaya) and ensure the domestic waste management was implemented according to CEMP Sub Plan 4.	February 2023	CV Kembang Jaya
02	C.23. Contractor to provide adequate garbage bins to all construction sites and workers' camps	Contractor to encourage all workers for appropriately implementing waste segregation into provided garbage bins with readable labels for waste segregation (Green – Organic Waste, Yellow – Non-Organic Waste and Recyclable Waste, Red – Non-Organic Waste and Non-Recyclable Waste, and Black – Hazardous Waste) and socialize to all workers.	February 2023	Contractor's HSE Officer
03	C 23. Provide garbage bins at basecamp	Contractors to provide segregated garbage bins at the working and accommodation areas after moving to the work area which allows a more permanent structure (for example: porta camp container, etc)	February 2023	Contractors (PRA and Supraco)

Table 12 provides information on environmental performance issues from previous Environmental Monitoring Reports. This table confirms that the action was completed or that the step was outstanding.

Table 12. EMP Compliance Outstanding Issues from Previous Report – Dieng-2

No	EMP Requirement	Further Action to Take	Responsibility and Timing	Resolution	Required Action
1	A.7 Include silica management in the SOP of hazardous material waste management.	Develop Silica management	Dieng 1, after the silica	TCLP test of silica has been completed, and	None

			test results, was released.	silica waste categorized as nontoxic substance	
2	A.8 Improve access control to existing wells pads 7, 9, 30 and 31, including fencing, gate and security guard.	Install fencing, gate and security guard in Pad 9	GDE, End of February 2022	Completed	None

3.1.2 Environmental Performance of Patuha-2 Sub Project

Summary of environmental performances of Patuha 2 sub project was presented in Table 13.

Table 13. Status of EMP Compliance at Patuha-2

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
1	**Civil Work**				
1A. Mobilization and Demobilization					
1	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.1 Truck that will deliver dust-generating construction materials will be covered with canvas or other suitable material to minimize dust dispersion	Yes	Delivery trucks were covered with a tarpaulin.	None
2	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.2 Contractor will ensure regular maintenance and inspection of construction vehicles, including emissions testing certificate	Yes	Inspection of vehicle and equipment was conducted regularly. Emission gas testing was conducted prior commencement of work.	None
3	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.3. Use multi-passenger vehicles to transport workers to and from the well sites	Yes	No further comments.	None
4	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.4. Stockyard will be covered during the non-working period	Yes	No further comments.	None
5	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.5 Vehicles and equipment will not be allowed to sit and idle for more than 30 minutes	Yes	Briefing for drivers and co-drivers before the commencement of work. Discussion not allowing the vehicle to idle for 30 minutes was included in the briefing.	None
1B. Waste Management					

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
1	Generation of waste	C.23. Provide garbage bins at basecamp	Yes	Waste segregation at site office and basecamp. Organic, non-organic, and hazardous waste bins were provided at the working areas.	None
2	Generation of waste	C.24. Contractor to prepare waste management plan (as part of CEMP), approved by PMC	Yes	Waste Management Sub-Plan has been developed and attached as a supplementary document in the SPC CEMP. PMU has approved waste MPS.	None
1C. Chemical Handling					
1	Chemical spill and wastewater discharge to the environment	C.23 Chemical handling and storage refers to MSDS. MSDS of chemicals to be available	Yes	MSDS of chemicals onsite were made available and recorded.	None
2	Chemical spill and wastewater discharge to the environment	C.46 Install tarpaulin and bund wall as the ground mat to avoid chemical spill to the environment	Yes	No further comments.	None
3	Chemical spill and wastewater discharge to the environment	CC 6. Chemical spill kit to be made ready within the working location	Yes	No further comments.	None
4	Chemical spill and wastewater discharge to the environment	CC 7. Excavate sump pit(s) temporarily as ground mat to avoid chemical spill to the accommodate wastewater environment generated during the mixer washing activity	Not applicable	Not applicable since concrete was produced by PT Pioneer Beton Industri	Not applicable

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
5	Chemical spill and wastewater discharge to the environment	CC 8. Install whip check on hose connection	Not applicable	Not applicable since concrete was produced by PT Pioneer Beton Industri	Not applicable
6	Poor housekeeping on waste generation from cement package or grouting additive bucket	CC 9. Re-Use bucket refers to waste management Sub-plan	Not applicable	Not applicable since concrete was produced by PT Pioneer Beton Industri	Not applicable
7	Poor housekeeping on waste generation from cement package or grouting additive bucket	CC 10. Segregate waste of cement package	Not applicable	Not applicable since concrete was produced by PT Pioneer Beton Industri	Not applicable
2	**Access Road work and Preparation Well Pad (Cut and Fill Activity)**				
1	Erosion / landslide (sediment run-off) due to cut and fill land clearing pad BB	CC 11. Mapping area for land clearing plan	Yes	No further comments.	None
2	Erosion / landslide (sediment run-off) due to cut and fill land clearing pad BB	CC 12. Conduct EHS Induction specifically designed for Loc BB works	Yes	No further comments.	None
3	Erosion / landslide (sediment run-off) due to cut and fill land clearing pad BB	CC 13. Install bund wall on the slope (especially at the extreme pitch)	Yes	No further comments.	None
4	Land clearing waste management	CC 14. Land clearing waste (e.g., tree logs) will be utilized as bund wall construction	Yes	Tree logs were used as construction materials	None
5	Erosion / landslide sediment run-off) due to exposed soil	CC 15. Maintenance of sediment trap	Yes	Sediment traps were installed at three locations: 1. Upstream of Cipadarum River	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
				2. STA200 of Cipadarum River (within the boundary) 3. Downstream of Cipadarum River	
6	Water contamination due to erosion and sedimentation	CC 16. Propose Silt Fence installation (Polypropylene Geotextile, 30cm above ground, 15cm inside the ground, steel wire strap) on runoff track downstream	Yes	Geotextile was installed for erosion and sedimentation control.	None
7	Water contamination due to erosion and sedimentation	CC 17. Propose to construct control box for monitoring sedimentation (Permit to local government by GDE) Install bund wall filter on runoff track downstream	Yes	Control box was installed downstream to accommodate the runoff. The size of the control box was 2mx2m	None
8	Water contamination due to erosion and sedimentation	CC 18. Construction of temporary ditch at Loc BB to accommodate runoff and flow it to the sediment trap	Yes	No further comments.	None
9	Forest fire Mortality of individuals, from poaching by construction workers.	CC 19. Install a sign of no burning waste and open fire at all construction sites and porta camp. Install signage of no hunting/poaching of wildlife.	Yes	No further comments.	None
10	Mortality of individuals from poaching by construction workers.	CC 20. Implement a strict code of conduct forbidding hunting/trapping and the purchase of wildlife, with heavy penalties. Train all personnel on this code of conduct and its justification.	Yes	No further comments.	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		Delivery of biodiversity induction to all personnel			
11	Mortality of wildlife due to construction works	CC 21. Delivery of special induction for work at Pad BB to all personnel Implement a strict code of conduct forbidding hunting/trapping and the purchase of wildlife, with heavy penalties. Train all personnel on this code of conduct, and its justification	Yes	No further comments.	None
12	Biodiversity loss	CC 22. Propose additional free space from boundary area to slope bottom normally 20 m space	Yes		Design of additional free space have been integrated into design
13	Mortality of individuals, owing to induced access for poachers/hunters via project roads	CC 23. Propose construction of temporary fence using zinc and wood frame along the boundary IPPKH to protect the working area from unauthorized person entrance	Yes	IPPKH boundary was marked by rope and safety line. Zinc fence was used to mark the boundary of pad area.	None
14	Loss of vegetation cover in specific areas of the project.	CC 24. Follow existing documents, including IPPKH and map, vegetation inventory, conceptual design, etc.	Yes	No further comments.	None
15	Loss of vegetation cover in specific areas of the project	CC 25. Joint survey with relevant PMU's representative and Perhutani to identify IPPKH boundary and demarcate working area before construction commencement	Yes	No further comments.	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
16	Mortality of individuals, owing to induced access for poachers/hunters via project roads	CC 26. Do not trespass IPPKH boundary barricade lines and sign this information will be included in the HSE Induction	Yes	No further comments.	None
17	Loss of vegetation cover in specific areas of the project.	CC 27. Providing for pre-clearing surveys to be undertaken by a suitably qualified ecologist to mark and map hollow-bearing trees, logs, and existing nest boxes that would require fauna management during removal.	Yes	No further comments.	None
18	Modification and fragmentation of habitat due to loss of vegetation cover.	CC 28. Vegetation removal works during land clearing should be supervised by a suitably qualified ecologist for native or endemic species to West Java. Coordination and communication with personnel involved (Contractor, LH, GDE)	Yes	No further comments.	None
19	Displacement of species due to noise from normal traffic, operation or maintenance activities.	CC 29. Should any wildlife encounter during the land clearing process, wildlife shepherding refers to Biodiversity Action Plan	Yes	GDE has established a form to record any encounter with wildlife during the work. Supraco has reported zero case of wildlife encounter during the July to December 2022 period.	None
20	Mortality of wildlife due to construction works	CC 30. A hollow tree fell, shall not be cut, removed or piled for another 24 hours to provide chance for animals to move away. The hollow trees shall then	Yes	No further comments.	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		be placed in the area of habitat or the substitute habitats.			
21	Mortality of individuals, owing to induced access for poachers/hunters via project roads	CC 31. Set up boundary /marking area using a safety line	Yes	No further comments.	None
22	Land clearing activity	CC 32. Land clearing to follow the approved IPPKH boundary	Yes	No further comments.	None
23	Land clearing activity	CC 33. Topsoil was collected and stored at a designated soil disposal storage area at PPL 04.	Not applicable	Top Soil from STA 0+10 to STA 0+190 was safe for disposal at PPL 04. No excavation top soil activity was reported during the July to December 2022.	
3	**Drilling Work**				
1	Increased vehicular emissions and noise due to mobilization of equipment and materials	C.1 Truck that will deliver dust-generating construction materials will be covered with canvas or other suitable material to minimize dust dispersion	Yes		None
		C.2 Contractor will ensure regular maintenance and inspection of construction vehicles, including emissions testing certificate	Yes,	GDE and the drilling contractor has inspected the vehicles that will be used during mobilization and drilling operation All vehicles used for mobilization have certificate emission testing	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.3 Use multi-passenger vehicles to transport workers to and from the well sites	Yes	Vehicles used for transport workers were multi-passenger vehicles such as minibuses and MPV cars.	None
		C.4 Stockyard will be covered during the non-working period.	Yes		None
		C.5 Vehicles and equipment will not be allowed to sit and idle for more than 30 minutes	Yes	Due limited area of the drilling site, vehicles were not allowed to park in the drilling site. Vehicles enter the drilling site only for loading and unloading material.	None
2	Increased dust in the form of PM10 and PM2.5 may come from excavations in the new wells, other construction support facilities like the basecamp	C.6 Install temporary fencing and/or enclosures at construction sites to contain dust levels	Yes	The drilling site was located in the existing well pad ;the fence was already in place, the area of a drilling site was far away from the settlement area	None
		C.7 Spray water in dusty areas, where applicable	Yes	Currently, it was raining in Patuha almost every day; spraying water was implemented situationally if needed	None
3	Increased level of noise during well drilling and testing	C.8 Inform staff and communities before well drilling.	Yes	General induction (Basic Safety Training/BST) was conducted for all workers before the drilling activity started. BST was conducted on 11 and 12 November 2021. Photograph and attendance list have been archived. Communities were informed through public consultation and spud in ceremony before drilling activity was conducted. Spud in ceremony in	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
				Patuha was conducted on 18 November 2021, attended by community representatives and local authorities.	
		C.9 Use of mobile rock muffler or silencer during well venting	NA	Well Testing use LECM (Low Emission Compact Muffler) as silencer instead of rock muffler	None
		C.10 Provide workers with earplug/muffs	Yes	Safety devices were provided for all workers, including earplugs/earmuffs for those who work in a noisy area	
		C.11 Rotate workers every two hours to prevent discomfort	Yes		None
		C.12. Implement actions (BAP) as defined in Table 9.2 of this EMP	Yes		
		C. 13 Provide workers assigned to well testing with personal protective equipment (PPE) like mask and H2S alarms and personal dosimeter	Yes		
		C.14. Conduct ambient H2S monitoring	Yes		
		C.15. Provide adequate ventilation in confined spaces	Yes		
4	Use of water for drilling	C.16 Reuse water-bentonite based mud on reducing water requirement	Yes	Water containing bentonite from well pumped to the water pond then water from water pond utilize for drilling	None
		C.17 Use aerated fluid drilling (clay-free) for the production zone of the wells.	Yes	GDE has contracted PT Air Drilling to provide Aerated Drilling Services	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.18 Drilling services contractors to keep a record of daily operations to include the volume of water used segregated by the source of water	Yes		None
		C.19 Secure water use permit for use of surface water	Yes	SIPPA (water use permit) has been approved No.593.3/KEP.25/03.1.04.2/DPMPTSP/2020 tentang "Perpanjangan Izin Pengambilan dan Pemanfaatan Air Permukaan" on 3rd August 2020	None
5	Generation of waste	C.20 Construct sump/pond to hold produced water and waste drilling fluids	Yes		None
		C.21 The sumps should be lined with impermeable material to prevent soil and water contamination.	Yes		
		C.22 Oil-water separator shall be provided for oily washings in the drilling equipment and trucks	NA		The drilling site was located in the existing well pad. Due to limited area, there was no oily washing of the truck in drilling site.
		C.23 Provide garbage bins at basecamp	Partial	No waste segregation according to available bins with colour codes (green, yellow, red and black)	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.24 Contractor to prepare waste management plan (as part of CEMP), approved by PMC	Yes		None

For all ‘Partial’ or ‘No’ compliance issues in the table above, the actions needed to solve the compliance issues were summarized in Table 14.

Table 14. EMP– Actions Needed for Compliance – Patuha-2

No	EMP Requirement	Further Action to Take	Date for Action	Who will Implement Action
01	C.23 Provide garbage bins at basecamp and rig area	Contractor to provide garbage bins with readable label for waste segregation (Green – Organic Waste, Yellow – Non Organic Waste and Recyclable Waste, Red – Non Organic Waste and Non-Recyclable Waste, and Black – Hazardous Waste)	End of February 2023	Waste Management Contractor (PT. ETI)

Table 15 provides information on environmental performance issues from previous Environmental Monitoring Reports. This table confirms that the action was completed or that the step was outstanding.

Table 15. EMP Compliance Outstanding Issues from Previous Report - Patuha 2

No	EMP Requirement	Further Action to Take	Responsibility and Timing	Resolution	Required Action
1	None	None	None	**None**	None

3.2 Health and Safety Performance

This chapter describes health & safety compliance management of all sub project.

3.2.1 Health and Safety Compliance of Dieng-2 Sub Project

Table 16 outlines the Health and Safety impact mitigation measures in the EMP and how the project implements the mitigation measures for all subprojects in Dieng-2. There was one landslide calamity occurred in well pad 9 (December 2022), resulting in a personnel injury. In December 2022, one natural event occurred in well pad 9 during well testing. Soil movement at one side of the embankment caused by continuous heavy rain during two days at the area. At that time one worker was about to do ablution at the back of the porta camp office, facing the embankment, when the soil collapse. The injured person was taken to hospital to get medical treatment and had returned to work. This event was reported by proper channel to Ministry of Energy (EBTKE).

Some recommended action was proposed and done to eliminate of minimize the risk and prevent recurring event:

- Relocate the porta camp office, shelter, workshop to a safer location in the well pad
- Install and revisit the location of Early Warning System (EWS) equipment
- Restore the soil of the collapsed embankment to prevent another landslide
- Conduct lesson learn briefing to all contractor in all well pad
- Check the stability of soil in all well pad. Some actions had been done to eliminate or minimize the risk and avoid recurrence event.

More detail report was attached in **Appendix 6.**

Table 16. Status of Health and Safety Compliance All Subprojects in Dieng-2

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
1. Civil Work					
A. General					
1	Occupational health risks	C.25. Conduct training on safety and health hazards at least monthly	Partial	HSE training related has been conducted, for example: first aid, CEMP introduction, firefighting. Need to include improve the frequency and topics of HSE related trainings and waste segregation	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
				to be implemented in the site, particularly to local hire worker which was lack of exposure to health and safety requirements	
2	Occupational health risks	C.26 Provide sanitary facilities and safe drinking water at the construction site and the workers' camp	Yes	Bottled water was provided at the basecamp and construction site	None
3	Occupational health risk	C.27. Provide workers with PPEs such as goggles, safety shoes, etc. and its use will be mandatory	Yes	No further comments	None
4	Occupational health risks	C.28. Workers who will be assigned to high-level noise-generating works (100 dB(A) will be rotated every two hours aside from wearing of PPEs.	Not applicable	No noise generation works (including machinery, equipment, etc.) were observed from July to December 2022. However, earplugs were made available onsite.	None
5	Occupational health risks	C.29. Conduct daily toolbox meetings to emphasize safety and health procedures	Yes	Toolbox meeting was conducted daily. Briefing for drivers and co-drivers before the commencement of work. This item was included in the briefing.	None
6	Occupational health risks	C.30. Site Engineers to encourage brief exercise routine to highlight the value of health in the workplace	Yes	Routine briefing of site engineers for occupational health and safety training	None
7	Occupational health risks	C.31. Employees of the contractor(s) will be required to have an annual physical and medical examination. Health records will be kept confidential in the employee file.	Yes	An annual medical check-up was conducted for all personnel	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
8	Occupational health risks	C.33. Contractors will be required to follow relevant HSE SOPs of GDE and applicable IFC-EHS General Guidelines 2007 (Section 2)	Yes	CEMP of SPC was developed following the IEE, ADB SPS, and relevant regulatory frameworks (IFC HSE Guidelines, etc.). PMU has approved the CEMP.	None

B. Mobilization and Demobilization					
1	Generation of dust and vehicular emissions from earthworks and movement of vehicles to and from the construction sites (Site preparation, vegetation and land clearing for wells, power plant, access roads, and underground transmission line)	CC 34. Drivers and equipment should have licenses and certificates	Yes	All drivers have obtained valid driving license and equipment have completed with certificates.	None
		C.6. Regularly inspect and maintain heavy equipment than 30 minutes	Yes	None	None
		C.7. Use of high-occupancy service vehicles to transport workers	Yes	None	Police and POKJA will assist in the mobilization process
		C.8. Emissions testing certificate of service vehicles will be required and monitored by PMU	Yes	None	None
		C.9. Install temporary fencing and/or enclosures at least 3-m high at construction sites	Yes	None	None
		C.10. Water will be sprayed daily in opened land areas or in other areas where dust was generated	Yes	None	None
		C.11. Stockyard will be covered during non-working hours	Yes	None	None
		C.12. Vehicles and equipment will not be allowed to sit and idle for more	Yes	None	None
		C.13. Cover trucks that deliver dust-generating construction materials	Yes	None	None
		C.14. No burning of solid or liquid wastes and other combustible materials will be allowed within the construction sites and labor camps	Yes	None	None

		C.15. Provide PPE to operators of heavy equipment	Yes	None	None
		C.16. Limit noise-generating activities during daytime and provide temporary enclosures to stationary noise sources	Yes	None	None
		C.17. Drivers and operators must strictly follow road regulations particularly speed and excessive blowing of horns will not be allowed	Yes	None	None
		C.18. Provide ear plugs/muffs to workers exposed to high-level noise and rotate schedule of these workers every two hours	Yes	None	None
C. Hazardous waste and Hazardous Materials Management					
1	Hazardous waste management	CC 35. Waste segregation of hazardous waste Hazardous waste will be collected in a closed container and will be stored temporarily at the designated area. An information signage will be installed at the hazardous waste temporary storage	Not applicable	No hazardous waste was generated at Dieng-2.	None
2	Hazardous waste management	CC 36. Hazardous waste will be transported offsite regularly by a licensed third party	Not applicable	No hazardous waste was generated at Dieng-2.	None
3	Hazardous waste management	CC 37. An information signage will be installed at the hazardous material storage area	Not applicable	No hazardous waste was generated at Dieng-2.	None
4	Hazardous waste management	CC 38. Hazardous material containers will be equipped with symbol and label	Not applicable	No hazardous waste was generated at Dieng-2. APAR was readily available at the working area.	None

5	Hazardous waste management	CC 39. Chemical handling and storage refer to MSDS. MSDS of chemicals to be available	Not applicable	No hazardous waste was generated at Dieng-2.	None
2. Access Road work and Preparation Well Pad (Cut and Fill Activity)					
1	Occupational health risk	C.27. Rotate worker every 2 hours (maximum time allowed to perform task)	Yes	No further comments	
2	Occupational health risk	C.32. Install clear and visible warning signs as well as sufficient lighting	Not applicable	Night-time work was not allowed.	
3. Drilling Work					
1	Potential transport-related and road accidents (Movement of construction and service vehicles)	C.19. Contractor to assign staff continuously to manage traffic and to ensure public safety dissemination to affected people in the villages/sub-villages	Yes	It was stated in Journey Management Plan approved by PMU Road traffic arrangements involving residents/locals hire an escort by Police	None
		C.20. Temporary public crossing points will be provided accommodating children, the elderly, and persons with disabilities	NA	Mobilization was mostly carried out at night when there was no public activity, so Temporary public crossings were not provided to accommodate children, the elderly, and persons with disabilities. but if anyone wants to cross, they will be guided by assigned personnel.	Assigned staff continuously to monitor traffic and to ensure public safety especially at current crossing points
		C.21. Clear and visible traffic warning signs will be installed, and adequate lighting will be provided.	Yes		None
2	Occupational health risks	C.30. Conduct training on safety and health hazards at least monthly	Yes	Attendance list and photograph have been recorded and available.	None

		C.31. Provide sanitary facilities and safe drinking water at the construction site and the workers' camp	Yes	Contractor has developed Hygiene and Sanitation Procedure to be implemented for this project	None
		C.32. Provide workers with PPEs such as goggles, safety shoes, etc., and its use will be mandatory	Yes	Contractor has provided PPE for all workers involved in this project and monitor PPE Compliance	None
		C.33. Workers who will be assigned to high-level noise-generating works (100 dB(A) will be rotated every two hours aside from wearing of PPEs.	Yes		None
		C.34. Conduct daily toolbox meetings to emphasize safety and health procedures	Yes		None
		C.35. Site Engineers to encourage brief exercise routine to highlight the value of health in the workplace	Yes	here was a routine briefing on safety issues to all workers, i.e. briefing on H2S issue, briefing on safety lesson learned, etc	None
		C.36. Employees of the contractor(s) will be required to have an annual physical and medical examination. Health records will be kept confidential in the employee file.	Yes	All workers involved in the drilling activities have been screened on their health condition by medical check-up. Workers medical check-up data have been reviewed, and GDE keeps the result	None
		C.37. Install clear and visible warning signs as well as sufficient lighting	Yes		None
		C.38. Contractors will be required to follow relevant HSE SOPs of GDE and relevant IFC-EHS	Yes .		None

		General Guidelines 2007 (Section 2)			
3	Occupational health risks during drilling works	C.65. Base camp to be provided with sanitary facilities, wash areas, safe drinking water, and garbage bins to contain waste generated by workers	Yes		None
		C.66. Location of the base camp shall not be close to settlements and water bodies	Yes	Most workers were live-in homestay in Dieng area, some of them live in base camp	None
		C.67. Local hiring shall be a priority to minimize the number of workers in base camp	Yes		None
		C.68. Fuel requirements in onsite fuel tanks and generators shall be located in designated contained areas to prevent leaks	Yes		None

3.2.2 Health and Safety Compliance of Patuha-2 Sub Project

Table 17 outlines the Health and Safety impact mitigation measures in the EMP and how the project implements the mitigation measures for all subprojects in Patuha-2.

Table 17. Status of Health and Safety Compliance of All Subprojects in Patuha-2

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
1. Civil Work					
A. General					
1	Occupational health risks	C.25. Conduct training on safety and health hazards at least monthly	Yes	HSE related trainings have been conducted, for examples: first aid, CEMP introduction, firefighting. Need to include improve the frequency and topics of HSE related trainings, particularly to local hire worker which was lack of exposure to health and safety requirements.	None
2	Occupational health risks	C.26 Provide sanitary facilities and safe drinking water at the construction site and the workers' camp	Yes	Bottled water was provided at the basecamp and construction site	None
3	Occupational health risk	C.27. Provide workers with PPEs such as goggles, safety shoes, etc. and its use will be mandatory	Yes	No further comments	None
4	Occupational health risks	C.28. Workers who will be assigned to high-level noise-generating works (100 dB(A) will be rotated every two hours aside from wearing of PPEs.	Not applicable	No noise generation works (including machinery, equipment, etc.) were observed from July to December 2022. However, earplugs were made available onsite.	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
5	Occupational health risk	C.29. Conduct daily toolbox meetings to emphasize safety and health procedures	Yes	Toolbox meeting was conducted daily. Briefing for drivers and co-drivers before the commencement of work. This item was included in the briefing.	None
6	Occupational health risks	C.30. Site Engineers to encourage brief exercise routine to highlight the value of health in the workplace	Yes	Routine briefing of site engineers for occupational health and safety training	None
7	Occupational health risks	C.31. Employees of the contractor(s) will be required to have an annual physical and medical examination. Health records will be kept confidential in the employee file.	Yes	An annual medical check-up was conducted for all personnel	None
8	Occupational health risks	C.33. Contractors will be required to follow relevant HSE SOPs of GDE and applicable IFC-EHS General Guidelines 2007 (Section 2)	Yes	CEMP of SPC was developed following the IEE, ADB SPS, and relevant regulatory frameworks (IFC HSE Guidelines, etc.). PMU has approved the CEMP.	None
B. Mobilization and Demobilization					
1	Occupational health risk	CC 40 Drivers and equipment should have licenses and certificates	Yes	All drivers have obtained valid driving license and equipment have completed with certificates.	None
2	Community safety risk during equipment mobilization	C.34. Clear and visible danger and warning signs/posters will be installed temporarily in areas affected by mobilization	Yes	Signs and safety lines along the mobilization access route were installed.	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
3	Community safety risk during equipment mobilization	C.35. Provide temporary crossing that will accommodate women, children and persons with disabilities	Not applicable	No temporary crossing will be installed. Mobilization was conducted predominantly during the nighttime. In addition, police and POKJA will assist the mobilization process in ensuring the safety of the adjacent community	Police and POKJA will assist in the mobilization process
4	Community safety risk during equipment mobilization	C.36. Coordinate with village head on the schedule of mobilization of heavy equipment and machinery	Yes	Communication and Permission with Stakeholder	None
5	Community safety risk during equipment mobilization	C.37. Staff/workers will be assigned to manage traffic within the affected communities	Yes	Mobilization was assisted by police & POKJA.	None
6	Community safety risk during equipment mobilization	C.38. Emergency system and equipment such as firefighting, ambulance, etc., will be made available during mobilization	Not applicable	The ambulance will be based on contract and arranged by PMU. However, nearest hospitals, police, and firefighting contact numbers were available in all vehicles.	None
7	Disruption to local traffic	C.39. Contractor will be required to prepare traffic management plan in consultation with local authorities	Yes	JMP has been established and approved by PMU prior to conducting mobilization and demobilization	None
8	Community safety risk during equipment mobilization	C.40. Conduct public consultations on the route taken for mobilization.	Yes	Public consultation at impacted villages	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
9	Disruption to local traffic	C.41. Conduct a pre-mobilization survey of the route to be taken to assess if adequate space or corridor was available, load capacity of bridges, the condition of public roads, including buildings/houses close to the roads (~100 m) the state of public roads and dwellings along the routes as the baseline for road rehabilitation or damage claims	Yes	A Pre-mobilization survey had been conducted in the early stage of JMP development. JMP has been approved by PMU.	None
10	Disruption to local traffic	C.42. Staff will be designated to manage traffic along the route for mobilization	Yes	Flag person was assigned to manage traffic during mobilization of materials and equipment.	None
C. Hazardous waste and Hazardous Materials Management					
1	Hazardous waste management	CC 41. Waste segregation of hazardous waste Hazardous waste will be collected in a closed container and will be stored temporarily at the designated area An information signage will be installed at the hazardous waste temporary storage	Not applicable	A dedicated container for hazardous waste was available at the construction site. Symbol and labelling of hazardous waste storage refer to PermenLH No. 14 of 2013. However, Supraco reported no generation of any hazardous waste during their activities during July to December 2022.	None
2	Hazardous waste management	CC 42. Hazardous waste will be transported offsite regularly by a licensed third party	Not applicable	Supraco reported no generation of any hazardous waste during their activities during July to December 2022.	None
3	Hazardous waste management	CC 43. An information signage will be installed at the hazardous material storage area	Yes	Hazard and safety awareness signs have been installed at the temporary storage. Temporary storage was also equipped	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
				with secondary containment, APAR, and chemical spill kit. Hazardous material storage was equipped with a cover and secondary containment. An information sign was also available. APAR was readily available at the hazardous material storage area.	
4	Hazardous waste management	CC 44. Hazardous material containers will be equipped with symbol and label	Yes	Symbol and label were attached to the solar container. Symbol and labelling of hazardous waste storage refer to PermenLH No. 3 of 2008.	None
5	Hazardous waste management	CC 45. Chemical handling and storage refer to MSDS. MSDS of chemicals to be available	Yes	MSDS was made available onsite. MSDS was kept in the container next to the hazardous material storage.	None
2. Access Road work and Preparation Well Pad (Cut and Fill Activity)					
1	Occupational health risk	C.27. Rotate worker every 2 hours (maximum time allowed to perform task)	Yes	No further comments	None
2	Occupational health risk	C.32. Install clear and visible warning signs as well as sufficient lighting	Not applicable	Night-time work was not allowed.	
3	Community safety risk during construction	CC 46. Limit noise-generating activities during daytime periods	Not applicable	Not applicable since no works identified with potential noise generation	
3. Drilling Work					
1	Increased community health and safety risks,	B.14 Develop occupational and community health and safety	Partial	GDE has carried out EHS induction to the affected village through the Socialization	In fact, there was no

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
	i.e., contact with vehicles and equipment, increased access to restricted sites, increased dust and gas exposure	management plan for subsequent dissemination at the EHS induction and dissemination to affected people in the villages/sub-villages		of Masyarakat Tanggap Bencana (Community Responsive Disaster) to increase community awareness of disasters and emergencies. GDE need to establish Community Health and Safety Management Plan	evidence that community health and safety risks increased due to contact with vehicles and equipment and dust and gas exposure as well. However, GDE realizes that the community need to educate and familiarize themselves with the Geothermal process and the risks.
2	Occupational health risks	C.25. Conduct training on safety and health hazards at least monthly	Yes	Attendance list and photograph have been recorded and archived.	
		C.26. Provide sanitary facilities and safe drinking water at the construction site and the workers' camp	Yes	Contractor has developed Hygiene and Sanitation Procedure to be implemented for this project	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.27. Provide workers with PPEs such as gogles, safety shoes, etc., and its use will be mandatory	Yes	Contractor has provided and distributed PPE to all workers involved in this project and monitor PPE Compliance	None
		C.28. Workers who will be assigned to high-level noise-generating works (100 dB(A) will be rotated every two hours aside from wearing of PPEs.	Yes		In general workers who assigned in the noisy area do not stand by at the area for more than two hours. Exposure to noise level in working area shall refer to Ministry of Manpower Decree No 5 year 2018
		C.29. Conduct daily toolbox meetings to emphasize safety and health procedures	Yes		None
		C.30. Site Engineers to encourage brief exercise routine to highlight the value of health in the workplace	Yes	There was a routine briefing on safety issues to all workers, i.e. briefing on H2S issue, briefing on safety lesson learned, etc	
		C.31. Employees of the contractor(s) will be required to have an annual physical and medical examination. Health	Yes	All workers involved in the drilling activities have been screened on their health condition by medical check-up.	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		records will be kept confidential in the employee file.		Workers medical check-up data have been reviewed, and GDE keeps the result	
		C.32. Install clear and visible warning signs as well as sufficient lighting	Yes		None
		C.33. Contractors will be required to follow relevant HSE SOPs of GDE and relevant IFC-EHS General Guidelines 2007 (Section 2)	Yes .	GDE has established an Occupational Health and Safety Management System consisting of policy, manual, plan, and procedure. These OHS-MS requirements, including ADB Safeguard requirements, were mandated to all Contractors in the contract document.	None
3	Community safety risk during equipment mobilization	C.34. Clear and visible danger and warning signs/posters will be installed temporarily in areas affected by mobilization (i.e., Kampung Alam Endah, Sugih Mukti, and Panundaan)	Yes	Contractor already developed Journey Management Plan before mobilization activity and implemented during mobilization activity. Journey Management Plan was included in CEMP	None
		C.35. Provide temporary crossing that will accommodate women, children and persons with disabilities	N/A.	Mobilization was mostly conducted during the night; no need to provide quick crossing	None
		C.36. Will coordinate with village head on the schedule of mobilization of heavy equipment and machinery	Yes	Contractor submitted information letter to the village head. Documentation of communication with village head was recorded in JMP	None
		C.37. Staff/workers will be assigned to manage traffic within the communities affected	Yes		None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.38. Emergency system and equipment such as fire-fighting, ambulance, etc., will be made available during mobilization along Kampung Alam Endah and Panundaan, including the provincial road in Bandung that will be used during mobilization in case of an accident	Yes		None
4	Disruption to local traffic	C.39. Contractor will be required to prepare a traffic management plan in consultation with local authorities in Panundaan, Sugih Mukti, and Alam Endah and the provincial agency in Bandung	Yes	Contractor already developed Journey Management Plan and implemented during mobilization activity	None
		C.40. Conduct public consultations on the route that will be taken for mobilization	Yes	Public consultation was held on 21 September 2021	None
		C.41. Conduct a pre-mobilization survey of the route to be taken to assess if adequate space or corridor was available, load capacity of bridges, the condition of public roads including buildings/houses close to the roads (~100 m), the situation of public roads and dwellings along the routes as the baseline for road rehabilitation or damage claims	Yes	Contractor conduct pre-mobilization survey prior to developing Journey Management Plan/JMP and survey result recorded in JMP	None

No	Key Activities/Environmental Impact	EMP Requirement (Mitigation Measure)	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
		C.42. Staff will be designated to manage traffic along the route for mobilization	Yes	It was stated clearly in JMP	None
5	The influx of workers in the Sugih Mukti may cause social conflicts with local people	C.77. Inform workers during orientation of their responsibility in observing proper behaviour in dealing with local residents and the consequence of non-compliance	Yes	It was informed during general induction for all workers before drilling activity on 11 and 12 November 2021	None
		C.78. Provide workers with a list of “do’s and don’t’s” to prevent potential conflicts with residents	Yes	It was informed during general induction for all workers before drilling activity on 11 and 12 November 2021	None

3.2.3 Further Actions To be Taken

For all ‘Partial’ or ‘No’ compliance issues in the table above (applicable for drilling and civil works), the actions needed to solve the compliance issues were summarized in Table 18.

Table 18. Status of Health and Safety Actions Needed for Compliance - All subprojects

No	Health and Safety Requirement	Further Action to Take	Date for Action	Who will Implement Action
1	B.14 Develop occupational and community health and safety management plan for subsequent dissemination at the EHS induction and dissemination to affected people in the villages/sub-villages	To develop Occupational and Community Health and Safety Management Plan	ASAP	PMU

There were no outstanding health and safety issues in the previous SEMR; therefore, no actions needed to be taken from the last SEMR reports were reported.

Table 19. EMP Compliance Outstanding Issues from Previous Report(s) – All subprojects

Issue	Required Action	Responsibility and Timing	Resolution	Required Action
N.A.	N.A.	N.A.	N.A.	N.A.

3.3 Biodiversity Action Plan Implementation

3.3.1 BAP Implementation in Dieng 2

Referring to the GDE's initiative for relocation of proposed Dieng 2 Power Plant from Pad 38 to Pad 12, a biodiversity rapid assessment of Pad 12 was conducted using several approaches including visual observation, interview with communities and GIS map review. Given the Pad 12 and its surrounding area was categorized in protected forest according to the Indonesian Government's Ministry of Environment and Forestry, the main objective of this assessment was to understand the baseline of biodiversity at Pad 12 and identify the potential risks and impacts to the existing biodiversity.

The results of the assessment advised that the most area surrounding of Pad 12 was a converted forest land to GDE's lay down and storage area. In the other side, there was an existing electrical sub-station operated by PLN. While the surrounding area was converted to cultivated land for potato which has been left by the users and there was no cultivation activity on that land." Currently, the surrounding area of Pad 12 was part of PT Perhutani's forest land. PT Perhutani was a state-owned enterprise responsible to manage the most protected forest in Java Island. The remnant forest within the interest area for proposed Dieng 2 power plant was dominated by pine trees (*Pinus merkusii Jungh. & de Vriese*). The other plants including carica (*Vasconcellea pubescens*) and terong belanda or Dutch Egg plant (*Solanum betaceum*) were found under pine trees canopy. Those plants were cultivated by local community for supporting their family income. Referring to the IEE 2019 of Dieng 2 Project, this vegetation was one of 15 invasive introduced species to the study area. The other two species were predominantly found in the IEE 2019 study area and potentially found in the interest area for proposed Dieng 2 power plant including Soga (*Acacia decurrens Willd.*), Eucalyptus (*Eucalyptus cf.urophylla Blume*).

PT Perhutani through their regional office (*Kesatuan Pemangkuan Hutan* – KPH) of Kedu Utara conducted a socialization of protected forest management at Sikunang Village of Kejajar Sub District, Wonosobo Regency on 29 July 2022. This village was located adjacent to the interest area for proposed Dieng 2 power plant. The forestry officers advised that the Perhutani engaged local community in managing and conserving protected forest at the surrounding area of Kejajar Sub-district including Sikunang Village. They also reminded the local community regarding the prohibited activities within protected forest including seasonal cropping (i.e. potato, carrot, etc). However, the local community may have benefits of protected forest environmental services including ecotourism and under tree canopy cultivating of several crops (i.e. coffee, *carica*, *terong belanda*, etc). In addition, PT Perhutani confirmed that there was no permit for forest management in Dieng Forest Management Resort (Resort Pemagkuan Hutan – RPH). So, PT Perhutani reminded local community to not believe in anyone claim to be a party who have permit for managing the forest and authorize for conversing forest land to cultivated land or other purposes.

Given the flora biodiversity of the interest area for proposed Dieng 2 power plant was low, it was expected that the fauna biodiversity of this area was considerately low also. Referring to the observation and study report (IEE, 2019), several common bird species of homogenic habitat (dominated by pine forest) including Sooty-headed Bulbul (*Pycnonotus aurigaster)*, Spotted Dove (*Spilopelia chinensis*), Javan Munia (*Lonchura leucogastroides*), Eurasian Tree Sparrow (*Passer montanus*), and Plaintive cuckoo (*Cacomantis merulinus*), None of them was categorized in protected species according to Government of Indonesia (GoI) regulation and they were categorized in Least Concern (LC) by the IUCN (International Union for Conservation of the Nature). A common Plantain Squirrel (*Callosciurus notatus*) was also observed in this area. There was no information regarding the other mammals as identified in IEE 2019 (i.e. Small Asian Mongoose - *Herpestes javanicus*, Sunda Procupine - *Hystrix javanica*, Common Palm Cive - *Paradoxus hermaphroditus*, etc). Further biodiversity assessment has been conducted by Sucofindo (an independent consultant) to assess current status of flora and fauna in January – February 2023.

Referring to above assessment, it was considered that Dieng 2 power plant development may result a low environmental risks and impacts. Several approaches as specified in the existing BAP might be sufficient for managing those environmental risks and impacts to the biodiversity at proposed area for Dieng 2 power plant development. Currently, no activities were conducted relevant to biodiversity action plan since the permitting process of the area for the Dieng Power Plant is still on progress.

Relevant maps and figures to this assessment were provided in **Appendix 7**.

3.3.2 BAP Implementation in Patuha 2

The most BAP implementations in Patuha 2 were similar with the activities as conducted during previous semester. The summary of those activities was seen below.

.

Table 20. Biodiversity Action Plan Implementation for Patuha 2

No	Impact	Mitigation Measure	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
1	Modification and fragmentation of habitat due to loss of vegetation cover	Install appropriate canopy bridges to increase connectivity over the road for primates.	Partial	The design (dimension and material) and locations has been selected. The installation will be conducted in January 2023. Currently still waiting for completion of civil works (Pad BB preparation)	None
2	Displacement of species due to noise, presence of machinery and equipment, presence of staff, and operation and/or maintenance activities	Regularly maintain and inspect/certificate all vehicles, equipment and machinery to ensure that noise levels conform to prescribed standards.	Yes	All vehicles were checked before use, including the build year, regular service evidence and emission test. Inspected tools and equipment were labelled.	None
3	Mortality of individuals from poaching by construction workers.	Mortality of individuals from poaching by construction workers. Mortality of individuals from poaching by construction workers.	Yes	Poaching was prohibited, and the Contractor has declared poaching policy and socialized to all workers Installation of temporary warning signs of no hunting, poaching of wildlife, and open flame at the working sites	None

No	Impact	Mitigation Measure	Compliance and Description (Yes, No, Partial)	Comment or Further Explanation if Needed	Reasons for Not Full Compliance
4	Mortality of individuals, owing to induced access for poachers/ hunters via project roads.	Install staffed access control on new road to well pad BB, allowing access to no- one except GDE or company staff, or government officials, and inspecting departing vehicles for poached wildlife.	Yes	Access control was protected with installation of fence along the perimeter of well pad.	None

Table 21. Status of Biodiversity Actions Needed for Compliance - Patuha 2

No	Key Activities or Environmental Impact	EMP Requirement	Further Action to Take Corrective Action Plan	Date for Action	Who Will Implement Action
1	Habitat fragmentations due to land clearing	Install appropriate canopy bridges to increase connectivity over the road for primates.	Installing the approved canopy bridges at selected locations.	After the completion of civil works	Supraco
2	Mortality of individuals, owing to induced access for poachers/ hunters via project roads.	Install staffed access control on new road to well pad BB, allowing access to no- one except GDE or company staff, or government officials, and inspecting departing vehicles for poached wildlife.	Installing permanent sign boards for prohibiting poaching/hunting and supporting the nature conservation at area surrounding the project site.	After the completion of civil works	Supraco

4 EMP MONITORING

4.1 Environmental Quality Monitoring

Environmental quality monitoring requirements were discussed in Section 9.4 of EMP in Draft IEE of Dieng 2 2019 and Final IEE of Patuha 2 2019.

The following table provides information on the environmental quality monitoring implemented for each subproject Dieng 2 and Patuha 2 during this reporting period. Maps, photos and detailed results compared to relevant national and/or international standards were presented in **Appendix 2**.

Table 22. Implemented EMP Environmental Quality Monitoring

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
Dieng-2 Sub-Project	**Corrective Action for Unit 1**				
	improvements to existing facilities in measures A.1. to A.8.	Well pads 7, 9, 10, 30, 31	During DED and initial stage of construction	Completed, except measures A5, A6, and A7	PMC and PMU
	Front End Engineering Design/Detailed Engineering Design				
	DED includes measures B.4. – B.10	Power Plant Unit 2	After the EPC contract awarded	To be conducted	EPC Contractor
	Working GRM, information centre set up, updated GDE website, availability of project-related flyers and other social media (measures B.11. – B.13.)	Power Plant Unit 2	Before the start of construction works	Completed	PMC and PMU
	Well Drilling and Development				
	Site-specific EMP (CEMP) prepared by contractors reflecting requirements as defined in measure B.14.	N/A	Before the start of construction works	All Site-specific EMP (CEMP) have been approved	PMC and PMU
	Ocular inspection of road condition, temporary enclosures along the affected road	Road intersection at Kejajar market and transport station, and Garung, Dieng Wetan and Dieng Kulon intersection	Quarterly during well development	Conducted before mobilization on September 2021	PMC and PMU
	Certificate of service vehicles on emissions testing			Completed	PMC and PMU
	Conducted regular ambient air quality monitoring: NO_2, PM_{10}, $PM_{2.5}$	Monitoring points defined in the EMP report's Figure	Quarterly during well development	Conducted in July and October 2022	PMU and Sucofindo

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
	Conduct ambient noise monitoring in settlements along the affected roads	4.3 (or **Appendix 2 - Figure 1**)	Quarterly during well development	Conducted in July and October 2022	PMU and Sucofindo
	Ocular inspection of transportation routes to confirm the adequacy of temporary road crossings, traffic warning signs, Presence of designated staff to manage traffic	Road intersection at Dieng Kulon, Bakal, Karang Tengah, Kepakisan, Dieng Wetan	Quarterly during well development	Conducted before on August 2022	Contractor
	Contractor's documents on payment for damages to affected people (if any).	Road intersection at Karang Tengah, Bakal, Dieng Kulon -	Quarterly during well development	No damage caused by transportation/mobilization during this period	Contractor
	Ocular inspection of availability of garbage bins; condition of location of temporary collection area; disposal method, MSDS, etc	Pad #7, Pad #9, Pad#10, Pad #30, Pad #31, Loc I	Once a month	Conducted on 27 October 2022	PMC and PMU
	Drilling contractors' list of chemicals, paints, lubricants, etc. used			Conducted on 27 October 2022	PMC and PMU
	Ocular inspection of working condition and maintenance of sump/pond	Pad #7, Pad #9, Pad#10, Pad #30, Pad #31, Loc I	Twice a month	Conducted on 27 October 2022	PMC and PMU
	Record of workers that attended orientation on environmental requirements of GOI and ADB; workers attended HSE orientation and training (if any)	Pad #7, Pad #9, Pad#10, Pad #30, Pad #31, Loc I	Start of drilling	Conducted on December 2021, next training will be January 2023	PMC and PMU
	Availability of emergency power and safety kit.			Conducted before mobilization	PMC and PMU

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
	Ocular inspection of workers wearing PPE; Availability of PPE and first aid kits (hard hats, safety shoes, masks, H2S detectors and alarms, etc.); Presence and condition of sanitary facilities; Clear signs and safety warnings; Housekeeping at base camp		Weekly	Conducted weekly by Drilling Contractor	Contractor
	Record of water quantity used for drilling	Tulis River, Cidolog River, Urang River (as relevant)	Daily	Conducted daily by Drilling Contractor	Contractor
	Ocular inspection of river condition (e.g., muddy)	Upstream and downstream of water extraction point at Tulis River, Cidolog River, Urang River (as relevant)	Weekly	Conducted weekly by Drilling Contractor	Contractor
	Surface water quality (pH, H2S, BOD, COD)	Upstream and downstream of water extraction point at Tulis River, Cidolog River, Urang River (as relevant)	Quarterly	Completed Conducted in July and October 2022	PMU and Sucofindo
	Ambient H_2S monitoring	Pad #7, Pad #9, Pad#10, Pad #30, Pad #31, Loc I	Quarterly	Completed Conducted in July and October 2022	
Patuha-2 Sub-Project	**Corrective Action for Unit 1**				
	Record on community counselling/simulation to handling H2S (measure A.1)	GDE Patuha	Conducted before drilling activity	Socialization and simulation of H2S gas handling were held on October 8, 2021, and	PMC and PMU

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
				participated by 26 females and 26 male community members.	
	Front End Engineering Design/Detailed Engineering Design				
	DED includes measures B.1. – B.6	PP Unit 2	After EPC Contract aawarded	To be conducted	EPC Contractor
	Working GRM, information centre set up, updated GDE website, availability of project-related flyers and other social media (measures B.10. – B.13.)	PP Unit 2	Before drilling activity	B.10 – B.13 measures has been established	PMC and PMU
	Site-specific EMP prepared by contractors, reflecting requirements as defined in measure B.15.	N/A	Before field activity	All Site-specific EMP (CEMP) have been approved	Contractor
	Well Drilling and Development				
	Ocular inspection of road condition, temporary enclosures along the affected road	Road intersection at Panundaan, Sugihmukti, and Alamendah to the the project site, and with the main Ciwidey-Rancabali (provincial road).	Quarterly during well development	Conducted in July and October 2022	Contractor
	Certificate of service vehicles on emissions testing	N/A	NA	Certificates of emission testing have been recorded and archived	Contractor

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
	Conduct regular ambient air quality monitoring: NO2, PM10, PM2.5	Monitoring points defined in the EMP report's Figure 4.4 and Table 4.5 (AQ) (or Appendix 2 - Figure 3 in **Appendix 2**)	Quarterly during well development	Conducted in July and October 2022	PMU and Sucofindo
	Conduct ambient noise monitoring in settlements along the affected roads		Quarterly during well development	Conducted on July and October 2022	PMU and Sucofindo
	Record of a road accident, number and type of vehicles, and damages to the road and associated infrastructure	Road intersection at Panundaan, Sugihmukti, and Alamendah to the the project site, and with the main Ciwidey-Rancabali (provincial road).	• Once before the start of mobilization • Quarterly during well development	Conducted in July and October 2022	PMU and Sucofindo
	Ocular inspection of transportation routes to confirm the adequacy of temporary road crossings, traffic warning signs, Presence of designated staff to manage traffic			Conducted in July and October 2022	PMU and Sucofindo
	Contractor's documents on payment for damages to affected people (if any).			NA	Contractor
	Ocular inspection of availability of garbage bins; condition of location of the temporary collection area; disposal method, MSDS, etc.	PTH-1C, PTH-4B, PTH-4C, PTH-4D, PTH-5A, PTH-6A, PTH-6B, PTH-7A, PTH-7B, PTH-9, PTH-9B, PTH-9A	Once a month	Conducted in well pad 4 in 28 September 2022	PMC and PMU
	Drilling contractors' list of chemicals, paints, lubricants, etc. used			Conducted in well pad 4 in 28 September 2022	PMC and PMU
	Ocular inspection of working condition and maintenance of sump (pond) for drilling	PTH-1C, PTH-4B, PTH-4C, PTH-4D, PTH-5A, PTH-6A, PTH-6B, PTH-7A, PTH-7B, PTH-9, PTH-9B, PTH-9A	Twice a month	Conducted in well pad 4 in 28 September 2022	PMC and PMU

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
	Record of workers that attended orientation on environmental requirements of GOI and ADB; workers attended HSE orientation and training (if any)	PTH-1C, PTH-4B, PTH-4C, PTH-4D, PTH-5A, PTH-6A, PTH-6B, PTH-7A, PTH-7B, PTH-9, PTH-9B, PTH-9A	Once at the start of construction, then quarterly	Conducted on 11 and 12 November 2021 attended by all workers	Contractor
	Availability of emergency power and safety kit	N/A	Before field activity	Has been provided	
	Ocular inspection of workers wearing PPE; Availability of PPE and first aid kits (hard hats, safety shoes, masks, H2S detectors and alarms, etc.); Presence and condition of sanitary facilities; Clear signs and safety warnings; Housekeeping at base camp	PTH-1C, PTH-4B, PTH-4C, PTH-4D, PTH-5A, PTH-6A, PTH-6B, PTH-7A, PTH-7B, PTH-9, PTH-9B, PTH-9A	Weekly	Conducted every week by Contractor	Contractor
	Record of water quantity used for drilling	Rivers: Cipaku, Citiis, Cipadarum, Ciputri (as relevant)	Daily	Water usage was recorded daily by the drilling contractor	Drilling Contractor
	Ocular inspection of river condition (e.g., muddy)	Upstream and downstream of water extraction point at Cipaku, Citiis, Cipadarum, Ciputri river (as relevant)	Weekly	Cipaku river condition was checked regularly and if it was deemed necessary to carry out the dredging process which was carried out by the PMU team every Saturday/Sunday	PMU
	Surface water quality (pH, H2S, BOD, COD)	Upstream and downstream of water extraction point at Cipaku,	Quarterly	Conducted on July and October 2022	PMU and Sucofindo

Subproject	Environmental Issue Monitored	Location	Monitoring Period	Monitoring Status/Progress	Responsible Organisation
		Citiis, Cipadarum, Ciputri river (as relevant)			
	Ambient H2S monitoring	PTH-1C, PTH-4B, PTH-4C, PTH-4D, PTH-5A, PTH-6A, PTH-6B, PTH-7A, PTH-7B, PTH-9, PTH-9B, PTH-9A	Quarterly	Conducted in July and October 2022	PMU and Sucofindo

Besides environmental, health and safety aspects, this report also includes Biodiversity Action Plan Monitoring requirements related to civil work activities. The following table summarizes the Monitoring of Biodiversity Action Plan Requirement.

Table 23. Monitoring Biodiversity Action Plan Requirement of Patuha 2

Impact	Mitigation action	Parameter to be monitored	Location	Monitoring Procedure	Frequency	Monitoring Status/Progress	Responsible Organisation
Loss of vegetation cover in specific areas of the project	Minimise forest clearance alongside rights of way and around well pads.	Vegetation clearance by Project staff and contractors was as minimal as legally and technically necessary	Project Area of Influence	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly, during preparation and construction phases	During the period of July – December 2022, there was no tree cutting during land clearing activity, except one (1) tree outside the IPPKH boundary. It was conduct for safety reason. This activity was conducted on 8 June 2022	PMC and PMU
	Source construction materials from outside of forested areas.	Sourcing of materials	Project Area of Influence	Review of records for sourcing of materials; inspections	Unannounced inspections at least quarterly, during preparation and construction phases	On-going	PMC and PMU
Introduction of invasive alien species	Take care to avoid the introduction of new invasive species to, and spread of existing invasive species within	Washing of vehicles, equipment and supplies before entry to Project area	Transit site outside Project Area of Influence	Inspections	Unannounced inspections at least quarterly during preparation and construction phases	On-going	PMC and PMU

Impact	Mitigation action	Parameter to be monitored	Location	Monitoring Procedure	Frequency	Monitoring Status/Progress	Responsible Organisation
	the Project area through: - washing of vehicles, equipment and supplies before entry to the Project area; - monitoring for invasive species; and - control/eradication of invasive species where found.	Abundance/spread of invasive alien species in Project area	Project Area of Influence	Surveys by specialist sub-contractor	Annually, in summer, during preparation and construction phases	On going	PMC and PMU
		Control of new/spreading areas of invasive alien species in Project area	Project Area of Influence	Records of invasive species control; inspections	Quarterly, during preparation and construction phases	On-going	PMC and PMU
Modification and fragmentation of habitat due to loss of vegetation cover.	Retain tree canopy connectivity over the new road wherever possible.	Canopy connectivity along the proposed RoW was identified, options for preservation identified, and connectivity preserved wherever possible	Project area	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly, during preparation and construction phases	On-going	PMC and PMU
	Install appropriate canopy bridges to increase connectivity over the road for primates.	Appropriate canopy bridges installed over the new road within one month of clearance of RoW	Project area	Inspections	Unannounced inspections at least quarterly during preparation and construction phases, until complete	On-going	PMC and PMU

Impact	Mitigation action	Parameter to be monitored	Location	Monitoring Procedure	Frequency	Monitoring Status/Progress	Responsible Organisation
Displacement of species due to noise, machinery and equipment and presence of staff.	Regularly maintain and inspect/certificate all vehicles, equipment and machinery to ensure that noise levels conform to prescribed standards	Noise levels of Project vehicles, equipment and machinery against prescribed standards	Project area	Review of certificates; inspections	Unannounced inspections quarterly during preparation and construction phases	On-going	PMC and PMU
Mortality of individuals from poaching by construction workers.	Implement a strict code of conduct forbidding hunting/trapping and purchasing wildlife, with heavy penalties. Train all personnel on this code of conduct, and its justification	Staff adherence to best practice	Project area	Review of training records; review of Project incident logbook; inspections	Unannounced inspections quarterly during preparation and construction phases	On going	PMC and PMU

4.1.1 Summary of Results – Noise Monitoring

1. Dieng Unit 2

The noise monitoring conducted in Quarterly and Semesterly basis during the drilling of SLR-T-9D, SLR-J-7D and SLR-J-7E well. Quarterly monitoring was conducted at two monitoring locations which were at Well Pad 7 (drilling area) and Well Pad 9 (well testing area). The semester monitoring was conducted at nine locations including 1) Kepakisan Village, 2) Simpangan Village, 3) Karang Tengah Village, 4) Pawuhan Village, 5) Karangsari Village, 6) Ngandam Village, 7) Sikunang Village, 8) Dieng 1 Office and 9) Power Plant Dieng Unit 1. Following was summary of nosie monitoring results at each monitoring location.

Quarterly Noise Monitoring:

The noise monitoring results during the 1st and 2nd quarter of 2022 advised that the noise ambient at two locations (Well Pad 7 and Well Pad 9) was below the allowable maximum level for 24 hours monitoring period according to Ministry of Environment (MoE) Decree No.48 of 1996 as seen **Appendix 2.**

Semesterly Noise Monitoring:

Based on the monitoring measurement results within the 1st semester of 2022, there was no exceeding parameters of noise threshold at all sampling locations. The results of noise monitoring were provided in **Appendix 2**.

Noise Monitoring During Testing at SLR-T-9C Well

Referring to Well Testing Contractor, there were three suspected noise sources during the well testing on 20 December 2022 which were FCV (Flow Control Valve), Diffuser and LECM. The noise monitoring results at those locations was 87 – 90 dBA with 15% of open control valve. It was reported that vibration level in settlement area felt very strong at FCV open 15%. Meanwhile, the noise monitoring results by "Rojimur" at resident area (approximately at the radius of 300 m from the SLR T-9C well) ranged between 40 and 70 dBA. Rojimur was a group of local community who was involved in noise monitoring. Informally Rojimur Team communicated the noise result to the community of Karang Tengah Village. The Karangtengah community who live near the SLR-T-9C said that they can tolerate the noise as long as it only happens in the day time (9.00 to 16.00) and the maximum opening for the well is no more than 15 percent. The Karangtengah community was informed about the well testing activity, including the potential risk and disturbances from this activity (the NCG, noise, vibration, and brine carryover), and informed of the mitigation for those risks.

The meaningful consultation was conducted on:

- 18 October 2022 with the Karangtengah community before the well testing started.
- 1 November 2022 with the community in a radius of 100-200 meters and 300 meters from the SLR-T-9C before the well testing started.
- 19 December 2022 with the Karangtengah community after the bleeding process and before the steam release started to inform the noise and vibration disturbance potential from well testing activity and to inform about Sentra Komunikai as an additional GRM Channel for the stakeholders.

2. **Patuha Unit 2**

Based on the 24 hours noise measurements at 15 sampling points during the period of July - December 2022, there was no exceeding noise threshold at all sampling locations, except at the sampling points N-9 Ciwidey – Rancabali Road and N-10 located closed to the road junction between existing access road to project site and Ciwidey – Rancabali Proviancial Road. This monitoring location was far from the project site (approximately 15 km). The existing noise background such as traffic and other community activity might influence to the monitoring results. The result of noise monitoring was presented in **Appendix 2**.

4.1.2 Summary Results of Vibration Monitoring

1. Dieng 2

The vibration monitoring was conducted on 26 April - 12 May 2022 at five locations. Two locations were located at Project site (Pad 9 Muster Point and Pad 9 2nd Muster Point at Telaga Merdada), while the other monitoring locations at residential area adjacent to well pad 9 and intersection of Krajan Village.

The assessment criteria of vibration monitoring referred to the MoE Decree No.49 of 1996 concerning Vibration Threshold. Appendix II of this regulation advised that mechanical vibration was divided into four criteria of damage (impact) as below:

- Category A: No trigger to building damage
- Category B: More likely trigger to crack at wall structure
- Category C: More likely trigger to damage of load-bearing structure wall
- Category D: Significant damage of load-bearing structure

The results of vibration monitoring at all monitoring locations advised that vibrations were not trigger to building damage (Category A). The all-monitoring results were provided in **Appendix 2**.

2. **Patuha Unit 2**

During this period, there was no measurement of vibration for Patuha Unit 2

4.1.3 Summary of Results – Surface Water Quality

1. Dieng Unit 2

There were five locations of surface water quality monitoring during this period including Sidendang River, Situlu River, Tulis River, Siputih/Sikunang River and Sidolok River Tulis, Siputih and Sidolok river was sampled in upstream and downstream location. Meanwhile for Sidendang and Situlu were sampled in one point location as control point to monitor impact of current Dieng 2 activities. The assessment criteria of surface water monitoring was according to surface water quality standards according to the Indonesian Government Regulation No. 22 of 2021 concerning Water Quality Management and Water Pollution Control Class II - Water Quality Standards for Recreation, Freshwater Fish Cultivation, Cultivation, Vegetation Irrigation, and Other Needs Requiring the Same Standard. The monitoring results advised that the water quality of Situlu River and Sidendang River was still good. Most of parameters were below the standard limit except nitrate and zinc were exceeding the water quality standards. Similar with above explanation, parameter that exceeded the limit in upstream and downstream Tulis River, Siputih/Sikunang River and Sidolok River were nitrate, phosphate, zinc and in fecal coliform. High concentration of nitrate, phosphate, zinc and fecal coliform might be significant indication that the water quality of those rivers was influenced by the anthropogenic activities such as agricultural and toilet waste disposal. The detailed monitoring results were in **Appendix 2**.

2. **Patuha Unit 2**

The surface water quality monitoring was conducted in 11 locations within the four sub watersheds including Ciwidey, Cibuni, Cipandak and Cikahuripan Sub-Watershed. The monitoring results of the 3rd and 4th quarter of 2022 advised that that some parameters in several monitoring locations were exceeding the limit of quality standards according to the Indonesian Government Regulation No. 22 of 2021 concerning the Implementation of Environmental Protection and Management, Appendix VI concerning National Water Quality Standards. Parameter that were exceeding the limit including TSS, pH, BOD, COD and phosphate The results of surface water quality monitoring were presented in **Appendix 2**.

4.1.4 Summary of Results – Groundwater Quality.

1. **Dieng Unit 2**

During this period, there was no measurement of groundwater quality for Dieng Unit 2.

2. **Patuha Unit 2**

During this period of report, measurement of spring water quality conducted at 1 (one) location namely Cihaliwung Springwater Monitoring result for the second semester of 2022 show that the analyzed parameters, in general still fulfill the quality standards required by Minister of Health Regulation No. 32 year 2017 concerning Environmental Health Quality Standards and Water Health Requirements for Sanitary Hygiene, Swimming Pools, Solus Per Aqua, and Public Baths as a reference for spring water quality (Appendix I Point A) The result of groundwater quality monitoring was presented in **Appendix 2**.

4.1.5 Summary of Results – Air Quality and Odour.

1. **Dieng Unit 2**

The air quality monitoring conducted in Quarterly and Semesterly basis. Quarterly monitoring was conducted at similar locations of noise monitoring. For this reporting period quarterly monitoring of air quality and noise was conducted at well pad 7 and well pad 9. The semesterly monitoring was conducted at similar locations of noise monitoring also including nine locations: 1) Kepakisan Village, 2) Simpangan Village, 3) Karang Tengah Village, 4) Pawuhan Village, 5) Karangsari Village, 6) Ngandam Village, 7) Sikunang Village, 8) Dieng 1 Office and 9) Power Plant Dieng Unit 1. Following was summary of noise monitoring results at each monitoring location.

Quarterly Monitoring

Based on monitoring results, all ambient air quality parameters were below the standard of maximum limits according to Government Regulation No 22 of 2021 concerning Environmental Protection and Management Implementation, Appendix VII Ambient Air Quality Standards. Air quality parameters that were measured compared to baseline and condition as well as modelling result were fulfil the standard limit. Baseline study conducted before well drilling and well testing at pad 7 and Pad 9. All paremeter measured during baseline sampling were below the standard limit. H2S Modelling was conducted before well testing at Pad 9. Result of modelling show that H2S concentration in settlement area (± 300 m radius) below the standard limit. This result was confirmed monitoring result of odor at 9 location asmentioned below

In comparison, odour measurement was conducted at 9 (nine) locations during well testing of SLR - 9C. Based on the monitoring results, odour at all locations were below the standard of maximum limit according to the Ministry of Environment Decree No.50 of 1996 concerning Odor Standard. The results of air quality and odor monitoring were provided in **Appendix 2**.

Semesterly Monitoring:

Based on the monitoring measurement results within the 2nd semester of 2022, there was no exceeding parameters of ambient air quality threshold at all sampling locations. The results of air quality monitoring were provided in **Appendix 2**.

2. **Patuha Unit 2**

The ambient air quality quarterly monitoring was conducted during the 2nd semester of 2022 at 18 sampling locations distributed within the surrounding areas of the project site. Results for all parameters in all sampling stations still meet the required environmental quality standards based on the Indonesia Government Regulation Number 22 of 2021 concerning Implementation of Environmental Protection and Management, Appendix VII concerning Ambient Air Quality Standards, while odour level referring to Ministry of Environment Decree No. 50 of 1996 concerning Odor Level Standards. In overall, the ambient air quality the surrounding areas of the project site was good. No exceeding parameters of ambient air quality threshold was observed. The results of air quality monitoring were provided in **Appendix 2.** Same as Dieng case in Patuha air quality parameters that measured this period were below the standard limit in all monitoring location including during baseline condition. No modelling for Patuha this period because refer to previous baseline monitoring result no exceedance found in settlement area.

4.1.6 Environmental Quality Monitoring Requirements Civil Work of Patuha-2

The summary of environmental quality monitoring implementation during this period can be showed in the following table. This monitoring requirements were referred to CEMP document and the implementation report submitted by contractor to PMU and PMC every month.

Table 24. EMP Environmental Quality Monitoring Implementation (Civil Works)

Environmental Issue Monitoring Plan	Location	Parameter	Responsible Organization	Frequency	Monitoring Date
Regular maintenance and inspection of equipment/vehicle	Vehicle parking area and equipment storage area	The machinery works properly, and no damage was identified	Supraco	Weekly for routine Operational equipment/vehicle and monthly for idle equipment/vehicle	Every week
Inspection of availability of garbage bins; condition of location of the temporary collection area; disposal method, MSDS, etc	Basecamp and construction site	Visual inspection of waste management at the construction site and basecamp	Supraco	Monthly	Every end of month
Premobilization inspection of equipment/vehicle by Client	Vehicle parking area and equipment storage area	The machinery works properly, and no damage was identified	Supraco	Initial prior mobilization	Prior mobilization activity
Mapping area for land clearing plan, socialization to personnel involved, and monitoring	Site office	Approved of land clearing map was available (by PMU) and has been communicated to personnel conducting the works	Supraco	Initial prior land clearing	No land clearing at this period
Ocular inspection of river condition	1. Upstream boundary (adjacent to GOA) 2. Within the boundary	Ocular inspection of turbidity	Supraco	Weekly	Every Thursday

Environmental Issue Monitoring Plan	Location	Parameter	Responsible Organization	Frequency	Monitoring Date
	(Adjacent to the bridge) 3. Downstream the boundary (Approximately 5 meters downstream of the boundary				
Biodiversity loss	Construction site	Loss of vegetation, Invasive alien, Displacement of species due to noise, presence of machinery and equipment, and a company of the staff	Supraco	Weekly (if applicable)	Construction activity during this period at access road to Pad BB (STA +20 – STA +200). No land clearing was applicable during this period. The biodiversity monitoring was conducted as per general observation (collect information if any wildlife siting at surrounding area of construction site).

4.2 Construction Phase Affected People Consultation

During the construction phase, the following table gives information on the consultations undertaken to understand the impact of the project on Affected People and how effective the EMP Mitigation measures were for residents, businesses, and other affected people around the construction sites.

PMU Social and Environmental Safeguard team has conducted numerous consultations by socialization, and direct approaches regarding Land Acquisition, RP Implementation, Grievance Redress Mechanism, Project Updates, Local Worker, Occupational Discussion, Occupational Community Development, etc. The following table summarized the consultation conducted during the July – December 2022 period.

Table 25. Construction Phase Affected People Consultation Dieng-2 Sub Project

No	Date	Topic	Key Issues	Meeting Type / Method	Venue	Participants		Key Person Present (PMU / PMC / Stakeholders)
						F	M	
1	19-Jul-22	FGD with Pawuhan Sub-Village Community at Radius 200 m – 300 m	Community concern on impact of well testing activities that have been carried out at Well Pad 31A in June 2022	FGD	Karangtengah Village Office	9	8	PMU and PMC Safeguard Teams, Dieng Unit 2, representatives of the Karangtengah Village government, and representatives of the Pawuhan community
2	20-Jul-22	FGD with the Pawuhan Sub-Village Community at a Radius of 200 m – 300	Concern of community that lived radius of 200-300 m toward the well testing activities that have been carried out at Well Pad 31A in June 2022	FGD	Karangtengah Village Office	8	13	PMU and PMC Safeguard Teams, Dieng Unit 2, representatives of the Karangtengah Village government, and representatives of the Pawuhan community
3	20-Jul-22	FGD with Karangtengah Community Regarding Complaints	Concerns and comments from local community regarding the project progress and activities	FGD	Karangtengah village hall office	1	8	ADB team, PMU Safeguard team, Dieng Unit 2, the representatives of Karangtengah village officer, and PMC Communication and GRM
4	20-Jul-22	FGD With the Siaga Pawuhan Team	Sharing experience of the Siaga Pawuhan Team during the well testing process at Well Pad 31A	FGD	Karangtengah Village Office	4	4	Siaga Pawuhan Team, this meeting was also attended by the ADB Team, the PMC Safeguard Team and Dieng Unit 2
5	21-Jul-22	FGD With Krajan Community Regarding Well Pad 38	Community concern and complaints related to the power plant development in Pad 38	FGD	Dieng Unit 1 Office	6	14	ADB Team, PMU-PMC Safeguard Team, Dieng Unit 2 Team, and PMC Civil Team
6	21-Jul-22	FGD with Banjarnegara NGO	NGO views and expectations on Dieng 2 activities	FGD	Dieng Unit 2 Office	9	16	ADB Team, the PMU-PMC Safeguard Team and the Dieng Unit 2 Team

No	Date	Topic	Key Issues	Meeting Type / Method	Venue	Participants		Key Person Present (PMU / PMC / Stakeholders)
						F	M	
7	7-Aug-22	Meeting with the Head of Karangtengah Village, Dieng 2	Discussion on the Pad 38 opening plan	Discussion	House of the Karangtengah Village Head	0	3	PMU HSE Manager, PMC Social Safeguard and Karangtengah Village Head
8	10-Aug-22	Coordination with Forkopimda Banjarnegara and Forkopimca Batur, Dieng 2	Coordination meeting discussing the progress and activity plan for well pad 38	Coordination	GDE Office in Dieng Unit 1	0	10	1. Bupati Banjarnegara 2. Kepala Urusan Umum Banjarnegara 3. Camat Batur 4. Danramil Batur 5. Kapolsek Batur 6. Manager PT. Geo Dipa Energi Dieng 7. Dieng 2 Patuha 2 Project Manager PT. Geo Dipa Energi 8. Dieng 2 Project Site Manager PT. Geo Dipa Energi 9. Dieng 2 Patuha 2 Project HSE Assistant Manager PT. Geo Dipa Energi PMC Communication and GRM
9	15-Aug-22	Coordination with Forkopimda Banjarnegara, Dieng 2	Elaborate more detail about the well pad 38 opening plan, risks that might occur, and steps to mitigate the risks	Coordination	GDE Office Unit 1	0	15	1. Bupati Banjarnegara 2. Head of DPRD Banjarnegara 3. Sekretaris Daerah Banjarnegara 4. Kapolres Banjarnegara 5. Dandim Banjarnegara 6. Kepala Pengadilan Negeri Banjarnegara 7. Kepala Seksi Intelijen Kejaksaan Negeri Banjarnegara 8. Camat Batur 9. Danramil Batur 10. Kapolsek Batur

No	Date	Topic	Key Issues	Meeting Type / Method	Venue	Participants		Key Person Present (PMU / PMC / Stakeholders)
						F	M	
								11. Karangtengah Head of Village 12. Manager PT. Geo Dipa Energi Dieng 13. Dieng 2 Project Site Manager PT. Geo Dipa Energi 14. HSE and Social Safeguard Manager PT. Geo Dipa Energi 10. 15. PMC Communication and GRM
10	15-Aug-22	Meaningful Consultation with the Administrators of Banjarnegara-based Social Media Accounts for Dieng 2	Banjarnegara-based Social Media Accounts perceptions about GDE D2P2 Projects, and request support for the project	Meaningful consultation	Banjarnegara	0	11	1. Rofiq (Need Feed) 2. Sofyan (Instambanjar) 3. Tri Iga Y (Banjarnegara24Jam) 4. Akhmad A (Pesonabanjarnegara) 5. Yan Fauzul I (Infocepat Banjarnegara) 6. Andrea Kusdiantoro (Humas Polres) 7. Agung DP (Humas Polres) 8. Ray Armand (HSE and Safeguard D2P2 Project PT. Geo Dipa Energi) 9. Slamet Riyadi (Humas Dieng 2 Project PT. Geo Dipa Energi) 10. Himawan (Staff Humas Dieng 2 Project PT. Geo Dipa Energi) 11. Iwan Pribadi (PMC Communication and GRM)

No	Date	Topic	Key Issues	Meeting Type / Method	Venue	Participants		Key Person Present (PMU / PMC / Stakeholders)
						F	M	
11	24-Aug-22	Meaningful Consultation with Community surrounding Well Pad 38 and Forkopimca Batur	Discussion on the well pad 38 latest situation and activity plan	Meaningful consultation	Banjarnegara	0	12	1. Sukadi (Kapolsek Batur) 2. Toto (Babinsa Karangtengah) 3. Mukhodin (Karangtengah Head of the village) 4. Tri Martono (Karangtengah village officers) 5. Sutarman (Danramil) 6. Aji Piluroso (Camat Batur) 7. Izzudin (PM Dieng 2) 8. Ray Armand (HSE & Safeguard Manager) 9. Sigit (HSE Superintendent Dieng 2) 10. Slamet (Social Safeguard Dieng 2) 11. Himawan (Social Safeguard Dieng 2) 12. Iwan Pribadi (PMC Communications and GRM)
12	30-Aug-22	Coordination with Karangtengah Village and Krajan Sub-village Heads to Discuss Assessment at SLR-T-9C, Dieng 2	(1) Social assessment activities to prepare for well testing at SLR-T- 9C, (2) Request input from the Head of Sub Village (Dusun) Krajan for recruiting enumerators from the Dusun to collect data of socio-economic from land owners in a 300 meter radius from Well Pad 9, (3) Request input from the Head of Krajan Hamlet for recruiting the	Coordination	Karangtengah Village and Krajan Hamlet Heads' houses separately	2	5	PMC Social Safeguard and Dieng Unit 2 teams, Head of Karangtengah Village and of Krajan Hamlet

No	Date	Topic	Key Issues	Meeting Type / Method	Venue	Participants		Key Person Present (PMU / PMC / Stakeholders)
						F	M	
			Rojimur and Senkom teams from the Dusun					
13	31-Aug-22	Meaningful Consultation with the Contractor, Complainant, and Head of Krajan Sub-village, Dieng 2	Discussion on the grievance solution for a local community from Karangtengah Village named Santo who was claiming that his home was affected and having cracks by the drilling mobilization activities held by the contractor named Supraco	Meaningful consultation	Dieng Kulon	1	7	Representatives from GDE, contractor, complainant, the head of Krajan sub-village, and PMC Communication and GRM person
14	12-Okt-22	Meaningful Consultation with the Representative of Garung Sub-District Area	Provide information to the affected persons in Garung Sub-District related to Tower Assessment of Garung-Wonosobo	Meaningful consultation	Garung Sub-District office hall	2	15	PMU Dieng 2 Social Safeguard, PMU Electrical Team, PMC Social Safeguard, Contractor PT Citramas, and the invitation from the representative of Garung Sub-District
15	13-Okt-22	Meaningful Consultation with the Representative of Wonosobo Sub-District Area	Provide information to the affected persons in Wonosobo Sub-District related to Tower Assessment of Garung-Wonosobo	Meaningful consultation	Wonosobo Sub-District office hall	5	16	PMU Dieng 2 Social Safeguard, PMU Electrical Team, PMC Social Safeguard, Contractor PT Citramas, and the invitation from the representative of Wonosobo Sub-District
16	14-Okt-22	Meaningful Consultation with the Representative of Mojotengah Sub-District Area	Provide information to the affected persons in Mojotengah Sub-District related to Tower Assessment of Garung-Wonosobo	Meaningful consultation	Mojotengah Sub-District office hall	2	16	PMU Dieng 2 Social Safeguard, PMU Electrical Team, PMC Social Safeguard, Contractor PT Citramas, and the invitation from the representative of Mojotengah Sub-District

No	Date	Topic	Key Issues	Meeting Type / Method	Venue	Participants		Key Person Present (PMU / PMC / Stakeholders)
						F	M	
17	17-Okt-22	Meaningful Consultation with the Representatives of Bakal and Karangtengah Village	Meaningful consultation on the recent community and social condition in Bakal and Karangtengah Villages related to the D2P2 Project	Meaningful consultation	Dieng 2 Project Temporary Office	0	6	Dieng 2 Social Safeguard, and PMC Communication & GRM, representatives from Bakal village, a representative from Karangtengah
18	18-Okt-22	Meaningful Consultation on the Well Testing Pad 9C with Krajan Community	Provide information to the affected persons in Karangtengah village regarding the well testing activity in Pad 9C, including its risk and mitigation	Meaningful consultation	Pad 9 located in Krajan Sub-village, Karangtengah village	2	53	Dieng 2 Social Safeguard, PMC Social Safeguard, PMC Sub-surface, Contractor, The Head of Krajan Sub-village, Krajan Community
19	21-Nov-22	Meeting with the Head of Karang Tengah Village	Discussion on the latest social issue development in the Pawuhan Sub-Village, in which the community have rejected the drilling plan in the soccer field close to Pad 30	Discussion	Dieng 2 Project Temporary Office	0	4	Head of Karangtengah village, PMU Dieng 2, and PMC Communication & GRM
20	19-Dec-22	Meaningful Consultation with Krajan, Karangtengah Community on the Bleeding Process Completion for Well Testing SLR-T-9C	Inform to the Krajan, Karangtengah Community about the completion of bleeding process and the start of the steam, brine carryover, noise, and vibration that will be produced by well testing SLR-T-9C	Meaningful consultation	Temporary Office Dieng 2 Project	13	23	PMU, PMC Communication & GRM, PMC Well Testing, Contractor Well Testing, and 29 representatives from Krajan, Karangtengah

Note:

- *Socialization was a method for delivering information with regards that the audiences will understand the delivered topic and messages by having deep understanding on the context of the topics;*

- *N/A: information was not available*

Table 26. Construction Phase Affected People Consultation Patuha-2 Sub Project

No	Date	Topic	Key Issues	Venue	Meeting Type / Method	Participants		Key Person Present (PMU/PMC/ Stakeholders)
						F	M	
1	12-Jul-22	Meaningful Consultation of Closing Soccer Field in Kampung Kendeng	Monitoring and evaluation on the closing soccer field in Kampung Kendeng	Kampung Kendeng	Meaningful consultations	3	8	PMU Safeguard Patuha Unit 2, Kampung Kendeng Community
2	27-Jul-22	Community Development of community capacity building	Capacity building or training session on developing proper proposal for the community around Patuha site	Kampung Kendeng	Presentation and discussion	6	11	PMU Safeguard Patuha Unit 2, Kampung Kendeng Community
3	18 Aug 2022	Update the progress of replacement land IPPKH Patuha 2	Update progress, plan of field survey to verification by Independent Appraisal or KJPP	Sugihmukti	Meaningful consultation	3	28	PMU-PMC Safeguard, Land owner, Sugihmukti village officer
4	2-Sept-22	Meaningful consultation on drilling PPL 2	Coordination with PTPN VIII because the conditions in the PPL 2 staging area were currently being used by PTPN VIII for temporary fertilizer storage	Meaningful consultation	Office of PTPN VIII Kebun Rancabolang	1	5	PMU Social Safeguard Patuha 2, PTPN VIII, ADA APS
5	12 Oct 2022	Plan of relocation drilling activity to business owner near pad	To inform business-owner near the drilling area regarding the relocation of the drilling location and know the business-owner's plans regarding the relocation of the drilling location	Rig Area	Meaningful consultation	2	1	PMU Social Safeguard, business owner near pad
6	23 Nov 2022	Coordination with Panundaan Village Officers	Coordination between Panundaan village government and JV ADA related to drainage repairment in RW 14 Citiwu	Panundaan	Coordination	4	1	PMU Safeguard, Panundaan Village Officers, JV ADA contractor

No	Date	Topic	Key Issues	Venue	Meeting Type / Method	Participants		Key Person Present (PMU/PMC/ Stakeholders)
						F	M	
7	19-Dec-22	Meaningful consultation on well-testing preparation PTH-G-4B	To inform community related to well testing activity and the impact and how to mitigate it.	Meaningful consultation	Kampung Pasir Waas	24	20	PMU Social Safeguard Patuha Unit 2, Contractor Depriwangga, Community of Kampung Pasir Waas

5 COMPLAINTS, ISSUES, CORRECTIVE ACTION

5.1 Information Disclosure

From July to December 2022, some meetings with the local community and leader have been conducted. The meeting was aimed to disclose project information to the stakeholders. The meeting topics were various, including project updates, safety drilling and well testing, and grievances.

Table 27 gives information on disclosure activities on environmental aspects that have been conducted for Dieng 2 and Patuha 2 Sub Project

Table 27. Information Disclosure for Dieng 2 and Patuha 2 Sub Project

No	Construction Activities	Social Safeguard Support	Date	PIC	Remark
DIENG 2					
1	Testing at Well SLR-T-9C	Conducting a meaningful consultation with the resident's representative of Krajan Sub-village (the closed sub-village to Pad 9)	18 October	PMU and PMC Social Safeguard with the involvement of PMU Sub Surface Team	The information has been disclosed including: • Potential risk and impact of well testing • Mitigation plan of risk and impact of well testing • Grievance mechanism
2	Drilling in Patuha 2 Project Site	Conducting a meaningful consultation with the resident's representative of Dieng Wetan, Bakal (Buntu Sub-village), Sikunang (Ngandam Sub-village) and Karang Tengah Village.	26 October	PMU and PMC Social Safeguard with the involvement of PMU Drilling Team	The information has been disclosed including management of surface water utilization during drilling works
3	Testing at Well SLR-T-9C	Conducting a meaningful consultation with the farmland owners/workers were farming within100 –200 meters and 300 meters from Pad 9C	2 November	PMU and PMC Social Safeguard with the involvement of PMU Sub Surface Team	The information has been disclosed including: • Potential risk and impact of well testing • Mitigation plan of risk and impact of well testing • Grievance mechanism

No	Construction Activities	Social Safeguard Support	Date	PIC	Remark
4	Testing at Well SLR-T-9C	Media gathering involving journalist and local governments particularly in Banjarnegara Regency	10 November	PMU and PMC Social Safeguard with the involvement of PMU Sub Surface Team	The information has been disclosed including: • Understanding well testing (objectives and procedures) • Potential risk and impact of well testing • Mitigation plan of risk and impact of well testing • Grievance mechanism
5	Testing at Well SLR-T-9C	Meaningful Consultation with resident's representative of Krajan Sub Village of Karangtengah Village	19 December	PMU and PMC Social Safeguard with the involvement of PMU Sub Surface Team	The information has been disclosed including the completion of bleeding process and continue with the flowing steam through main line including the potential of brine carryover, noise, and vibration during testing at Well SLR-T-9C
			PATUHA 2		
No	**Construction Activities**	**Social Safeguard Support**	**Date**	**PIC**	**Remark**
1	Testing at Well PTH-G-4B	Meaningful Consultation with resident's representative of Kendeng Sub Village and tea plantation workers at surrounding Pad PPL 4	19 December	Patuha Unit 2 and Well Testing Contractor	The information has been disclosed including: • Potential risk and impact of well testing • Mitigation plan of risk and impact of well testing • Grievance mechanism

5.2 Grievance Redress Mechanism

GDE has established a Standard Operation Procedure for its Grievance Redress Mechanism since 10 September 2020 with GDE's Decree No. 034.SK/PST.00-GDE/IX/2020. This SOP includes step-by-step instructions and specific time and workflows to handle stakeholder complaints effectively. The scope was divided into (i) Information, (ii) Consultation, and (iii) Mediation. A grievance log has been established. When relevant, the receipt and resolution of all grievances were reported here on a semi-annual basis in the Semi-Annual Environmental Monitoring Report when relevant.
For Dieng-2 Sub-Project (HALO DIENG 2), the communication media being used were:

a. Hotline : +62 812 – 10000 – 630
b. E-mail : halodieng2@geodipa.co.id
c. Complain Boxes : 4 boxes located at the Communication Centre (i.e. mosque in Pawuhan Sub-Village, the head of the village office, and mosque in Karangtengah Village)

d. Office : PT Geo Dipa Energi (Persero) Unit Dieng Jl. Raya Dieng-Batur, Banjarnegara

For Patuha-2 Sub-Project (HALO PATUHA 2), the communication media for grievances were as follows:

a. Hotline :+62 812 – 30000 – 630
b. E-mail : halopatuha2@geodipa.co.id
c. Office : PT Geo Dipa Energi (Persero) Unit Patuha, Jl. Rancabolang Km. 14, Desa Sugihmukti, Kec. Pasirjambu, Bandung

GDE has also established a Grievance Redress Committee referring to GDE's Decree No. 015.SK/PST.00-GDE/IV/2021 dated 15 April 2021. GDE conducted the first initial meeting of the Grievance Redress Committee in July-August 2021. GDE has intensified the Grievance Redress Mechanism disclosure/dissemination to stakeholders. Each local (village/sub-district) government office has a banner/leaflet/etc. related to GDE Grievance Redress Mechanism provided.

Table 28. Grievance Redress Committee

No	Role/Institution	Position within Team
COMMITTEE		
PT Geo Dipa Energi (Persero) – Project Head Office		
1	Hefi Hendri *Project General Manager*	Head of Committee
2	Ray Armand *HSE & Safeguard Division / Manager*	Member
	Reyno Muhammad *Government Relation & Social Safeguard Staff*	
	Sari Ramadhani Putri *Environment Safeguard Assistant Manager*	
	Sannita Debora Ambarita *Health & Safety Staff*	

No	Role/Institution	Position within Team
Representatives of sub-district level communication forum (*Forkompinca*)		
3	Head of Sub-District (*Kecamatan*)	Member
4	Head of Police Sector (Polsek)	Member
5	Head of Military Area Command (Koramil)	Member
TECHNICAL TEAM		
PT Geo Dipa Energi (Persero) – Project Site Office Patuha 2		
6a	Danang Maulana Project Manager Patuha 2	Head of Technical Team
7a	Aditya Rahman HSE & Safeguard Superintendent Patuha 2	Member
8a	Yudha Wahyu Pratama Social Safeguard & Public Relation Supervisor Patuha 2	Member
9a	Ananda Riana Putri Social Safeguard & Public Relation Staff Patuha 2	Member
PT Geo Dipa Energi (Persero) – Project Site Office Dieng 2		
6b	Izuddin Project Manager Dieng 2	Head of Technical Team
7b	Sigit Dwi Pamungkas HSE & Safeguard Superintendent Dieng 2	Member
8b	Slamet Riyadi Social Safeguard & Public Relation Supervisor Dieng 2	Member
9b	Himawan Kusuma Putra Social Safeguard & Public Relation Staff Dieng 2	Member
Representatives of village government and community		
10	Head of Villages	Member
11	Community Leaders	Member
12	Women Representatives	Member
Others		
13	Wahyu Setyawan Minarto, Health Safety Environmental and Safeguard Specialist (Project Management Consultant)	Member
14	Contractor Representatives	Member

The GRM records indicate that even the mechanisms developed to facilitate stakeholder communication were effective. To add social mitigation readiness for well-testing at Pad 9, GDE established Central Communication which opened 24-hour a day during the well-testing as an additional GRM channel to receive complaints and grievances, particularly but not limited to the well-testing activity, from the community. GDE has also intensified the GRM channel disclosure/dissemination via leaflets. There were 9 (nine) grievances/complaints recorded. Five grievances were resolved and for grievance still in progress, as summarised in Table 29 and elaborated below. Following Table 30 summarises grievances received for Patuha 2 Sub Project during July – December 2022 period

Table 29. List of Grievance(s) Received in July to December 2022 periods for Dieng-2 Sub-Project

Village	Complaint/ Grievance Topic(s)	Number of Complaint/ Grievance Received		Status of Grievance Resolution	
		#of complaint from previous monitoring period	# of complaint received within this monitoring period	# Resolved	# of On going
Krajan Sub Village, Karangtengah Village	1. Compensation due to irrigation pipes for his plantations that were affected by pond excavation activities near Wellpad 09 2. Compensation due to mobilization of drilling equipment to Wellpad 9 affected a local community member's home (crack on the wall).	-	2	2	-
Simpangan Sub Village, Karangtengah Village	Compensation due to mobilization of drilling equipment disconnected the internet cable to a local community member's home.	-	1	1	-
Kepakisan Village	Water pollution due to water mud from drilling activity in Wellpad 7 contaminated potato plantations.	-	1	-	1
Bitingan Sub Village, Kepakisan Village	Water pollution due to water mud from drilling activity in Wellpad 7 impacted potato plantations from overflow of waste rmud at ditch of wellpad. The dike was immediately repaired to resolve the complaint.	-	1	1	-
Karangtengah Village	Compensation due to GDE and the contractor closed the drainage from	-	1	1	-

Village	Complaint/ Grievance Topic(s)	Number of Complaint/ Grievance Received		Status of Grievance Resolution	
		#of complaint from previous monitoring period	# of complaint received within this monitoring period	# Resolved	# of On going
	the pad to the river, constructed embankments, and promised not to dump the waste cutting from drilling in Pad 33				
Karangtengah Village	Compensation because of well testing activity. Due to the well testing were still in progress, GDE received and documented the grievance, then monitored the potato plantation to calculate the compensation estimation after potatoes harvesting.	-	3	-	3

Table 30. List of Grievance(s) Received in July to December 2022 periods for Patuha-2 Sub-Project

Village / Institution	Complaint/ Grievance Topic(s)	Number of Complaint/ Grievance Received		Status of Grievance(s)	
		#of complaint from previous monitoring period	# of complaint received within this monitoring period	# Resolved	# of On going
No grievance during reporting period					

There were no issues raised in the previous SEMRs which have not yet been resolved.

Table 31. Project Complaints or Issues – Not resolved from previous reports

Details of Complaint	Detail of Person (Date, Name, Contact Details)	Action Needed and Date	The reason this was still not resolved
N.A.	N.A.	N.A.	N.A.

5.3 Corrective Actions

The following table gives information on any formal corrective action that has been issued to the contractor to improve environmental performance:

Table 32. Corrective Actions Issued

Reason for Corrective Action	Date Issued	Outcome	Comment / Follow Up
Non proper hazardous waste management (Patuha)	4 April 2022	Hazardous waste has been transported from Patuha on August & October 2022 for further treatment by government approved party	Done
Housekeeping at Rig area (Patuha 2) need to be improved	15 August 2022	Conduct housekeeping at Rig area	Done
Some safety devices need to be repaired	7 September 2022	Repair safety devices as instructed	Done
No label on IBC tank, no bund wall on silo cementing and some	15 September 2022	Provide label and bund wall, repair broken equipment	Done

Reason for Corrective Action	Date Issued	Outcome	Comment / Follow Up
equipment were broken			
No waste segregation	15 September 2022	Conduct socialization on waste segregation, provide bins for different type of waste	Ongoing and to be followed up by contractor
No MSDS on IBC tank	15 September 2022	Provide MSDS	Done
Non proper housekeeping management	21 September 2022	Ongoing improvement of housekeeping management by Contractor	Done
No barricade in high pressure area	23 September 2022	Provide barricade and sign	Done
Non proper housekeeping management	26 September 2022	Ongoing improvement of housekeeping management by Contractor	Ongoing and to be followed up by contractor
Drill cutting management need to be improved	27 October 2022	Ongoing improvement of drill cutting management	Ongoing and to be followed up by contractor

5.4 H_2S Dispersion and Noise Modelling of Well Testing Activity at Well SLR-T-9C

Modelling was conducted for four scenarios including: 1) Failure in bleed facilities, 2) Bleed NCG with operational condition without NCG Tank, 3) Bleed NCG with operational condition with NCG Tank, and 4) Monitoring Phase (30 days).Noise propagation modelling was carried out using ISO 9613-2 and CNOSSOS-EU methods which were implemented in SoundPLAN Essential 5.1. The sound barrier construction was extending from North-East to South-West, 8 m high. With an open section on the Southwest side. There were 3 noise sources modelled: diffuser, control valve and LECM. Noise levels at sensitive receptors were primary concern. The sensitive receptor was modelled as a 2-level building. Full report of noise modelling was presented in **Appendix 4.** Summary of the noise modelling was as follows:

The modelling result without sound barrier, show that at all receptors points the noise level exceeds the standard, both night and day. The exceedance ranges from 12.7-31.9 dBA on the ground floor during the day; and ranges from 22.8-41.9 dBA at night. The day and night contours have the same pattern, but with slightly higher values at night.

The modelling result with sound barrier show that at all receptors points the noise level exceeds the standard, both night and day. The exceedance ranges from 9.2-35.6 dBA on the ground floor during the day; and ranges from 19.4-45.6 dBA at night. The higher ones were on R4 and R5 which were located on the South and Southeast sides. The South and Southeast sides were the open sides of the sound barrier. It was predicted that there was the effect of sound wave reflection by the barrier wall at the south and southeast location.

5.5 H_2S Modelling of Proposed Dieng 2 Power Plant

Considering high concentration of H_2S will be spreading in surrounding settlement area adjacent to proposed power plant location at Pad 38, GDE decided to relocate power plant location to Pad 12 where the area was far from settlement area compared to Pad 38. In Addition to that GDE will remodelling H_2S

dispersion of the new proposed location based on new input data (combined data of calculation and measurement of emission rate and H_2S flow rate). Data input for H_2S remodelling was as follows:

Parameter	Unit	Value
Number of sources		5
Height	m	20.33
Diameter	m	10
Total Volumetric Flow Rate	m^3/s	3,738
Total H2S Emission Rate	g/s	115.75

The results of modelling the distribution of H_2S Dieng Unit 2 at Pad 12 using the AERMOD View dispersion model and assessing the potential for odour disturbances at sensitive receptor points based on information and assumptions GDE has so far advised that:

- For a 1-hour average, the maximum concentration was 2.343 ppm (3.515 mg/m^3) at a location located ± 850 m Northwest of Unit 2 Pad 12. In the entire modelling domain of 5 km x 5 km there was a potential for odour.
- For a 24-hour average, the median value was 0.0213 ppm and 25.3% of modelling domain area has H_2S maximum concentration concentrations above 0.02 ppm. The maximum concentration was 0.567 ppm (0.851 mg/m^3) at a location located ± 240 m in the Southeast of Unit 2. The R2 (Central Coral) and R3 (Mushroom) receptor points gave a daily maximum concentration of 0.026 ppm. Other receptor points give a maximum concentration of 0.037- 0.146 ppm.
- For the annual average, the maximum concentration of H_2S in the grid was 0.020 ppm (0.030 mg/m^3) at a distance of ± 800 m in the Northwest of Unit 2.
- The number of days H_2S concentration > 0.02 ppm was 3-27 days or 1-7% in a year.
- Maximum exposure of 2.343 ppm (3.515 mg/m^3) was odour nuisance, has no impact on health.

Referring to the results above, an abatement plant was not necessary to be included in the plant design. A provision might be made for an abatement plant and only install an abatement plant if subsequent AMDAL monitoring shows non-compliance during plant operation. Full report of H2S modelling was presented in **Appendix 5**

5.6 Contract Status of NGO Aspinal Foundation for Patuha

GDE plans to have Memorandum of Understanding with NGO Aspinal Foundation and Yayasan Konservasi Alam Bandung (YKAB = Bandung Nature Conservation Foundation). This MoU intends to have collaboration on biodiversity conservation in Patuha Area.

Current status of the draft MoU was still being reviewed by GDE and it will be finalized as soon as part of GDE's commitment for supporting biodiversity conservation at the location where they were operating..

5.7 Schedule of IEE Updating

IEE updating for Patuha 2 currently was on-going, prepared by PwC Consultant. Second draft has been submitted to PMU mid of December 2022 and reviewed by PMC and ADB. PwC currently was still finalization the report and expected early February 2023 will be submitted to PMU.
Meanwhile IEE updating for Dieng 2 still in initial process of collecting data and information. It was expected that FEED for Dieng 2 will be commenced early February 2023.

5.8 Corrective Action Based on Finding of ADB Mission

ADB Mission on March 2022 found that noise level exceeds the limit in several location due to drilling activity. Therefore, ADB proposed to regulate specifications for equipment (pumps) and contracts to include conditions for noise abatement and noise performance standards. Furthermore GDE establish pump specification in the contract in order to fulfil noise performance standard. Following were requirement set by GDE in the contract for pump specification:

<table>
<tr><th>GDE Requirement</th><th>Equipment Provided by Contractor</th></tr>
<tr><td>1. Supply Pump</td><td rowspan="4">Total 9 units of multistage water pumps have been delivered and installed c/w check valves and gauge valves at 3 Pump Stations:
1. WPS Sidolok - 3 units (5 stage centrifugal pump with engine diesel Mitsubishi engine 6d40 T)
2. PAD 29 - 3 units (7 stage centrifugal pump with engine diesel Mitsubishi 8DC9 T)
3. Booster Karang Tengah - 3 units c/w silent cover (7 stage centrifugal pump with engine diesel Mitsubishi 6D40 T)
Pump capacity from each station were tested more than 1200 gpm (gallon per minute) refer to the results at PAD 31, PAD 09, and PAD 07</td></tr>
<tr><td>Multi stage pump to continuously deliver water at minimum of 1200 gpm during drilling from water source to water pond/wellpad. Include check valve and suction line. Included in stand by unit of multistage pumps.</td></tr>
<tr><td>2. Centrifugal pump</td></tr>
<tr><td>Centrifugal pump to deliver a minimum of 1200 gpm during drilling from well pond to rig tank/ well.</td></tr>
<tr><td>3. Water Tank</td><td rowspan="2">The water tank 350 bbl was installed as a Booster at Karang Tengah</td></tr>
<tr><td>1 (one) unit water tank 350 bbl minimum volume c/w 20 HP centrifugal pump, or as per required</td></tr>
<tr><td>4. Fuel Tank</td><td rowspan="2">2500 L x 3 unit (one for each station)</td></tr>
<tr><td>Fuel tank min 2000 L x 2 ea at every WPS (Water Pump Station)</td></tr>
<tr><td>5. Porta Camp</td><td rowspan="2">Total 3 unit of portacamp have been set up at:
1. WPS Sidolok - 10 Ft
2. PAD 29 - 20 Ft
3. Booster Karang Tengah - 10 Ft</td></tr>
<tr><td>10 ft porta camp complete with genset, heater, lighting and tool box x 2 units.</td></tr>
<tr><td>6. Chicksan/high pressure hose</td><td rowspan="2">if required</td></tr>
<tr><td>1 (one) set of 2” 10,000 psi WP chicksan or 2” 5,000 psi hose 12 m to connect water supply line to 3-1/8” 5,000 psi / 3,000 psi/ 2,000 psi side valve</td></tr>
<tr><td>7. Adapter Flange</td><td rowspan="2">if required</td></tr>
<tr><td>3-1/8” 5,000 psi; 3,000 psi; 2,000 psi c/w R-31 and R-35 ring gaskets</td></tr>
</table>

GDE Requirement	Equipment Provided by Contractor
8. Water lines	Water line was installed at well pond (under GDE construction team)
400 (four hundred) m length of water line using 4-1/2” or 3-1/2” exused DP or equivalent to transfer 1200 gpm water from well pond to tank/rig	

6 CONCLUSION and RECOMMENDATION

6.1 Conclusion

In overall, the environmental performance of Dieng 2 Sub Project was considered in moderate level where GDE needs to improve several environmental mitigation measures through their supply chains (contractors and sub-contractors), since several non-compliance issues reported during July to December 2022 period. The areas need to be improved were included:

1) Waste management at drilling site and associated facility;
2) Noise control during well testing; and
3) Water supply for drilling works.

In the other side, the environmental performance of Patuha 2 Sub Project was considered in good level where GDE needs to improve environmental mitigation measure particularly waste management through their supply chains (contractors and subcontractors), even though no major non-compliance issues reported during July to December 2022 period.

6.2 Recommendations

Referring to the above conclusions, the following recommendations were made below.

Implementation of site-specific construction environmental management plans (CEMPs) must be monitored and reported regularly every month. Considering the current situation and condition in the site that dynamically changes, CEMP needs to be refined to accommodate the current state and lessons learned from current CEMP implementation.

For Patuha-2, a land clearing management plan was recommended to describe the detailed procedures (including stage approvals) and sequencing of land clearing activities for the well development at location BB. This plan shall be well-coordinated with the existing Biodiversity Action Plan (BAP) and detailed in biodiversity protection procedures by PMU and PMC for the contractor to follow.

It was also important for the contractors to implement combined occupational and community health and safety plans addressing community health issues during the construction phase. The Grievance Redress Mechanism (GRM) shall be further operationalized next semester with GRC dissemination, kick-off meetings, and GRC monitoring.

It was further recommendation to assess the potential impacts of drilling, well testing and powerplant development on noise and ambient air quality at nearby environmental sensitive receptors, such as the communities living close to the proposed plant locations (i.e. for Dieng-2). These predictive assessments provide more opportunities for impact mitigation success if conducted early in the design process, i.e. during initial plant layout conceptualization and planning and selection of plant technologies. This was expected during the Front-End-Engineering-Development (FEED) phase, rather than the Detailed Engineering Design (DED) only. However, predictive assessment findings from the FEED can be re-evaluated and refined during the DED by the EPC contractor.

Consultation and communication with all stakeholders shall be conducted regularly to communicate the impact (both positive and negative) and mitigation measures prepared to the stakeholders and obtain their recognition on D2P2 project development.

• APPENDICES

Appendix 1 PMU & PMC Joint Site Inspection to Dieng & Patuha Well Site
Appendix 2 Environmental Quality Laboratory Testing Results
Appendix 3 Photolog
Appendix 4 H_2S Dispersion and Noise Modelling of Well Testing Activity at Well SLR-T-9C
Appendix 5 H_2S Modelling of Proposed Dieng 2 Power Plant
Appendix 6 Land Slide Incident at Wellpad-9
Appendix 7 Biodiversity Rapid Assessment of Pad 12

Appendix 1 PMU & PMC Joint Site Inspection to Dieng & Patuha Well Site

PT GEO DIPA ENERGI (PERSERO)

GEO DIPA ENERGI

BERITA ACARA
No. D2P2-BA-AEC-GDE-00012

AECOM

Date : 28 September 2022		**Subject :** Joint Site Inspection at PT ADA site area on CEMP Implementation
Location : PPL 4		
Prepared by:	**Aknowledged by:**	**Aknowledged by:** A/n: Bonny. Hendra.
Name: Hasbullah Hasan **PMC Representative**	**Name: Aditya Rahman** **PMU**	**Name: Melky/Sugiharto** A/n **Contractor**

Today on Wednesday dated Twenty-Eight of September Two Thousand Twenty Second, PMU (represented by Aditya Rahman and Sari Ramadhani) PMC (represented by Hasbullah), Air Drilling Associates (ADA) (represented by Sugiharto and Melky) did a joint site inspection at ADA site area at PPL 4

The Site Inspection began with an explanation from Mr. Melky about ADA's scope of work in drilling activities and how ADA managing the impacts and risks caused by the activities. Furthermore, site sighting is carried out in the ADA site area, interview with HSE officer and checking HSE documents such as MSDS, SOP, JSA and PTW document. Detail of site inspection is described in the table below:

No	Description	Findings	Corrective Action
1	General	PT ADA's scope of work is to perform aerated drilling fluid. When the site inspection is carried out drilling activity was installing a 20-inch casing so that ADA is on standby waiting for the next drilling plan	NA
2	CEMP Implementation- Waste Management	In overall, the implementation of commitments as listed in CEMP was met the KPIs and no incompliance finding. Some remarks were made for information and improvement as below. • Hazardous waste (used oil and contaminated rags) resulted from PT ADA activities were managed by ETI. • Used chemical containers were pressed and send to ADA Warehouse in Bogor • There is no waste bin for organic waste • There is no label on bin (container) for contaminated glove or rag provided at the site	NA NA Contractor to provide Contractor to provide
3	CEMP Implementation – Air Quality Management	• Regular vehicle maintenance and emission test were conducted. • Machineries (compressors) have valid certification (SKPP/Surat Kelayakan Penggunaan Peralatan) from Ministry ESDM	

No	Description	Findings	Corrective Action
4	CEMP Implementation – Noise & Vibration Management	Noise monitoring has conducted regularly in the site area. Latest measurement was 15 September 2022	NA
5	HSE Program	Daily tool box meeting, JSA, PTW and HSE documents are documented and recorded properly	NA

PT GEO DIPA ENERGI (PERSERO)

GEO DIPA ENERGI

BERITA ACARA
No. D2P2-BA-AEC-GDE-00014

AECOM

Date : 30 September 2022		**Subject :** Joint Site Inspection on CEMP Implementation at PT Halliburton Cementing Work Site
Location : PPL 4		
Prepared by:	**Aknowledged by:**	**Aknowledged by:**
Name: Hasbullah Hasan **PMC Representative**	**Name: Rista Jayanti** **PMU**	**Name: Fadil Auza** **Contractor**

Today on Friday dated Thirty of September Two Thousand Twenty Second, PMU (represented by Rista Jayanti and Helmy Hasan), PMC (represented by Hasbullah Hasan and Novianto Hadi Suwito), Halliburton Cementing (represented by Fadil Auza and Herman Aripin) did a joint site inspection at PT Halliburton Cementing Work Site at PPL 4.

The Site Inspection began with an explanation from Mr. Fadil Auza about PT Halliburton Cementing Division's scope of work in drilling activities and how this company managing the environmental impacts and risks caused by the current activities. Furthermore, site sighting is carried out in the PT Halliburton Cementing work site, interview with their representative officers and checking HSE documents such as MSDS, SOP, JSA and PTW document during this inspection. Detail of site inspection is described in the table below:

No	Description	Findings	Corrective Action
1	General	PT Halliburton Cementing's scope of work is responsible to conduct cementing for drilling works. When the site inspection is carried out, Halliburton Cementing just completed cementing at 450 m drilling measured depth and standby waiting for the next cementing works.	NA
2	CEMP Implementation- Waste Management	In overall, the implementation of commitments as listed in CEMP was met the KPIs and no incompliance finding. Some remarks were made for information and improvement as below.	
		• Hazardous waste (used oil and contaminated rags) resulted from PT Halliburton Cementing activities were managed by themselves.	NA
		• Used chemical containers were pressed and send to Halliburton Cementing Warehouse in Bekasi.	NA
		• The waste storage and records/manifest were managed properly.	NA
3	CEMP Implementation – Water and Soil Pollution Prevention	• Several improper lining and bund-wall (broken and disposition) were observed.	Contractor to fix the lining and bund-wall for ensuring no pollution to water and soil

No	Description	Findings	Corrective Action
			underneath work site.
4	HSE Program	Overall HSE Plan implementation was implemented refer to Rig Bundling HSE Plan. Those are including Daily toolbox meeting, JSA, PTW and HSE documents. Those have been documented and recorded properly.	NA

PT GEO DIPA ENERGI (PERSERO)

GEO DIPA ENERGI

BERITA ACARA
No. D2P2-BA-AEC-GDE-00015

AECOM

Date : 30 September 2022		**Subject :**
Location : PPL 4		Joint Site Inspection at Halliburton Sperry site area on CEMP Implementation
Prepared by:	**Aknowledged by:**	**Aknowledged by:**
Name: Hasbullah Hasan **PMC Representative**	**Name: Rista Jayanti** **PMU**	**Name: Joko Purnomo/Tri Aguska** **Contractor**

Today on Friday dated Thirty of September Two Thousand Twenty Second, PMU (represented by Rista Jayanti and Helmy Hassan) PMC (represented by Hasbullah and Novianto HS), Halliburton Sperry (represented by Joko and Tri Agusta) did a joint site inspection at Halliburton Sperry site area at PPL 4

The Site Inspection began with an explanation from Mr. Joko about Halliburton Sperry 's scope of work in drilling activities and how Halliburton Sperry managing the impacts and risks caused by the activities. Furthermore, site sighting is carried out in the Halliburton Sperry site area, and checking HSE documents such as MSDS document. Detail of site inspection is described in the table below:

No	Description	Findings	Corrective Action
1	General	Halliburton Sperry's scope of work is to perform directional drilling as requested by well planner. When the site inspection is carried out drilling activity was stopped due to mud pump was broken and need to be repaired so that Halliburton Sperry is on standby waiting for the next drilling plan	NA
2	CEMP Implementation- Waste Management	In overall, the implementation of commitments as listed in CEMP was met the KPIs and no incompliance finding. • No Hazardous waste resulted from Halliburton Sperry activities. • Used chemical containers (in small amount of WD 40, grease and cleaner) are send to Halliburton Sperry Warehouse in Serpong and then send to waste management vendor • Domestic waste generated are disposed in the bin provided by ETI. Number of Halliburton Sperry worker onsite are 4 persons, therefore domestic waste generated is negligible	NA NA
3	CEMP Implementation – Air Quality Management	• NA	NA
4	CEMP Implementation – Noise & Vibration Management	• NA	NA
5	HSE Program	Daily tool box meeting, JSA, PTW and other HSE Program of Halliburton Sperry are	NA

No	Description	Findings	Corrective Action
		following Rig HSE Program	

PT GEO DIPA ENERGI (PERSERO)

GEO DIPA ENERGI

BERITA ACARA
No. D2P2-BA-AEC-GDE-0017

AECOM

Date : 27 October 2022		**Subject :**
Location : Well Pad 07		Joint Site Inspection on PRA and Services Companies' CEMP Implementation of Rig Bundling.
Prepared by:	**Aknowledged by:**	**Aknowledged by:**
Name: Novianto HS **PMC Representative**	**Name: Dian Nur Febrianto** **PMU Representative**	**Name: Ahmad Barokah** **Contractor Representative**

Today on Thursday dated Twenty Seven of October Two Thousand Twenty Second, PMU (represented by Dian Febrianto), PMC (represented by Novianto and Hasbullah), PT PRA's onsite representative (Ahmad Barokah, HSE Officer), PPLI's onsite representative (Yahya Yuda Maulana) did a joint site inspection at Pad 07 and associated facilities including temporary hazardous waste storage at laydown area nearby Pad 28 and drilling cutting storage at Pad 33. This joint site inspection was aknowledged by PMU Environmental Safeguard Supervisor (Dian Nur Febrianto) and PMC HSE Officer for drillng works (Merza Yureilmy). The site inspection results as detailed below.

No	Description	Findings	Corrective Action
1	General	During the site inspection, the drilling activity at SLR 07 E Well is on-going since 21 October 2022 and current bit depth is about 821.64 m. In overall, the implementation of CEMP of Rig Bundling is considerably partially comply. Several remarks were made and discussed below.	See detailed recommended actions below
2	H_2S Mitigation Plan	All mitigation measures were implemented properly including adequate PPE, H_2S detector installation, periodical air quality monitoring. There is no potential H_2S risk at confined space. A number of SCBA are provided at certain places where potential H2S release might be occurred and also at minicamp.	N/A
3	Noise Management	• All mitigation measures were implemented properly including adequate PPE, periodical noise monitoring at surrounding area of pad and booster pump house. • Rotate workers every two hours at booster pump house	N/A
4	Water use for drilling	• Record of water use for current drilling activity through North Water Supply (source: Sidolok River) is provided. • Currently, South Water Supply system (source from Tulis River) will not be used because the supply from Sidolok River is sufficient for current drilling activity.	N/A

No	Description	Findings	Corrective Action
5	Waste Management	• Drilling cutting management is main issue since the volume of cuttings is higher than treatment capacity at drilling waste storage at Pad 33. The current treatments (including bricks fabrication and flooring) do not significantly reduce the existing volume of cuttings at the drilling waste storage. Several alternatives to solve this issue is under discussion between PPLI (Wate Management Contractor), PMU, and GDE. • Domestic liquid waste is not treated at Sewage Treatment Plan (STP) but collected in septic tank. • Garbage bins at minicamp and rig site were provided, but no waste segregation. • Hazardous waste manifest is included oil contaminated stuffs such as oil filters, used hand gloves, rags (*majun*). • Improper domestic waste management of by CV Kembang Jaya was still found at temporary disposal site (TPS) beside Pad 7 (see detail findings in Waste Management Sub Plan below). • Approved waste management plan (as part of CEMP) was provided. Contractors need to improve current implementation (see detail findings in Waste Management Sub Plan below).	Rig bundling contractor is strongly suggested to improve waste management implementation and engage PPLI and CV Kembang Jaya to achieve the KPIs. The updated progress might be reported the in next CEMP Implementation Report.
6	Occupational Health and Safety	• Regular trainings on safety and health hazards were done. • Sanitary facilities and safe drinking water at the drilling site and at the workers' camp are provided. • Mandatory PPEs such as googles, safety shoes, etc. are provided for all workers, except at TPS and paving block manufacturing. • Mapping noisy site particularly high-level noise-generating works 100 dB(A) and required suitable PPE are implemented. • Toolbox meetings, applicable JSA and PTW are conducted to emphasize safety and health procedures. • HSE Supervisor and Site Engineers has encouraged brief exercise routine in daily basis to highlight the value of health in the workplace. • Employees of contractor(s) have annual physical and medical examination. Health	N/A

No	Description	Findings	Corrective Action
		records are kept confidential in the employee file. • Clear and visible warning signs as well as sufficient lighting have been installed. • Contractors' HSE Plan has been prepared to follow relevant HSE SOPs of GDE and relevant IFC-EHS General Guidelines 2007 (Section 2).	
7	Hazardous Material Register and Safety Data Sheet	A Hazardous Material Register and respective Safety Data Sheets (SDSs) are kept on site at all times and regularly maintained.	N/A
	Sub Plan – Noise and Vibration Management		
1	Noise mitigation (Engineering control)	• Regular maintain and service all vehicles and equipment are implemented to reduce noise generated. • Particularly noisy equipment such as generators, crushers, grinders, compressor, pumps, etc. which has the potential to exceed the Specific Standards has been fitted with noise barriers, baffles, sound insulation or enclosures. • Noisy machine, equipment and tools at optimum air pressure are operated to minimize noise emission. • Regular inspection and maintenance of equipment and machinery are conducted to ensure that it is in good condition.	N/A
2	Vibration	No issue of disturbance raised by community due to vibration.	N/A
	Sub Plan – Waste Management		
1	Drilling cutting and sludge (used mud) management	The record of mass waste balance is provided by duty waste management contractor's personnel. Concerning to the current volume of cuttings, several options are prepared as part mitigation measures including increasing bricks production and flooring as much as possible at existing pads (i.e. Pad 11, 14, 25, etc). In addition, a control box with sufficient dimension will be made to control the leachate water from the existing temporary drilling cutting storage and avoid surface water pollution at downstream.	Contractor (PPLI) to provide record of mass waste balance in the next CEMP implementation monthly report. It would be used to evaluate the effectiveness of the mitigation measures.
2	Drilling Waste Liquid management	• The wastewater from the drying of drilling cuttings and sludge is collected then distributed to the mud pond/waste collection for further recycling for mud making materials. • The wastewater from the drying of drilling cuttings and sludge is collected then channeled to the mud pond/waste	Rig bundling contractor is strongly suggested to improve waste management implementation and report the updated progress in the next CEMP implementation

No	Description	Findings	Corrective Action
		collection for further injection into the well at Pad 29. On 26 October 2022, some water was channeled to waste water pond at Pad 29 without treatment to maintain the water level at waste pond at Pad 07. There is only one waste pond at this site.	monthly report.
3	General waste management	Waste management procedures is not implemented properly.	Corrective actions recommended during previous inspection are not properly implemented yet. Those are included: • All employees and waste handlers need to be trained in waste management procedures and the consequences of non-compliance and relevant laws and regulations relating to domestic waste, non-hazardous waste, drilling waste, and hazardous waste • The updated progress shall be reported in the next CEMP implementation monthly report.
4	Waste classification and segregation	There are various colored waste bins (yellow for recycle waste, red for non-organic or non-biodegradable waste and green for organic waste) in minicamp and rig site. However, various wastes are found in existing garbage bins without any proper segregation as per existing waste bins.	Corrective actions recommended during previous inspection are not properly implemented yet. Those are included: • Waste management contractor to provide clear symbol of waste bins. • Awareness shall be frequently remined during regular toolbox meeting • The updated progress might be reported the in next CEMP implementation monthly report.
5	Domestic waste management	• Similar as finding during the previous inspection, domestic solid waste was managed by CV Kembang Jaya at a temporary disposal site (TPS) beside Pad 7. This local company operates two	Corrective actions recommended during previous inspection are not properly implemented yet. Those

No	Description	Findings	Corrective Action
		incinerators for non-organic waste management and an open dumping site for organic waste management. It was reported by CV Kembang Jaya's on duty representative that this local company has obtained permit for TPS operation from Environmental Agency of Banjarnegara. This TPS is located at a piece of land adjacent to existing farmland. It is belonged to a villager and has been rental during the last 12 months. • There is record of waste received from various collecting points including existing drilling site (Pad 09), drilling pad (Pad 07 Extension), and workers accommodations at five sub villages. • Two incinerators are operated manually. No clear information regarding the management of ash, residual waste, and particulates. • An open dumping site is operated beside existing creek flowing to downstream river since the project commencement during the last 12 months.	are included: • CV Kembang Jaya is required to provide copy of permit for TPS operation from Environmental Agency of Banjarnegara Regency. • Domestic management plan is required to be included in Waste Management Plan. • The above documents are strongly suggested to be included in next CEMP implementation monthly report.
6	Hazardous waste handling and disposal	• Other oil contaminated waste (used hand gloves, spill kits, rugs or *majun*, oil filters) are included in hazardous waste manifest. • There is no waste bin for electronic wastes (i.e. battery)	Contractor (PRA) shall provide waste records for the entire waste management within the well pad and associated facility to track wastes (including electronic wastes) flows during the last several months (PPLI to advise where the unrecordable wastes have been disposed). The updated progress needs to be reported in the next CEMP implementation monthly report.
7	Hazardous waste storage	• There are 3 (three) drums containing used oil without its symbols. The date of receiving is not clearly visible. • There is a broken lining in the middle of waste storage.	Corrective actions recommended during previous inspection are not properly implemented yet. Those are included: • The date of receiving should be clearly visible for identifying the waste holding period according to the applicable waste management regulation.

No	Description	Findings	Corrective Action
			• The updated progress needs to be reported the in next CEMP implementation monthly report.
	Others		
1	Worker condition	• Currently, the total on duty workers are 159 (154 males, 5 females) • Day shift is 78 and night shift is 81 • ± 63 workers are residents from surrounding villages	• All workers need to be regularly reminded on relevant Gender Actions Plans and the consequences of non-compliance • All local workers need to be reminded on work agreement including termination section.
2	Pad facility	• There is no pedestrian path within drilling site due to limited area of Pad 07. • There is no dedicated toilet for woman. • The electrical generator for mini camp was placed at entrance area without lining and some oil spills were observed under this equipment. • The existing drainage at the perimeter of pad is not well designed. It has led to surface water pollution issue since drilling liquid flow to existing stream (outside the well pad) connected to Sidolok River, instead of wastewater pond. Ideally, all water flows are channeled to wastewater pond and no open channel to outside of well pad. The current mitigation measures are blocking the open channel towards existing stream and monitoring the surface water in the channel. Water suction using PPLI's wastewater truck and water suction pump is undertaken whenever potential overflow was observed. However, leaking of drilling liquids are observed at several places within the channel and end of open channel which has been blocked. A non-permanent small settling water pond (0.5x0.5x0,5 m) was made and water suction using PPLI's wastewater truck and water suction pump is undertaken as temporary mitigation measures.	• All local workers need to be reminded on specific places with high potential hazards. All visitors need to have sufficient information on drilling site and specific places with high potential hazards. All visitors should be accompanied by HSE officer on duty during their visit in rig site. • Contractor (PRA) shall provide a toilet specifically designated for women. • Contractor (PRA) shall provide proper lining under the electrical generator to avoid soil and ground water pollution. Also, the existing contaminated soils under the generator shall be collected and send to PPLI's temporary hazardous waste storage. • Concerning to the upcoming high rainfalls during the

No	Description	Findings	Corrective Action
			peak of wet season, Contractor (PRA) shall provide permanent solution to improve the drainage at the perimeter of well pad as soon as possible. Technical inputs might be requested to PMU/PMC Civil Engineering Team.
3	Others	Relevant photographs are provided separately as part inspection results.	

Appendix 2 Environmental Quality Monitoring Results

Appendix 2 Environmental Quality Monitoring Results – A. Dieng 2 Sub Project

Figure 1 Sampling Location of Air Quality, Noise and Vibration

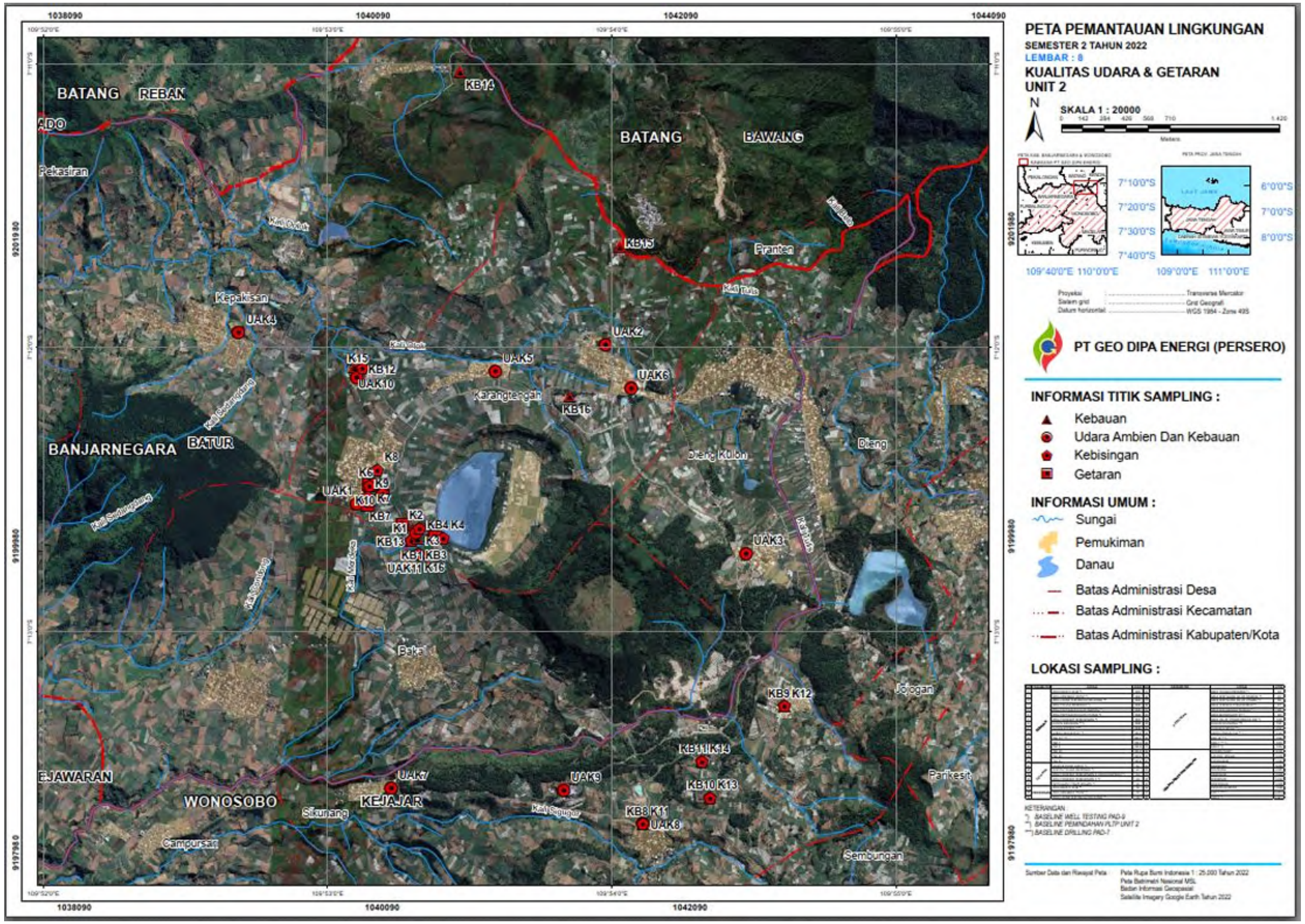
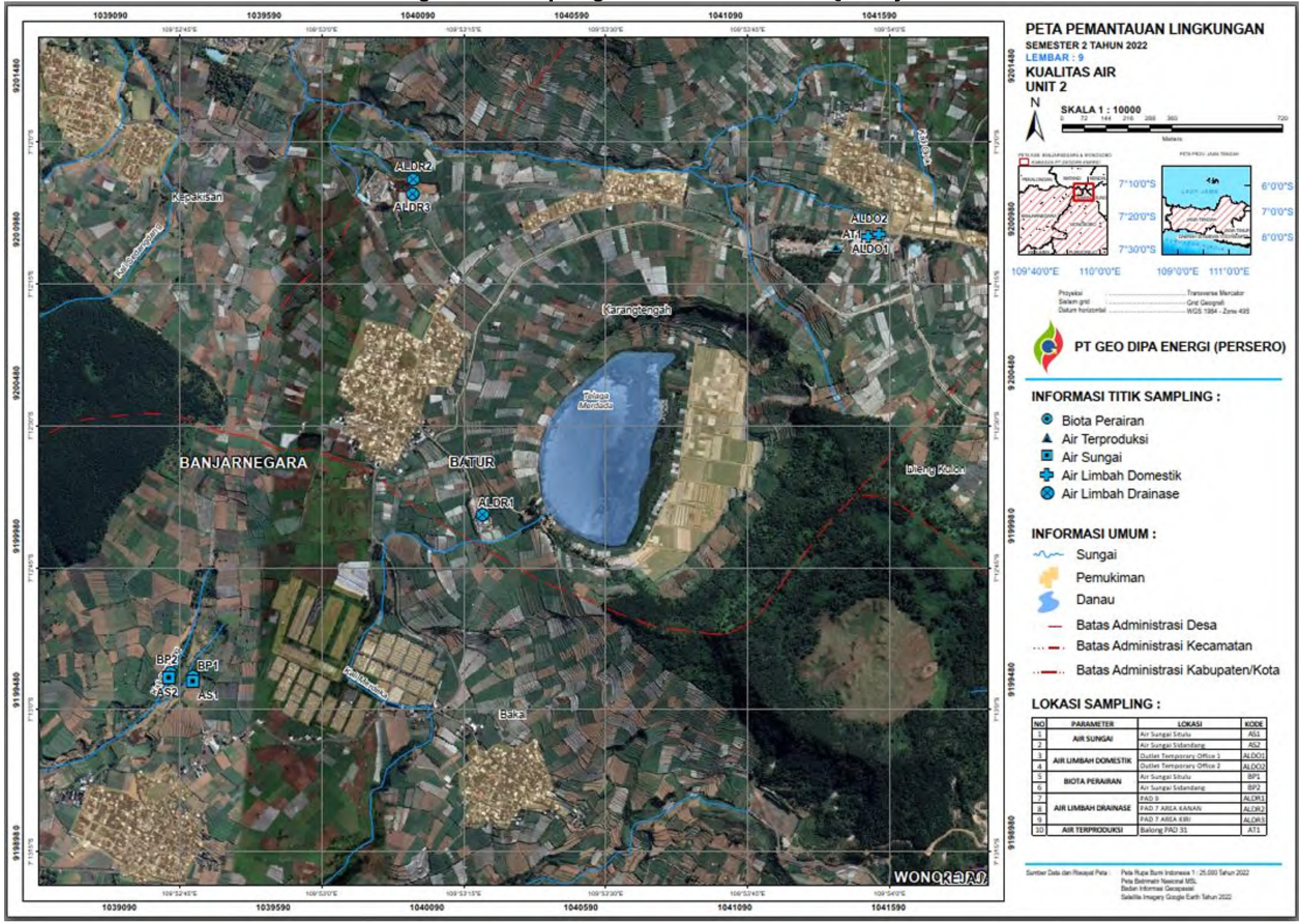


Figure 2 Sampling Location of Water Quality



PT Geo Dipa Energi (Persero)

AIR SUNGAI

1. Ambient Air Quality Monitoring Result

Ambien Air Quality Quarterly Monitoring Description

Period	Quarterly
Regulation Standar	Government Regulation of the Republic of Indonesia Number 22 of 2021 Appendix VII
Monitoring Location	AQ-1 Well Pad 7 AQ-2 Well Pad 9

Table 1 Results of Ambient Air Quality Analysis for the Third Quarter of 2022

Parameter	Unit	Result		Threshold Limit	WHO Guideline	Method
		AQ-1	AQ-2			
Sulfur Dioxide (SO2)	µg/Nm^3	< 26	< 26	**150**	20	SNI 19-7119.7-2017
Carbon Monoxide (CO)	µg/Nm^3	< 1146	< 1146	**10.000**	-	PO/AKL/46
Nitrogen Dioxide (NO2)	µg/Nm^3	12,1	10,6	**200**	200	SNI 19-7119.2-2017
Oksidan (O3)	µg/Nm^3	11,6	9,6	**150**	100	SNI 19-7119.8-2017
Hidrocarbon (HC)	µg/Nm^3	< 20	< 20	**160**	-	MASA 3rd Ed. 198 P (Sect. II Part 101)
Particle (PM 10)	µg/Nm^3	38,2	31,4	**75**	50	SNI 19-7119.15-2016
Particle (PM 2.5)	µg/Nm^3	16,1	14,6	**55**	25	SNI 19-7119.14-2016
Total Suspended Particulate (TSP)	µg/Nm^3	95,1	94,2	**230**	-	SNI 19-7119.3-2017
Lead (Pb)	µg/Nm^3	< 0,040	< 0,040	**2**	-	SNI 19-7119.4-2017
Ammonia (NH_3)	ppm	0,051	0,052	**2**	-	SNI 19-7119.1-2005
Hydrogen Sulfide (H_2S)	ppm	< 0,008	< 0,008	**0,02**	-	SNI 19-4844-1998

Source: Laboratory Analysis Result PT. Sucofindo 2022

Table 2 Results of Ambient Air Quality Analysis for the Fourth Quarter of 2022

Parameter	Unit	Result		Threshold Limit	WHO Guideline	Method
		AQ-1	AQ-2			
Sulfur Dioksida (SO2)	µg/Nm^3	< 26	< 26	**150**	20	SNI 19-7119.7-2017
Karbon Monoksida (CO)	µg/Nm^3	< 1146	< 1146	**10.000**	-	PO/AKL/46
Nitrogen Dioksida (NO2)	µg/Nm^3	12,1	10,6	**200**	200	SNI 19-7119.2-2017
Oksidan (O3)	µg/Nm^3	11,6	9,6	**150**	100	SNI 19-7119.8-2017
Hidrokarbon (HC)	µg/Nm^3	< 20	< 20	**160**	-	MASA 3rd Ed. 198 P (Sect. II Part 101)
Partikel (PM 10)	µg/Nm^3	38,2	31,4	**75**	50	SNI 19-7119.15-2016
Partikel (PM 2.5)	µg/Nm^3	16,1	14,6	**55**	25	SNI 19-7119.14-2016
Partikel Tersuspensi (TSP)	µg/Nm^3	95,1	94,2	**230**	-	SNI 19-7119.3-2017
Timbal Hitam (Pb)	µg/Nm^3	< 0,040	< 0,040	**2**	-	SNI 19-7119.4-2017
Amoniak (NH_3)	ppm	0,051	0,052	**2**	-	SNI 19-7119.1-2005
Hidrogen Sulfida (H_2S)	ppm	< 0,008	< 0,008	**0,02**	-	SNI 19-4844-1998

Source: Laboratory Analysis Result PT. Sucofindo 2022

Ambien Air Quality Semesterly Monitoring Description

Period	Semester 2, 2022
Threshold Limit	- Government Regulation of the Republic of Indonesia Number 22 of 2021 Appendix VII - Ministry of Environment Decree No. Kep.50/MENLH/11/1996 Tanggal 25/1996 (Odor)
Monitoring Location	1 AQ-1 Ngandam Village 2 AQ-2 Pawuhan Village 3 AQ-3 Karangsari (Dieng Kulon) Village 4 AQ-4 Karang Tengah Village 5 AQ-5 Kepakisan Village 6 AQ-6 Simpangan Village 7 AQ-7 Sikunang Village 8 AQ-8 Production Office 9 AQ-9 Power Plant

Table 3 Ambient Air Quality Monitoring Results for the Second Semester of 2022

Parameter	Unit	Result									Threshold Limit	Method
		AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	AQ-7	AQ-8	AQ-9		
Sulfur Dioxide (SO2)	µg/Nm^3	< 26	< 26	< 26	< 26	< 26	< 26	< 26	< 26	< 26	**150**	SNI 19-7119.7-2017
Carbon Monoxide (CO)	µg/Nm^3	< 1146	< 1146	< 1146	< 1146	< 1146	< 1146	< 1146	< 1146	< 1146	**10.000**	PO/AKL/46
Nitrogen Dioxide (NO2)	µg/Nm^3	17,3	19,2	17,2	17,3	15,3	16,8	18,3	18,2	16,7	**200**	SNI 19-7119.2-2017
Oksidan (O3)	µg/Nm^3	12,3	14,6	11,5	12,4	11,3	12,5	13,1	13,8	11,4	**150**	SNI 19-7119.8-2017
Hidrocarbon (HC)	µg/Nm^3	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	**160**	MASA 3rd Ed. 198 P (Sect. II Part 101)
Particle (PM 10)	µg/Nm^3	28,2	51,2	24,1	27,1	40,2	26,1	26,2	43,2	29,1	**75**	SNI 19-7119.15-2016
Particle (PM 2.5)	µg/Nm^3	15,1	30,2	11,6	12,1	24,8	11,5	13,2	24,6	13,2	**55**	SNI 19-7119.14-2016
Total Suspended Particulate (TSP)	µg/Nm^3	95,2	106,7	95,5	98,6	78,6	96,7	96,1	83,2	98,7	**230**	SNI 19-7119.3-2017
Lead (Pb)	µg/Nm^3	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	< 0,040	**2**	SNI 19-7119.4-2017
Ammonia (NH_3)	ppm	< 0,045	< 0,045	< 0,045	< 0,045	< 0,045	< 0,045	< 0,045	< 0,045	< 0,045	**2**	SNI 19-7119.1-2005
Hydrogen Sulfide (H_2S)	ppm	< 0,008	< 0,008	< 0,008	< 0,008	< 0,008	< 0,008	< 0,008	< 0,008	0,01	**0,02**	SNI 19-4844-1998

Source: Laboratory Analysis Result PT. Sucofindo 2022

The results of ambient air quality measurements taken in the third and fourth quarters of 2022, in compliance with the environmental quality standards set by the Government Regulation of the Republic of Indonesia Number 22 of 2021 Appendix VII and the WHO Ambient Air Quality Guidelines, indicate that all test parameters (particularly PM10 and PM2.5, the key parameters) were within the established limits, with no monitoring locations exceeding the standards.

2. Noise Monitoring Result

Noise Measurement Description

Period	Quarterly
Threshold Limit	Decree of the Minister of the Environment No. 48 Year 1996 WHO Guidelines
Monitoring Location	1 Well Pad 7 2 Well Pad 9
Remarks	Ls: Measurement at intervals of 06.00 – 22.00 Lm: Measurements at intervals of 22.00 – 06.00 Lsm: Measurement during 24-hour activity

Table 4 Results of Noise Measurement for the Third Quarter of 2022

No.	Location	Unit	Q III			Q IV			Treshold Value	WHO Guidelines		Methods
			Ls	Lm	Lsm	Ls	Lm	Lsm		Day Time	Evening Time	
1	Location of Drill Pad 7	dBA	59,6	40,6	57,9	59,8	45,6	58,3	58	55	45	SNI 8427:2017
2	Pad 9 Well Test Area	dBA	55.5	39.5	53,9	56,8	40,2	55,2	58	55	45	SNI 8427:2017

Source: Sucofindo Laboratory, 2022

Information

- *Ls : Measurement at an interval of 06.00 – 22.00*
- *Lm : Measurement at an interval of 22.00 – 06.00*
- *Lsm : Measurement during 24 hour activity*

The noise level measurements conducted in the third and fourth quarters of 2022 were found to be below the threshold value set by the Decree of the Minister of Environment No. 48 of 1996. However, the measurements taken during the daytime or 'Ls' at the Pad 7 drill and Pad 9 well test locations slightly exceeded the standards of the WHO Noise Level Guidelines. This could be attributed to the full activity of workers and equipment, particularly in the project area.

Noise Measurement Description

Period	2nd Semester 2022		
Threshold Limit	Decree of the Minister of the Environment No. 48 Year 1996		
Monitoring Location	1	AQ-1	Ngandam Village
	2	AQ-2	Pawuhan Village
	3	AQ-3	Karangsari (Dieng Kulon) Village
	4	AQ-4	Karang Tengah Village
	5	AQ-5	Kepakisan Village
	6	AQ-6	Simpangan Village
	7	AQ-7	Sikunang Village
	8	AQ-8	Production Office
	9	AQ-9	Power Plant

Table 6 Noise Measurement for Second Semester 2022

No.	Location	Unit	Q1			Q II			Threshold Limit (L_{SM})	IFC Guidelines		Methods
			Ls	Lm	Lsm	Ls	Lm	Lsm		Day Time	Night Time	
1	Ngandam Village	dBA	55,5	37,5	53,8	47,5	38,5	55,5	55	55	45	PO/AKL/60
2	Pawuhan Village	dBA	48,5	38,5	49,2	48,5	37,5	48,5	55	55	45	PO/AKL/60
3	Karangsari (Dieng Kulon) Village	dBA	54,2	38,7	52,6	48,5	36,7	54,2	55	55	45	PO/AKL/60
4	Karang Tengah Village	dBA	54,5	37,5	52,9	53,5	36,7	54,5	55	55	45	PO/AKL/60
5	Kepakisan Village	dBA	53,2	37,6	51,6	49,6	37,2	53,2	55	55	45	PO/AKL/60
6	Simpangan Village	dBA	51,5	37,5	50,0	49,2	36,7	51,5	55	55	45	PO/AKL/60
7	Sikunang Villagge	dBA	55,5	36,8	53,8	50,6	36,0	55,5	55	55	45	PO/AKL/60
8	Production Office	dBA	53,7	39,6	52,1	48,7	38,4	53,7	70	70	70	PO/AKL/60
9	Power Plant Unit 1	dBA	55,6	40,7	53,9	58,6	40,4	55,6	70	70	70	PO/AKL/60

Source: Laboratory Analysis Result PT. Sucofindo 2022

Based on the Kep. MENLH Kep.48/MENLH/11/1996 regulations regarding noise level standards, the 24-hour noise level measurements (LSM) conducted during the second semester of 2022 indicated that all monitoring locations had noise levels below the threshold value. These results demonstrate that the activities of PT Geo Dipa Energi (Persero) Dieng Unit 1 related to noise levels have remained within safe limits for both the workers and the community residing in the area.

3. Surface Water Monitoring

Monitoring Description

Periode	Quarterly
Threshold Limit	Appendix VI. Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management, Water Class II
Monitoring Location	1. Sidandang River — One sampling location 2. Situlu River — One sampling location 3. Tulis River — Upstream & downstream 4. Putih River (Sikunang) — Upstream & downstream 5. Sidolog River — Upstream & downstream

Table 7 Results of Situlu and Sidandang River Quality Analysis for the Third Quarter of 2022

Parameter	Unit	Result		Threshold Limit	Method*
		Situlu	Sidandang		
Physics					
Temperature	°C	18	18	Normal ± 3	2550 B
Dissolved solid	mg/L	255	205	1000	2540 C
Suspended solid	mg/L	5	4	50	2540 D
Organic Chemistry					
pH at Lab	-	7,7	7,7	6 – 9	4500-H^+-B
BOD 5 days 20 °C *	mg/L	< 0,5	< 0,5	3	5210 B
COD - $K_2Cr_2O_7$	mg/L	< 2,5	< 2,5	25	PO/LK/05 (Titrimetric)
Dissolved Oxygen at Lab	mg/L	7,4	7,5	4	4500-O-G
Total Phosphate as P	mg/L	< 0,010	< 0,010	0.2	4500-P-D
Nitrate as N	mg/L	**14,05**	**17,52**	10	4500-NO_3-E
Ammonia as NH3	mg/L	0,55	0,07	-	4500-NH_3-F
Dissolved Arsenic	mg/L	< 0,002	< 0,002	1	3114 C
Cobalt	mg/L	< 0,002	< 0,002	0.2	3120 B, 3030 E

Parameter	Unit	Result		Threshold Limit	Method*
Barium	mg/L	< 0,010	< 0,010	-	3120 B, 3030 E
Boron	mg/L	< 0,220	< 0,220	1	3120 B, 3030 E
Selenium	mg/L	< 0,002	< 0,002	0.05	3114 C
Cadmium	mg/L	< 0,0001	< 0,0001	0.01	3120 B, 3030 E
Chromium Hexavalent	mg/L	< 0,016	< 0,016	0.05	3500-Cr-B
Copper	mg/L	< 0,015	< 0,015	0.02	3120 B, 3030 E
Iron	mg/L	0,1	0,5	-	3120 B, 3030 E
Lead	mg/L	< 0,002	< 0,002	0.03	3120 B, 3030 E
Mangan	mg/L	< 0,030	< 0,030	-	3120 B, 3030 E
Mercury	mg/L	< 0,0005	< 0,0005	0.002	3112-B
Zinc	mg/L	0,04	0,08	0.05	3120 B, 3030 E
Chloride	mg/L	43,2	19,6	-	4500-Cl^-D
Cyanide	mg/L	< 0,040	< 0,040	0.02	4500-CN-E
Flouride	mg/L	< 0,080	< 0,080	1.5	4500-F-D
Nitrite as N	mg/L	0,04	0,013	0.06	4500-NO_2^-B
Sulfate	mg/L	8,94	5,78	-	SNI 06-6989.20:2009
Free Chlorin at Lab	mg/L	< 0,050	< 0,050	0.03	4500-Cl^-G
Sulphur - H_2S	mg/L	< 0,020	< 0,020	0.002	SNI 06-6989.70:2009
Microbiology					
Faecal Coliform	per 100 mL	10	10	1000	9222 D
Total Coliform	per 100 mL	350	350	5000	9222 B
Organic Chemistry					
Oil & Grease	mg/L	< 2,5	< 2,5	1000	5520 C
Surfactant Anionic as MBAS	mg/L	0,04	0,03	0,2	5540 C
Phenolic compound	mg/L	< 0,02	< 0,02	1	5530 C

*) *Standard methods 23rd edition 2017,APHA-AWWA-WEF*

Source: Laboratory Analysis Result PT. Sucofindo 2022

Exceed the limit

The nitrate parameter that exceeds the quality standard in both rivers is estimated to be due to the influence of fertilization used by local farmers

Table 8 Results of Situlu and Sidandang River Quality Analysis for the Fourth Quarter of 2022

Parameter	Unit	Result		Threshold Limit	Method •)
		Situlu	Sidandang		
Physics					
Temperature	°C	18	18	Normal ± 3	2550 B
Dissolved solid	mg/L	236	193	1000	2540 C
Suspended solid	mg/L	5	4	50	2540 D
Organic Chemistry					
pH at Lab	-	7,6	7,6	6 – 9	4500-H^+-B
BOD 5 days 20 °C *	mg/L	< 0,5	< 0,5	3	5210 B
COD - $K_2Cr_2O_7$	mg/L	< 2,5	< 2,5	25	PO/LK/05 (Titrimetric)
Dissolved Oxygen at Lab	mg/L	7,4	7,4	4	4500-O-G
Total Phosphate as P	mg/L	< 0,010	0,04	0.2	4500-P-D
Nitrate as N	mg/L	**21**	**21**	10	4500-NO_3-E
Ammonia as NH3	mg/L	< 0,036	< 0,036	-	4500-NH_3-F
Dissolved Arsenic	mg/L	< 0,002	< 0,002	1	3114 C
Cobalt	mg/L	< 0,002	< 0,002	0.2	3120 B, 3030 E
Barium	mg/L	< 0,010	< 0,010	-	3120 B, 3030 E
Boron	mg/L	< 0,220	< 0,220	1	3120 B, 3030 E
Selenium	mg/L	< 0,002	< 0,002	0.05	3114 C
Cadmium	mg/L	< 0,0001	< 0,0001	0.01	3120 B, 3030 E
Chromium Hexavalent	mg/L	< 0,016	< 0,016	0.05	3500-Cr-B
Copper	mg/L	< 0,015	< 0,015	0.02	3120 B, 3030 E

Parameter	Unit	Result		Threshold Limit	Method •)
Iron	mg/L	0,2	0,3	-	3120 B, 3030 E
Lead	mg/L	< 0,002	< 0,002	0.03	3120 B, 3030 E
Mangan	mg/L	< 0,030	< 0,030	-	3120 B, 3030 E
Mercury	mg/L	< 0,0005	< 0,0005	0.002	3112-B
Zinc	mg/L	**0,1**	**0,3**	0.05	3120 B, 3030 E
Chloride	mg/L	35,1	19,6	-	4500-Cl^-D
Cyanide	mg/L	< 0,040	< 0,040	0.02	4500-CN-E
Flouride	mg/L	< 0,080	< 0,080	1.5	4500-F-D
Nitrite as N	mg/L	0,004	0,02	0.06	4500-NO_2^-B
Sulfate	mg/L	6,70	5,04	-	SNI 06-6989.20:2009
Free Chlorin at Lab	mg/L	< 0,050	< 0,050	0.03	4500-Cl^-G
Sulphur - H_2S	mg/L	< 0,020	< 0,020	0.002	SNI 06-6989.70:2009
Microbiology					
Faecal Coliform	per 100 mL	120	100	1000	9222 D
Total Coliform	per 100 mL	280	1000	5000	9222 B
Organic Chemistry					
Oil & Grease	mg/L	< 2,5	< 2,5	1000	5520 C
Surfactant Anionic as MBAS	mg/L	0,02	0,014	0,2	5540 C
Phenolic compound	mg/L	< 0,02	< 0,02	1	5530 C

**) Standard methods 23rd edition 2017,APHA-AWWA-WEF*
Source: Laboratory Analysis Result PT. Sucofindo 2022

Exceed the limit

As with the previous quarter's monitoring results, the nitrate parameter in both rivers continues to exceed the threshold value. Additionally, the Zinc parameter has also exceeded the threshold value, which is assumed to be due to the influence of pesticides used by local farmers.

Tulis River

The results of laboratory analysis of surface water quality parameters for the third quarter of 2022 located at the upstream monitoring point of the Tulis River can be seen in the following table.

Table 9 Results of Laboratory Analysis of Surface Water Samples in *Upstream* Tulis River Quarter III Year 2022

Parameter	Unit	Result	Water Quality Standard Class II	METHOD
PHYSICS:				
Temperature	^0C	20	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	171	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	8	50	SNI 06-6989.3-2019
INORGANIC CHEMISTRY:				
pH	-	7,6	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	4,9	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	**0,4**	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	8,45	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	1,85	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005

Parameter	Unit	Result	Water Quality Standard	METHOD
			Class II	
PHYSICS:				
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	< 0.030	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,07**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	10,6	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	< 0.080	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	16.2	300	SNI 06-6989.20-2019
Khlorin Free	mg/L	< 0.050	0,03	4500 -Cl G#)
Sulfur sebagai H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent s sebagai MBAS	mg/L	0,13	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	MPN/100 ml	110	1000	BC. 9221 E#)
Total Coliform	MPN/100 ml	150	5000	BC. 9221 B#)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the third quarter of 2022 located at the downstream monitoring point of Tulis River can be seen in the following table.

Table 10 Results of Laboratory Analysis of Surface Water Samples in Downstream of Tulis River Quarter III Year 2022

Parameter	Unit	Result	Water Quality Standard	METHOD
			Class II	
PHYSICS:				
Temperature	^0C	19	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	182	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	9	50	SNI 06-6989.3-2019
INORGANIC CHEMISTRY :				
pH	-	7,6	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	5,7	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	**1,1**	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	1,91	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	0,5	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,3	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	< 0.035	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	14,5	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	**0,97**	0,06	SNI 06-6989.9-2004

Parameter	Unit	Result	Water Quality Standard	METHOD
			Class II	
PHYSICS:				
Sulphate (SO_4)	mg/L	26,8	300	SNI 06-6989.20-2019
Khlorin Free	mg/L	< 0.050	0,03	4500 -Cl G#)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,034	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	MPN/100 ml	110	1000	BC. 9221 E#)
Total Coliform	MPN/100 ml	150	5000	BC. 9221 B#)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the fourth quarter of 2022 located at the upstream monitoring point of the Tulis River can be seen in the following table.

Table 11 Results of Laboratory Analysis of Surface Water Samples in *Upstream* Tulis River Quarter IV Year 2022

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^0C	20	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	158	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	7	50	SNI 06-6989.3-2019
Color	Pt-Co Unit	3,2	50	SNI 06-6989,80-2011
Garbage	Nil	Nil	Nil	
INORGANIC CHEMISTRY				
Ph	-	7.4	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
DO	mg/L	6,2	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	0,1	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	**11**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	0,14	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,08	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	< 0.035	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	9,79	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	**0,25**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	11,1	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G #)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,04	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	540	1000	9222 D #)
Total Coliform	Mml/100 ml	540	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the fourth quarter of 2022 located at the downstream monitoring point of Sungai Tulis can be seen in the following table:

Table 12 Results of Laboratory Analysis of Surface Water Samples Downstream of Tulis River Quarter IV Year 2022

Parameter	Unit	Result	Water Quality Criteria by Class	Method
			Class II	
PHYSICS				
Temperature	^{0}C	19	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	164	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	6	50	SNI 06-6989.3-2019
Color	Pt-Co Unit	21,1	50	SNI 06-6989,80-2011
Garbage	Nil	Nil	Nil	
INORGANIC CHEMISTRY				
pH	-	7.5	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	8,0	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	0,1	0,2	SNI 06-6989.31-2005

Parameter	Unit	Result	Water Quality Criteria by Class	Method
			Class II	
PHYSICS				
Nitrate (NO. 3-N)	mg/L	6.91	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	0.56	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	1,3	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	0,09	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	0,05	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	11	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.80	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	**0,35**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	34,5	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G$^{\#)}$
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,032	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004

Parameter	Unit	Result	Water Quality Criteria by Class	Method
			Class II	
PHYSICS				
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	540	1000	9222 D #)
Total Coliform	Mml/100 ml	540	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

From the results of the laboratory analysis above, based on the monitoring of the water quality of the Tulis River in the period of Quarters III and IV of 2022, in accordance with Government Regulation No. 22 of 2021 concerning Implementation of Environmental Management and Protection shows relatively good results in the Upstream and Downstream parts of the river. In the Upper Deaf River there are several Inorganic Chemical parameters that have not met Class II river water quality standards, some of these parameters are Total Phosphate (P) parameters of 0.4 mg / L and Dissolved Zinc amounted to 0.07 mg/L in the Third Quarter Period. Meanwhile, parameters that exceeded quality standards in the fourth quarter were nitrate (NO_3-N) of 11 mg / L and nitrite (NO_2-N) of 0.25 mg / L.

In the lower reaches of the Tulis River, there are several Inorganic Chemical parameters that have not met Class II river water quality standards in the Third Quarter Period, namely Total Phosphate (P) parameters of 1.1 mg / L and Nitrite (NO 2-N) of 0.97 mg / L, then in the fourth quarter period is the Nitrite parameter (NO 2-N) of 0.35 mg / L. Around the sampling location is residential and *homestay* areas and the dominance of community agricultural land so that there is a possibility of seepage from settlement waste around the river and residual seepage from the use of fertilizer on agricultural land.

Putih River (Sikunang)

The results of laboratory analysis of surface water quality parameters for the third quarter of 2022 located at the upstream monitoring point of the Putih River (Sikunang) can be seen in the following table.

Table 13 Results of Laboratory Analysis of Surface Water Samples in the Upstream of the Putih River (Sikunang) Quarter III of 2022

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^{0}C	18	± 3 Temperature Natural	SNI 06-6989.23-2004
Dissolved Residue (TDS)	mg/L	204	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	6	50	SNI 06-6989.3-2019
INORGANIC CHEMISTRY				

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
pH	-	7,1	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	6,8	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	0,14	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	9,34	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	0,03	0,2	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,2	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,08**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	29,8	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	**1,62**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	21,4	300	SNI 06-6989.20-2019

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G #)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,035	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	94	1000	9222 D #)
Total Coliform	Mml/100 ml	430	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the third quarter of 2022 located at the downstream monitoring point of the Putih River (Sikunang) can be seen in the following table.

Table 14 Results of Laboratory Analysis of Surface Water Samples in the Downstream Putih River (Sikunang) Quarter III of 2022

Parameter	Unit	Result	Water Quality Standard	Methode
			Class II	
PHYSICS				
Temperature	^0C	18	± 3 Temperature Natural	SNI 06-6989.23-2004
Dissolved Residue (TDS)	mg/L	206	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	5	50	SNI 06-6989.3-2019
INORGANIC CHEMISTRY				
pH	-	7,3	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	6,9	Min. 4	4500 O G #)

Parameter	Unit	Result	Water Quality Standard	Methode
			Class II	
PHYSICS				
Total Phosphate (P)	mg/L	0,1	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	**11,48**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	0,12	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	**1,7**	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,2	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,09**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	29,8	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	**0,71**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	21,4	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G[#)]
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011

Parameter	Unit	Result	Water Quality Standard	Methode
			Class II	
PHYSICS				
Detergent as MBAS	mg/L	0,023	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	63	1000	9222 D #)
Total Coliform	Mml/100 ml	170	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the fourth quarter of 2022 located at the upstream monitoring point of the Putih River (Sikunang) can be seen in the following table.

Table 15 Results of Laboratory Analysis of Surface Water Samples in the Upstream of the Putih River (Sikunang) Quarter IV of 2022

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^0C	26	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	315	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	5	50	SNI 06-6989.3-2019
Color	Pt-Co Unit	4.6	50	SNI 06-6989,80-2011
Garbage	Nil	Nil	Nil	
INORGANIC CHEMISTRY				
pH	-	7.8	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	8,2	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	0,1	0,2	SNI 06-6989.31-2005

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Nitrate (NO. 3-N)	mg/L	**10,70**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	< 0.036	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,3	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,3**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	57.1	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO_2-N)	mg/L	**0,08**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	48.0	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G#)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,025	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	920	1000	9222 D #)
Total Coliform	Mml/100 ml	1600	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the second quarter of 2022 located at the downstream monitoring point of the Putih River (Sikunang) can be seen in the following table.

Table 16 Results of Laboratory Analysis of Surface Water Samples Downstream of the Putih River (Sikunang) Quarter IV of 2022

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^{0}C	19	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	314	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	5	50	SNI 06-6989.3-2019
Color	Pt-Co Unit	5.0	50	SNI 06-6989,80-2011
Garbage	Nil	Nil	Nil	
INORGANIC CHEMISTRY				
pH	-	7.7	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	7,6	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	< 0.010	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	**11**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	< 0.036	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	< 0.0001	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,07**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	58,3	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	**0,07**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	48,9	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G#)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,030	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	430	1000	9222 D #)
Total Coliform	Mml/100 ml	430	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

From the results of the laboratory analysis above, the test results of the Putih River water quality can be conveyed as follows:

1. Period of Quarter III of 2022

Based on monitoring the water quality of the Putih River (Sikunang) in the period of Quarter III Year 2022, in accordance with Government Regulation No. 22 year 2021 concerning Implementation of Environment Management and Protection shows relatively good results in the Upstream and Downstream parts of the river. In the **upstream** of the Putih River (sikunang), the parameters of Physics, Organic Chemistry, and Microbiology have met the quality standards, in the Kimia Inorganic parameters that exceed Class II river water quality standards in the parameters Dissolved Zinc (Zn) of 0.08 mg/L and Nitrit (NO 2-N) of 1.62 mg/L.

In the downstream of the Putih River (Sikunang), the parameters of Physics, Microbiology and Organic Chemistry have met the quality standards, Inorganic chemicals parameters which exceeds the quality standards of river water Class II in the parameters Nitrate (NO_3-N) of 11.48 mg/L, Boron (B) of 1.7 mg/L, Dissolved Zinc (Zn) of 0.09 mg/L, and Nitrite (NO_2-N) of 0.71 mg/ L. It is estimated that there is seepage of residue fertilizer use on agricultural land around the sampling site.

2. Period of Quarter IV of 2022

Based on monitoring the water quality of the Putih River (Sikunang) in the period of the fourth quarter of 202 2, in accordance with Government Regulation No. 22 of 2021 concerning Implementation of Environment Management and Protection shows relatively good results in the upstream and downstream parts of the river. In the upstream of the Putih River (Sikunang), for the parameters of Physics, Organic Chemistry and Microbiology have met the quality standards, in the parameters of chemical inorganic which exceeds the quality standards of Class II river water only parameters of Nitrate (NO 3-N) of 10.7 mg/L, Dissolved Zinc (Zn) of $_{0.3}$ mg/L, and Nitrit (NO 2-N) of 0.08 mg/L .

In the downstream of the Putih River (Sikunang), for the parameters of Physics, Organic Chemistry and Microbiology have met the quality standards, the chemical inorganic parameter for parameters that exceed Class II river water quality standards is the Nitrate parameter ($NO_{3\text{-}N}$) of 11 mg/L, Dissolved Zinc (Zn) of 0.07 mg/L, and Nitrit ($NO_{2\text{-}N}$) of 0.07 mg/L. It is known that around the sampling location is residential and *homestay* areas and the dominance of community agricultural land so that there is a possibility of seepage from settlement waste around the river and seepage of residues from the use of fertilizers on agricultural land.

Sidolog River

The results of laboratory analysis of surface water quality parameters for the third quarter of 2022 located at the upstream monitoring point of the Sidolog River can be seen in the following table.

Table 17 Results of Laboratory Analysis of Surface Water Samples in Upstream Sidolog River Quarter III of 2022

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^{0}C	18	± 3 Temperature	SNI 06-6989.23-2004

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
			Natural	
Dissolved Residue (TDS)	mg/L	234	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	4	50	SNI 06-6989.3-2019
INORGANIC CHEMISTRY				
pH	-	7,5	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	7,4	Min. 4	4500 O G $^{\#)}$
Total Phosphate (P)	mg/L	< 0.010	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	9,34	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	< 0.036	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,4	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,1**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	24.5	300	SNI 06-6989.19-2009

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO_2-N)	mg/L	0,011	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	6.80	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G #)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	< 0.020	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	10	1000	9222 D #)
Total Coliform	Mml/100 ml	280	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the third quarter of 2022 located at the downstream monitoring point of the Sidolog River can be seen in the following table

Table 18 Results of Laboratory Analysis of Surface Water Samples *Downstream* of Sidolog River Quarter III of 202 2 2

Parameter	Unit	Resut	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^0C	18	± 3 Temperature Natural	SNI 06-6989.23-2004
Dissolved Residue (TDS)	mg/L	234	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	4	50	SNI 06-6989.3-2019
INORGANIC CHEMISTRY				

Parameter	Unit	Resut	Water Quality Standard	Method
			Class II	
PHYSICS				
pH	-	7,4	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	7,6	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	< 0.010	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	**13,56**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	0,023	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	0,6	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,5	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,09**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	6 0.8	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO_2-N)	mg/L	**0,65**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	20,4	300	SNI 06-6989.20-2019

Parameter	Unit	Resut	Water Quality Standard Class II	Method
PHYSICS				
Khlorin Free	mg/L	< 0.050	0,03	4500 -Cl G#)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,04	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	10	1000	9222 D #)
Total Coliform	Mml/100 ml	220	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the fourth quarter of 2022 located at the upstream monitoring point of the Sidolog River can be seen in the following table.

Table 19 Results of Laboratory Analysis of Surface Water Samples in the Upstream of *the* Sidolog River Quarter IV of 2022

Parameter	Unit	Result	Water Quality Standard Class II	Method
PHYSICS				
Temperature	^0C	19	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	236	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	4	50	SNI 06-6989.3-2019
Color	Pt-Co Unit	3,6	50	SNI 06-6989,80-2011
Garbage	Nil	Nil	Nil	
INORGANIC CHEMISTRY				
pH	-	7.4	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	7.2	Min. 4	4500 O G #)
Total Phosphate (P)	mg/L	0,1	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	**15**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	< 0.036	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	0,05	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	0,04	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	24,1	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite (NO2-N)	mg/L	0,03	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	5,70	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G#)
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
ORGANIC CHEMISTRY				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,022	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	170	1000	9222 D #)
Total Coliform	Mml/100 ml	430	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

The results of laboratory analysis of surface water quality parameters for the fourth quarter of 2022 located at the downstream monitoring point of the Sidolog River can be seen in the following table.

Table 20 Results of Laboratory Analysis of Surface Water Samples Downstream of Sidolog River Quarter IV of 2022

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Temperature	^0C	19	± 3 Temperature Natural	SNI 06-6989.23-2005
Dissolved Residue (TDS)	mg/L	308	1000	SNI 06-6989.27-2005
Suspended Residue (TSS)	mg/L	9	50	SNI 06-6989.3-2019
Color	Pt-Co Unit	5,9	50	SNI 06-6989,80-2011
Garbage	Nil	Nil	Nil	
INORGANIC CHEMISTRY				
pH	-	7.6	6 - 9	SNI 06-6989. 11-2019
BOD_5	mg/L	< 0.5	3	SNI 06-6989. 72-2009
COD	mg/L	< 2.5	25	SNI 6989.2-2019
DO	mg/L	6.6	Min. 4	4500 O G #)

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Total Phosphate (P)	mg/L	0,1	0,2	SNI 06-6989.31-2005
Nitrate (NO. 3-N)	mg/L	**21**	10	SNI 06-6989.79-2011
Ammonia (NH 3-N)	mg/L	< 0.036	(-)	SNI 06-6989.30-2005
Dissolved arsenic (As)	mg/L	< 0.002	0,05	SNI 06-6989.81-2018
Cobalt (Co) dissolved	mg/L	< 0.002	0,2	SNI 6989.68-2009
Dissolved barium (Ba)	mg/L	< 0.010	(-)	SNI 06-6989.39-2005
Boron (B) dissolved	mg/L	< 0.220	1	SNI 06-2481-1991
Dissolved selenium (Se)	mg/L	< 0.002	0,01	SNI 06-6989.83-2018
Dissolved cadmium (Cd)	mg/L	< 0.0001	0,01	SNI 06-6989.38-2005
Valence chromium 6 (Cr^{6+}) dissolved	mg/L	< 0.016	0,05	SNI 06-6989.71-2009
Dissolved copper (Cu)	mg/L	< 0.015	0,02	SNI 06-6989.84-2019
Dissolved iron (Fe)	mg/L	1,3	(-)	SNI 06-6989. 84-2019
Dissolved lead (Pb)	mg/L	< 0.002	0,03	SNI 06-6989.46-2009
Dissolved manganese (Mn)	mg/L	< 0.030	(-)	SNI 06-6989.84-2019
Dissolved mercury (Hg)	mg/L	< 0.0005	0,002	SNI 6989.78-2019
Dissolved zinc (Zn)	mg/L	**0,07**	0,05	SNI 06-6989. 84-2019
Chloride (Cl^-)	mg/L	55,1	300	SNI 06-6989.19-2009
Cyanide (CN)	mg/L	< 0.040	0,02	SNI 06-6989.77-2011
Fluoride (F)	mg/L	< 0.080	1,5	SNI.06-6989.29 -2005
Nitrite ($_{NO2-N}$)	mg/L	**0,25**	0,06	SNI 06-6989.9-2004
Sulphate (SO_4)	mg/L	24,5	300	SNI 06-6989.20-2019
Chlorin Free	mg/L	< 0.050	0,03	4500 -Cl G$^{\#)}$
Sulfur as H_2S	mg/L	< 0.020	0,002	SNI 06-6989.70-2009
ORGANIC CHEMISTRY				

Parameter	Unit	Result	Water Quality Standard	Method
			Class II	
PHYSICS				
Oils &; Fats	mg/L	< 2.5	1	SNI 06-6989.10-2011
Detergent as MBAS	mg/L	0,031	0,2	SNI 06-6989.51-2005
Phenol	mg/L	< 0.02	0,005	SNI 06-6989.21-2004
MICROBIOLOGY				
Fecal Coliform	Mml/100 ml	**1600**	1000	9222 D #)
Total Coliform	Mml/100 ml	1600	5000	9222 B #)

Source : Results of Laboratory Analysis of PT Sucofindo, 2022

From the results of the laboratory analysis above, the test results of the Sidolog river water quality can be conveyed as follows:

1. Period of Quarter III of 2022

Based on monitoring the water quality of the Sidolog River in the period of Quarter II I of 202 2, in accordance with Government Regulation No. **22** of 20**2**1 concerning Implementation of Environment Management and Protection showed relatively good results in the upstream and downstream parts of the river. In the upper reaches of the Sidolog River, the physics parameter has met the quality standard, in the chemical inorganic parameter which exceeds the Class II river water quality standard in the Dissolved Zinc (Zn) parameter of 0.1 mg / L. Organic Chemical Parameters and microbiological parameters have met Class II river water quality standards.

In the lower reaches of the Sidolog River, the parameters of Organic Physics and Chemistry have met the quality standards, in the chemical inorganic parameters that exceed the Class II river water quality standards are Nitrate parameters (NO 3-N) of 13.56 mg/L, Dissolved Zinc (Zn) of 0.09 mg/L, and Nitrit (NO 2-N) of 0.65 mg/L. Microbiological parameters have met Class II river water quality standards. It is estimated that there is residual seepage of fertilizer use on agricultural land. It is known that around the sampling location is residential and *homestay* areas and the dominance of community agricultural land so that there is a possibility of seepage from settlement waste around the river and seepage of residues from the use of fertilizers on agricultural land.

2. Period of Quarter IV of 2022

Based on monitoring the water quality of the Sidolog River in the fourth quarter of 2022, in accordance with Government Regulation No. 22 of 2021 concerning Implementation of Environmental Management and Protection shows relatively good results in the upstream and downstream parts of the river. In the upper reaches of the Sidolog River, the physics parameters have met quality standards, on inorganic chemical parameters that exceed Class II river water quality standards on the Nitrate parameter (NO 3-N) by 15 mg / L. In Organic Chemical Parameters and parameters microbiology has met Class II river water quality standards.

In the Downstream of the Sidolog River, for Physical parameters have met quality standards, inorganic chemical parameters for parameters that exceed Class II river water quality standards are Nitrate (NO 3-N) of 21 mg / L, Dissolved Zinc (Zn) of 0.07 mg/L, and Nitrite (NO 2-N) at 0.25 mg/L. The Organic Chemistry and Microbiology Parameters have met class II river water quality standards. It is estimated that there is seepage of fertilizer residue on agricultural land. This is related to the conditions around the location of the sampling point around agricultural land so that it is estimated that there is seepage of residues from fertilizer use on agricultural land.

4. Domestic Wastewater Monitoring

Monitoring Description

Period	Every Month
Threshold Limit	Regional Regulation of Central Java Province Number 5 year 2012 concerning Amendments to Central Java Provincial Regulation No. 4 of 2004 concerning changes to Wastewater Quality Standards for Business and/or Geothermal Exploration and Production activities.
Monitoring Location	1 PMU Temporary Office 1 (Front) 2 PMU Temporary Office 2 (Back)

Table 21 Results of Domestic Wastewater Analysis at PMU Temporary Office 1 (Semester II Year 2022)

Parameter	Unit	Result	Threshold Limit	Method
July				
pH	--	No data available, due to drainage channel maintenance	6 – 9	SNI 06-6989.11-2019
BOD_5	mg/l		30	SNI 06-6989. 72-2009
COD	mg/l		100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l		30	SNI 06-6989.3-2019
Oil & Grease	mg/l		5	SNI 06-6989.10-2011
Ammonia	mg/l		10	SNI 06-6989.30-2005
Total Coliform	Sum/100ml		3000	9222 B#)

Parameter	Unit	Result	Threshold Limit	Method
August				
pH	--	7,3	6 – 9	SNI 06-6989.11-2019
BOD.5	mg/l	1,39	30	SNI 06-6989. 72-2009
COD	mg/l	4,98	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	21	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	**16,3**	10	SNI 06-6989.30-2005
Total Coliform	Sum /100ml	$9x10^2$	3000	9222 B#)
September				
pH	--	6,9	6 – 9	SNI 06-6989.11-2019
BOD.5	mg/l	< 0,5	30	SNI 06-6989. 72-2009
COD	mg/l	< 2,5	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	20	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	**16**	10	SNI 06-6989.30-2005
Total Coliform	Sum /100ml	**$3,7x10^5$**	3000	9222 B#)
October				
pH	--	7,5	6 – 9	SNI 06-6989.11-2019
BOD.5	mg/l	< 0,5	30	SNI 06-6989. 72-2009
COD	mg/l	< 2,5	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	15	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	< 0,036	10	SNI 06-6989.30-2005
Total Coliform	Sum /100ml	$1x10^2$	3000	9222 B#)
November				
pH	--	6,1	6 – 9	SNI 06-6989.11-2019
BOD.5	mg/l	< 0,5	30	SNI 06-6989. 72-2009
COD	mg/l	< 2,5	100	SNI 06-6989.2-2019

Parameter	Unit	Result	Threshold Limit	Method
Total Suspended Solid (TSS)	mg/l	8	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	< 0,036	10	SNI 06-6989.30-2005
Total Coliform	Sum /100ml	$1x10^2$	3000	9222 B$^{\#)}$
December				
pH	--	6,9	6 – 9	SNI 06-6989.11-2019
BOD$_5$	mg/l	1,95	30	SNI 06-6989. 72-2009
COD	mg/l	6,96	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	4	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	0,54	10	SNI 06-6989.30-2005
Total Coliform	Sum /100ml	$1x10^2$	3000	9222 B$^{\#)}$

Source: Laboratory Analysis Result PT. Sucofindo 2022

Exceed the limit

Table 22 Results of Domestic Wastewater Analysis at PMU Temporary Office 2 (Semester II Year 2022)

Parameter	Unit	Result	Threshold Limit	Method
July				
pH	--	No data available, due to drainage channel maintenance	6 – 9	SNI 06-6989.11-2019
BOD$_5$	mg/l		30	SNI 06-6989. 72-2009
COD	mg/l		100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l		30	SNI 06-6989.3-2019
Oil & Grease	mg/l		5	SNI 06-6989.10-2011
Ammonia	mg/l		10	SNI 06-6989.30-2005
Total Coliform	Jumlah /100ml		3000	9222 B$^{\#)}$
August				
pH	--	7,1	6 – 9	SNI 06-6989.11-2019
BOD$_5$	mg/l	1,34	30	SNI 06-6989. 72-2009

Parameter	Unit	Result	Threshold Limit	Method
COD	mg/l	4,80	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	5	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	6,85	10	SNI 06-6989.30-2005
Total Coliform	Jumlah /100ml	**$4x10^4$**	3000	9222 B[#)]
September				
pH	--	7,4	6 – 9	SNI 06-6989.11-2019
$BOD._5$	mg/l	< 0,5	30	SNI 06-6989. 72-2009
COD	mg/l	< 2,5	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	14	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	< 0,036	10	SNI 06-6989.30-2005
Total Coliform	Jumlah /100ml	**$1,0x10^4$**	3000	9222 B[#)]
October				
pH	--	7,2	6 – 9	SNI 06-6989.11-2019
$BOD._5$	mg/l	< 0,5	30	SNI 06-6989. 72-2009
COD	mg/l	< 2,5	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	12	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	< 0,036	10	SNI 06-6989.30-2005
Total Coliform	Jumlah /100ml	$1x10^2$	3000	9222 B[#)]
November				
pH	--	6,9	6 – 9	SNI 06-6989.11-2019
$BOD._5$	mg/l	< 0,5	30	SNI 06-6989. 72-2009
COD	mg/l	< 2,5	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	7	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011

Parameter	Unit	Result	Threshold Limit	Method
Ammonia	mg/l	2,67	10	SNI 06-6989.30-2005
Total Coliform	Jumlah /100ml	$1x10^2$	3000	9222 B#)
December				
pH	--	6,7	6 – 9	SNI 06-6989.11-2019
$BOD._5$	mg/l	1,97	30	SNI 06-6989. 72-2009
COD	mg/l	7,02	100	SNI 06-6989.2-2019
Total Suspended Solid (TSS)	mg/l	4	30	SNI 06-6989.3-2019
Oil & Grease	mg/l	< 2,5	5	SNI 06-6989.10-2011
Ammonia	mg/l	1,65	10	SNI 06-6989.30-2005
Total Coliform	Jumlah /100ml	$1x10^2$	3000	9222 B#)

Source: Laboratory Analysis Result PT. Sucofindo 2022

	Exceed the limit

High levels of ammonia and total coliform are an indication of the influence of sewage from toilets

5. Produced Water Monitoring

Monitoring Description

Periode	Semesterly
Threshold Limit	Regional Regulation of Central Java Province Number 5 th. 2012 concerning Amendments to Central Java Provincial Regulation No. 4 of 2004 concerning changes to Wastewater Quality Standards for Business and/or Geothermal Exploration and Production activities.
Monitoring Location	Pond PAD 31

Table 23 Results of Laboratory Analysis of Produced Water Samples for the Second Semester of 2022

Parameter	Unit	Result	Threshold Limit	Method
		Pond PAD 31		
Sulphide (as H_2S)	mg/L	< 0,020	1	SNI 06-6989. 70-2009
Ammonia (as NH_3-N)	mg/L	**15,5**	10	SNI 06-6989.30-2005
Mercury (Hg)	mg/L	< 0,0005	0.005	SNI 06-6989.78-2019
Arsenic (As)	mg/L	< 0,002	0.5	SNI 06-6989.81-2018
Temperature (on site)	^oC	20	45	SNI 06-6989.23-2005
pH (on site)	-	7,1	6.0 – 9.0	SNI 06-6989.11-2019

Source: Laboratory Analysis Result PT. Sucofindo 2022

	Exceed the limit

The high ammonia concentration is suspected to originate from the brine water that is mixed in the pond.

6. Odor (H2S) Monitoring

Monitoring Description

Period	Quarterly
Threshold Limit	Decree of the Minister of the Environment No: Kep. 50/MENLH/11/1996, November 25, 1996 (Odor)
Monitoring Location	1 Pad 7 2 Pad 9 3 Pad 10 4 Pad 30 5 Pad 31 6 Ex Mess PLN

Table 24 H2S Monitoring Second Semester of 2022

No	Period	H_2S Analysis Result (ppm)						Baku Mutu (ppm)
		Pad 07	Pad 09	Pad 10	Pad 30	Pad 31	Mess PLN	
1	Quarter I	< 0,008	< 0,008	< 0,008	< 0,008	< 0,008	-	0,02
2	Quarter II	< 0,008	< 0,008	< 0,008	< 0,008	< 0,008	-	0,02

Source: Laboratory Analysis Result PT. Sucofindo 2022

7. Drainage Water Monitoring

Monitoring Description

Period	Quarterly
Threshold Limit	Regional Regulation of Central Java Province Number 5 th. 2012 concerning Amendments to Central Java Provincial Regulation No. 4 of 2004 concerning changes to Wastewater Quality Standards for Business and/or Geothermal Exploration and Production activities.
Monitoring Location	1 Drainage in Pad 9 2 Drainage in Pad 7 (Left) 3 Drainage in Pad 7 (Right)

Table 25 Results of Analysis of Drainage Water Quality Third Quarter of 2022

Parameter	Unit	Analysis Result			Threshold Limit	Method
		Pad 9	Pad 7 (Left)	Pad 7 (Right)		
Oil & Grease	mg/L	< 2,5	-	-	15	SNI 6989.10:2011
Total Organic Carbon	mg/L	2,61	-	-	110	SNI 06-6989.30-2005
pH	-	6,3	-	-	-	SNI 06-6989.11-2019

Source: Laboratory Analysis Result PT. Sucofindo 2022

Table 26 Results of Analysis of Drainage Water Quality Fourth Quarter of 2022

Parameter	Unit	Analysis Result			Threshold Limit	Method
		Pad 9	Pad 7 (Left)	Pad 7 (Right)		
Oil & Grease	mg/L	< 2,5	< 2,5	< 2,5	15	SNI 6989.10:2011
Total Organic Carbon	mg/L	3,5	3,7	3,5	110	SNI 06-6989.30-2005
pH	-	7,9	8,1	8,4	-	SNI 06-6989.11-2019

Source: Laboratory Analysis Result PT. Sucofindo 2022

8. Water Biota

Monitoring Description

Periode	Quarterly
Method	Data analysis on the number of species, composition, abundance, and diversity of plankton and benthos
Monitoring Location	**1. Situlu River (Upstream)** **2. Sidandang River (Downstream)**

Table 27 Monitoring Results of Aquatic Biota Third Quarter of 2022 Upstream Situlu River

Organism	Result	Method
FITOPLANKTON		(Census-SRC) / APHA 2017 (10200 F)
BACILLARIOPHYCEAE		
Asteromphalus sp.	300	
Navicula sp.	300	
Pinnularia sp.	1200	
Synedra sp.	900	
EUGLENOPHYCEAE		
Astasia sp.	900	
Taxa (S)	**5**	
Abundance (Sel/m^3)	**3600**	
Diversity Index (H')	**1.47**	
Equitability Index (E)	**0.92**	
Dominance Index (D)	**0.25**	

Organism	Result	Method
ZOOPLANKTON		

Organism	Result	Method
OLIGOHYMENOPHOREA		(Census-SRC) / APHA 2017 (10200 G)
Vorticella sp.	300	
BDELLOIDEA		
Adineta sp.	300	
MONOGONONTA		
Euchlanis sp.	600	
Taxa (S)	**3**	
Abundance (Ind/m^3)	**1200**	
Diversity Index (H')	**1.04**	
Equitability Index (E)	**0.95**	
Dominance Index (D)	**0.38**	

Organism	Result	Method
MACROBENTHOS		SNI 03-3401-1994
GASTROPODA	0	
Taxa (S)	**0**	
Abundance (Ind/m^2)	**0**	
Diversity Index (H')	**0.00**	
Equitability Index (E)	**0.00**	
Dominance Index (D)	**0.00**	

Table 28 Monitoring Results of Aquatic Biota Fourth Quarter of 2022 Upstream Situlu River

Organism	Result	Method
FITOPLANKTON		(Census-SRC) / APHA 2017 (10200 F)
BACILLARIOPHYCEAE		
Asteromphalus sp.	300	
Navicula sp.	200	
Pinnularia sp.	1200	
Synedra sp.	900	
EUGLENOPHYCEAE		
Astasia sp.	800	
Taxa (S)	**5**	
Abundance (Sel/ m^3)	**3640**	
Diversity Index (H')	**1,47**	
Equitability Index (E)	**0,92**	
Dominance Index (D)	**0,25**	

Organism	Result	Method
ZOOPLANKTON		(Census-SRC) / APHA 2017 (10200 G)
OLIGOHYMENOPHOREA		
Vorticella sp.	300	
BDELLOIDEA		
Adineta sp.	300	
MONOGONONTA		
Euchlanis sp.	700	
Taxa (S)	**3**	

Organism	Result	Method
Abundance (Ind/ m^3)	**1300**	
Diversity Index (H')	**1,04**	
Equitability Index (E)	**0,95**	
Dominance Index (D)	**0,38**	

Organism	Result	Method
MACROBENTHOS		SNI 03-3401-1994
GASTROPODA	0	
Taxa (S)	**0**	
Abundance (Ind/ m^3)	**0**	
Diversity Index (H')	**0,00**	
Equitability Index (E)	**0,00**	
Dominance Index (D)	**0,00**	

Table 29 Monitoring Results of Aquatic Biota Third Quarter of 2022 Downstream Sidandang River

Organism	Result	Method
FITOPLANKTON		(Census-SRC) / APHA 2017 (10200 F)
BACILLARIOPHYCEAE		
Leptocylindricus sp.	1800	
Navicula sp.	600	
Nitzschia sp.	7800	
Synedra sp.	3300	
EUGLENOPHYCEAE		
Astasia sp.	300	
Taxa (S)	**5**	
Abundance (Sel/ m^3)	**13800**	
Diversity Index (H')	**1.15**	
Equitability Index (E)	**0.71**	
Dominance Index (D)	**0.40**	

Organism	Result	Method
ZOOPLANKTON		Census-SRC) / APHA 2017 (10200 G)
BDELLOIDEA		
Adineta sp.	1500	
MONOGONONTA		
Euchlanis sp.	300	

Organism	Result	Method
Taxa (S)	**2**	
Abundance (Ind/ m^3)	**1800**	
Diversity Index (H')	**0.45**	
Equitability Index (E)	**0.65**	
Dominance Index (D)	**0.72**	

Organism	Result	Method
MACROBENTHOS		SNI 03-3401-1994
GASTROPODA		
Chironomus sp.	41	
Taxa (S)	**1**	
Abundance (Ind/ m^3)	**41**	
Diversity Index (H')	**0.00**	
Equitability Index (E)	**0.00**	
Dominance Index (D)	**1.00**	

Table 30 Monitoring Results of Aquatic Biota Fourth Quarter of 2022 Downstream Sidandang River

Organism	Hasil	Method
FITOPLANKTON		(Census-SRC) / APHA 2017 (10200 F)
BACILLARIOPHYCEAE		
Leptocylindricus sp.	1700	
Navicula sp.	500	
Nitzschia sp.	7500	
Synedra sp.	3000	
EUGLENOPHYCEAE		
Astasia sp.	300	
Taxa (S)	**5**	
Abundance (Sel/ m^3)	**13000**	
Diversity Index (H')	**1,15**	
Equitability Index (E)	**0,71**	
Dominance Index (D)	**0,40**	

Organism	Hasil	Method
ZOOPLANKTON		(Census-SRC) / APHA 2017 (10200 G)
BDELLOIDEA		
Adineta sp.	1500	
MONOGONOTA		
Lepadella sp.	300	

Organism	Hasil	Method
Taxa (S)	**2**	
Abundance (Ind/ m^3)	**1800**	
Diversity Index (H')	**0,45**	
Equitability Index (E)	**0,65**	
Dominance Index (D)	**0,72**	

Organism	Hasil	Method
MACROBENTHOS		SNI 03-3401-1994
GASTROPODA		
Chironomus sp.	40	
Taxa (S)	**1**	
Abundance (Ind/ m^3)	**40**	
Diversity Index (H')	**0,00**	
Equitability Index (E)	**0,00**	
Dominance Index (D)	**1,00**	

9. Erosion and Landslide

Monitoring Description

Period	Semesterly
Method	Conduct observations in the field and identify evidence of management activities that have been carried out.
Monitoring Location	1 Pad 29 2 Mess PLN

Table 31 Erosion and Landslide Monitoring Result

Location	Coordinate	Erosion		Landslide		Remark	Documentation
		Deep (cm)	Distance (m)	Distribution Length (m)	Distance (m)		
Ex Mess PLN (Pad 38)	7°12'34.70"S 109°53'4.27"E	< 10	3-6	-	-	Mild, erosion by surface runoff. Most of the area is still covered with vegetation	
Pad-28	7°12'13.19"S 109°54'3.45"E	< 10	< 10	-	-	Mild, erosion by surface runoff. The slopes around PAD 28 are covered with retaining walls, fences and vegetation (grass and trees)	

Source: Field Observation, December 2022

10. Solid Waste Generation

Monitoring Description

Period	Quarterly
Method	Inspect the availability of trash bins, temporary landfill locations, disposal methods, MSDS, etc. Record the volume of organic-inorganic waste
Monitoring Points	1 Pad 7 2 Pad 9 3 Pad 10 4 Pad 30 5 Pad 31 6 Ex Mess PLN

Table 32 Results of Monitoring of Waste Management Second Semester of 2022

No	Location	Remark	Documentation		
1.	Pad 7	Domestic trash bis is available. Waste is transported once a week to GDE TPS by officers.			

No	Location	Remark	Documentation		
2	Pad 7 (Drilling)	Domestic waste generated from drilling activities. Domestic waste management is carried out by a designated third party.			
3	Pad 9	There are domestic trash cans onsite. Garbage is transported once a week to the GDE Dieng TPST (final disposal) by officers.			
4	Pad 10	There is a well revitalization activity in Pad 10, where waste management is carried out independently			

No	Location	Remark	Documentation		
		by a third party/contractor (PT Poeser Indonesia)			
5	Pad 30	There are domestic trash cans onsite. Garbage is transported once a week to the GDE Dieng TPST (final disposal) by officers.			
6	Pad 31	No worker activity at Pad 31 after well testing			

No	Location	Remark	Documentation		
7	Pad 38 (Ex Mess PLN)	No activity at Pad 38 (no waste generated).			

Source : Field Observation, Juni 2022

11. Traffic and Road Safety

Monitoring Description

Period	Quarterly
Parameter	1. Traffic Accident Records related to Dieng 2 Project from local Police office 2. Visual inspection of Access Road Conditions 3. Measurement of Access Road Service Level (Vc Ratio)
Monitoring Location	1 Kejajar Terminal/Market 2 Dieng Kulon Intersection 3 Dieng Wetan Intersection 4 Karang Tengah 5 Bakal 6 Kepakisan

a. Traffic Accident

Environmental monitoring activities for Semester II of 2022 for the parameters of traffic accidents are carried out by collecting data on traffic accidents (July – December 2022) that occur around the Dieng Unit 2 project site from Batur Police and Kejajar Police, as well as data from contractors/PMCs. According to data from the PMC and the local Police (Polsek Batur and Polsek Kejajar) in the second semester of 2022, there were traffic accidents in working area PT Gedo Dipa Energi (Persero) Dieng Unit as presented in the following table.

Table 32A Traffic Accident

No	Time	Location	Status	Chronological	Data/Information Source
1	Monday 12 September 2022, 06.00 AM	Turut Road, Bakal Village. Batur District, Banjarnegara Regency	Minor injuries	INitially motorcycle with police number . AA-3044-DZ driven by WONTEN moving from west to east at a moderate speed, arriving at the incident location allegedly from the north of the road there was a Pick Up. with police number R-1878-NW driveed by TUSLAM was about to enter the traffic flow/enter the lane to the east, because the distance was too close which resulted in an accident.	Accident Unit Banjarnegara Police
2	NA	Garung-Dieng Road. Sembungan Village.	Minor injuries	NA	Accident Unit Wonosobo Police

No	Time	Location	Status	Chronological	Data/Information Source
		Kejajar District. Wonosobo Regency			
3	NA	Tegalrejo Sub village road Tambi Village, Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
4	NA	Kejajar-Garung road. Sembungan Village Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
5	NA	Wonosobo-Dieng road Rejosari Village Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
6	NA	Tambi - Jlumprit road. Sigedang Village Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
7	NA	Garung - Kejajar road Sigedang Village Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
8	NA	Kejajar-Temanggung road Surengede Village Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
9	NA	Wonosobo-Dieng road Kademangan Village Kejajar District. Wonosobo Regency	Minor injuries	NA	Accident Unit Wonosobo Police
10	NA	Garung-Dieng Road. Sembungan Sub Village	Minor injuries	NA	Accident Unit Wonosobo Police

No	Time	Location	Status	Chronological	Data/Information Source
		Kejajar District. Wonosobo Regency			

b. Road Condition

Environmental monitoring of the road access condition is conducted to see whether the construction and operational activities of the Dieng 2 Project PLTP generate an impact on road damage. Monitoring activities are carried out through field observation (visual) on road access that is used to mobilization activity of employee operational vehicles, equipment, and materials.

Documentation of environmental monitoring activities related to road conditions around the Dieng 2 Project for the first semester of 2022 can be seen in the following picture.

	
Kejajar Road – Dieng	**Simpangan Road– Kepakisan**

Access Road to Pad 9 (Karang Tengah)

Access Road to Pad 31
(Dieng Kulon – Karangtengah)

Access Road to Pad 30 (Pawuhan)

Access Road to Unit 2 Power Plant (Bakal –Batur)

c. Access Road Service Level

Smoothness of Traffic and Road Transportation is a condition of traffic and the use of transportation that is free from obstacles and congestion on the road. Traffic smoothness is influenced by road capacity and traffic volume. Road capacity is the ability of a road segment to accommodate the ideal traffic volume per unit time, expressed in vehicles/hour or passenger car units (PCU)/hour. Meanwhile, the volume/capacity ratio (V/C ratio) is the ratio between traffic volume and road capacity.

Monitoring of traffic conditions around the Dieng PLTP is carried out using the calculation of the V/C Ratio or Road Service Level. The level of service (Level of Service) of a road is indicated by a comparison or comparison between the volume of traffic (pcu/hour) and road capacity (pcu/hour), the volume of traffic that is calculated as a comparison is traffic during peak hours, both morning hours busy, day or night. The level of road service is measured by the magnitude of the level of service, the amount of which is shown in the following table:

Table 33 V/C Rasio Value Second Semester of 2022 Period

Time	Number of Vehicle (Vehicle/hour)			Number of Vehicle (PCU/hour)			Total Vehicle/V (PCU/hour)	Road Capacity/ C (PCU/hour)	Road Service Level (V/C ratio)	
	LV[1]	HV[2]	MC[3]	LV	HV	MC				
Dieng Kulon										
06.30-07.30	244	80	544	244	104	272	620	5705,7	0,1086	A
12.15-13.15	188	100	476	188	130	238	556	5705,7	0,0974	
16.00-17.00	220	28	440	220	36,4	220	476,4	5705,7	0,0835	
Dieng Wetan										
06.30-07.30	236	104	572	236	135,2	286	657,2	5532,8	0,1188	A
12.15-13.15	208	84	408	208	109,2	204	521,2	5532,8	0,0942	
16.00-17.00	232	68	248	232	88,4	124	444,4	5532,8	0,0803	
Kejajar Market										
06.30-07.30	240	84	904	240	190,2	452	801,2	4195,2	0,1910	B
12.15-13.15	216	96	1620	216	124,8	810	1150,8	4195,2	0,2743	
16.00-17.00	292	128	1004	292	166,4	502	960,4	4195,2	0,2289	
Kepakisan										
06.30-07.30	64	36	188	64	46,8	94	204,8	4195,2	0,0488	A
12.15-13.15	76	16	336	76	20,8	168	264,8	4195,2	0,0631	

Time	Number of Vehicle (Vehicle/hour)			Number of Vehicle (PCU/hour)			Total Vehicle/V (PCU/hour)	Road Capacity/ C (PCU/hour)	Road Service Level (V/C ratio)	
	LV[1]	HV[2]	MC[3]	LV	HV	MC				
16.00-17.00	104	24	300	104	31,2	150	285,2	4195,2	0,0680	
Karang Tengah										
06.30-07.30	124	56	296	124	72,8	148	344,8	4195,2	0,0822	A
12.15-13.15	160	56	412	160	72,8	206	438,8	4195,2	0,1046	
16.00-17.00	172	16	436	172	20,8	218	410,8	4195,2	0,0979	
Bakal										
06.30-07.30	116	36	232	116	46,8	116	278,8	4195,2	0,0664	A
12.15-13.15	100	40	292	100	52	146	298	4195,2	0,0710	
16.00-17.00	76	36	412	76	46,8	206	328,8	4195,2	0,0784	

Source: Field Observation and Calculation by PT. Sucofindo, 2022

Notes:

LV1 (Light Vehicles): Two-wheeled motorized vehicles with a wheelbase of 2.0 - 3.0 m)

HV2 (Heavy motor vehicle): with a wheelbase of more than 3.50 meters)

MC3 (Motorcycle): Two or three wheeled motorized vehicle)

Road Service Level:

A: Free flow conditions with high speed and low traffic volume. Driver can choose the desired speed without any obstacles 0.00-0.19

B: In the stable current zone. The driver has enough freedom to choose the speed 0.20-0.44

C: In the stable current zone. The driver is limited in choosing the speed 0.45-0.74

D: Approaching unstable currents where almost all drivers will be restricted. Service volume relates to tolerable (acceptable) capacity 0.75-0.85

E: Traffic volume is approaching or at its capacity. Unstable current with frequent stop conditions 0.85-1.00

F: Forced or jammed current at slow speed. Long queues and big obstacles >1.00

Appendix 2 Environmental Quality Monitoring Results – B. Patuha 2 Sub Project

Figure 3 Ambient Air Quality, Odor and Noise Level Sampling Locations

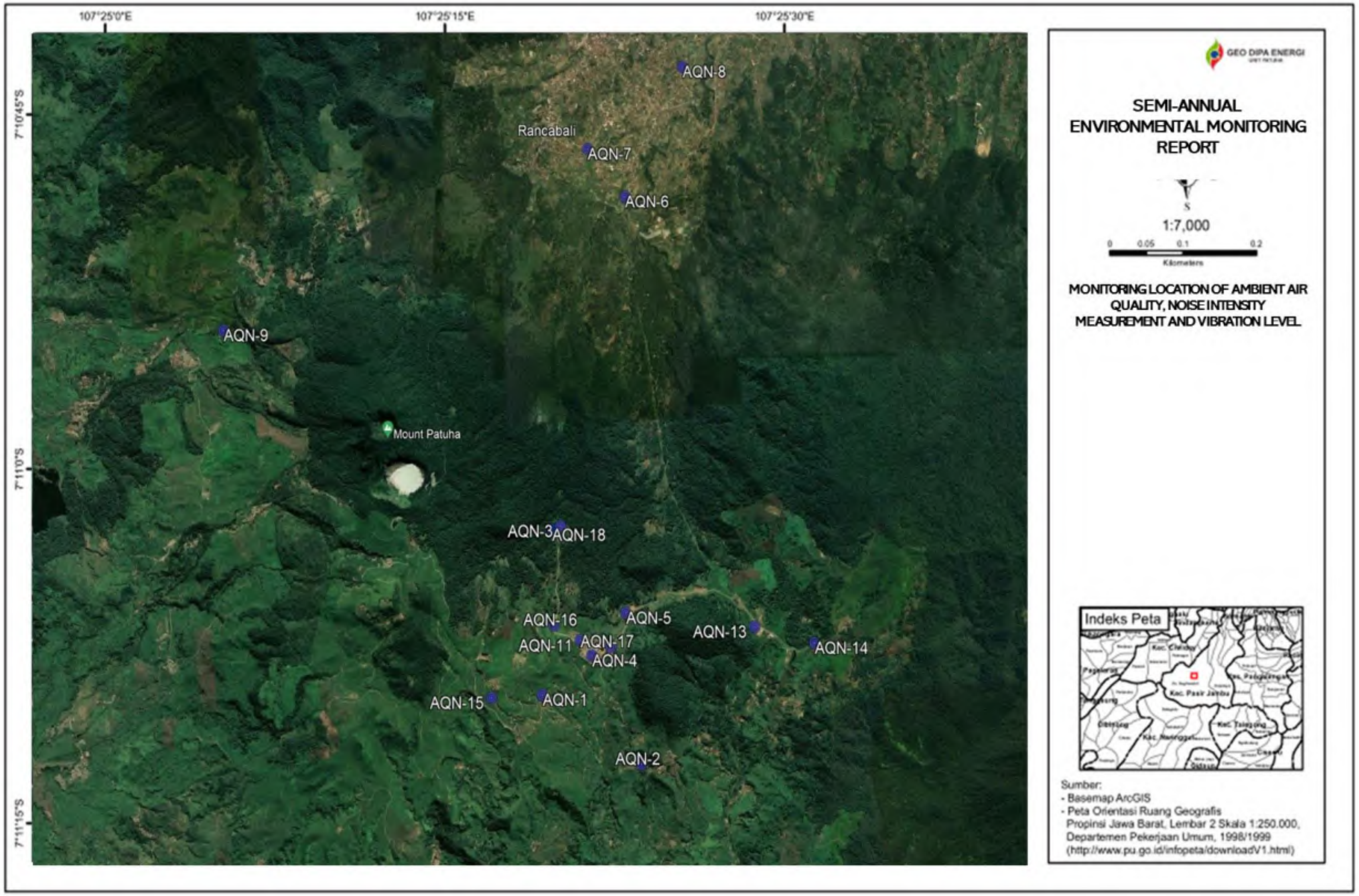


Figure 4 Surface/ River Water Sampling Locations

Figure 5 Springwater Quality Monitoring Sampling Locations

Figure 6. Domestic Wastewater Sampling Location

Remarks:

1.	*Temporary Office (DWW-1)*	*:*	*07°10'56,5" LS - 107°25'16,6" BT*
2.	*Lay Down Basecamp Rig (DWW-2)*	*:*	*07°10'57,4" LS - 107°25'26,3" BT*
3.	*Basecamp Rig PPL 7 (DWW-3)*	*:*	*07°10'46,3" LS - 107°25'38,5" BT*
4.	*Basecamp Rig PPL 4 (DWW-4)*	*:*	*07°10'18,5" LS - 107°25'7,43" BT*
5.	*Rig Camp PPL 2 (DWW-5)*	*:*	*07°10'48,1" LS - 107°25'06,5" BT*

1. Ambient Air Quality and Odor Monitoring

Ambient air quality, odor level and noise level sampling locations are carried out at:

- AQN-1 : Babakan Village (S 07°11’17,0” - E 107°25’00,4”)
- AQN-2 : Nyingkur Village (S 07°11’43,3” - E 107°25’40,4”)
- AQN-3 : Well PPL 04/G (S 07°10’17,0” - E 107°25’09,5”)
- AQN-4 : Patuha 2 Geothermal Power Plant Plan (S 07°11’03,3” - E 107°25’21,0”)
- AQN-5 : Well PTH-7 (S 07°10’47,3” - E 107°25’38,5”)
- AQN-6 : Cibodas Village (S 07°08’17,6” - E 107°25’39,9”)
- AQN-7 : Alamendah Village (S 07°07’59,9” - E 107°25’24,6”)
- AQN-8 : Citiwu Village (S 07°07’29,4” - E 107°26’05,9”)
- AQN-9 : Ciwidey – Rancabali Road (S 07°09’02,8” - E 107°22’51,8”)
- AQN-10 : The road that connects the project site with the Ciwidey – Rancabali Road (S 07°06’55,5” - E 107°26’40,8”)
- AQN-11 : *Temporary Office* (S 07°10’57,8” - E 107°25’16,4”)
- AQN-12 : Access to Loc BB (S 07°10’18,2” - E 107°25’05,9”)
- AQN-13 : Kendeng Village (S 07°10’55,1” - E 107°26’27,8”)
- AQN-14 : Camara Village (S 07°11’01,6” - E 107°26’52,4”)
- AQN-15 : Camara Village (S 07°11’17,0” - E 107°24’39,7”)
- AQN-16 : Well Pad 2 (S 07°10’52,05” - E 107°25’5,84”)
- AQN-17 : Well Pad 6 (S 07°11’0,45” - E 107°25’28,87”)
- AQN-18 : Well PTH-9 (S 07°10’18,2” - E 107°25’05,9”)

Result of ambient air quality and odor measurement is presented in the following table:

Table 34 Ambient Air Quality and Odor Level Measurement Results

Parameter			SO_2	CO	NO_2	TSP	PM_{10}	$PM_{2,5}$	NH_3	H_2S
Threshold Limit			**150**	**10.000**	**200**	**230**	**75**	**55**	**2**	**0,02**
Unit			**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**ppm**	**ppm**
AQN-1	2021	TW-1	26,73	< 11,45	12,81	39,24	20,36	8,25	< 0,02	< 0,001
		TW-2	25,65	< 11,45	11,37	32,21	16,66	72,59	< 0,02	< 0,001
		TW-3	24,78	< 11,45	11,83	31,45	16,66	7,06	< 0,02	< 0,001
		TW-4	20,3	< 11,45	12,6	31,54	11,76	7,1	< 0,02	< 0,001
	2022	TW-1	< 21,30	< 11,45	9,12	28,2	12,45	8,06	< 0,02	< 0,001
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	21,53	< 11	< 14	28,36	10,17	5,61	< 0,02	< 0,001
		TW-4	20,74	< 11	< 14	27,61	10,92	4,86	0,02	< 0,001
AQN-2	2021	TW-1	26,42	< 11,45	11,54	35,55	18,74	7,38	< 0,02	<0,001
		TW-2	25,25	< 11,45	12,26	30,53	14,08	8,79	< 0,02	< 0,001
		TW-3	25,06	< 11,45	11,29	34,91	16,04	8,47	< 0,02	< 0,001
		TW-4	20,3	< 11,45	12,6	31,54	11,76	7,1	< 0,02	<0,001
	2022	TW-1	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,001
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AQN-3	2021	TW-1	26,68	< 11,45	13,57	38,31	16,54	8,63	< 0,02	0,004
		TW-2	26,32	< 11,45	13,84	36,17	20,13	9,66	< 0,02	0,002
		TW-3	26,7	< 11,45	13,73	30,54	19,22	8,42	< 0,02	0,002
		TW-4	24,6	< 11,45	13,88	45,3	16,2	8,1	< 0,02	0,005
	2022	TW-1	21,3	45,8	13,5	37,62	13,4	9,56	< 0,02	0,004
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-3	27,3	1.717,80	22,45	69,17	20,06	7,92	< 0,02	0,007
		TW-4	26,9	< 11	17,47	45,03	19,31	7,17	< 0,02	0,002
AQN-4	2021	TW-1	28,61	< 11,45	13,77	33,79	20,78	6,89	< 0,02	0,007
		TW-2	25,73	< 11,45	12,92	35,26	17,37	9,43	< 0,02	0,003
		TW-3	25,82	< 11,45	13,08	35,84	17,42	8,35	< 0,02	0,004
		TW-4	25,3	< 11,45	12,9	38,3	13,1	6,85	< 0,02	0,004
	2022	TW-1	23,12	< 11,45	10,56	30,54	11,44	8,43	< 0,02	0,008
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	26,46	< 11	< 14	29,05	14,76	5,58	< 0,02	0,006
		TW-4	25,61	< 11	14,13	31,35	15,52	6,35	< 0,02	0,005
AQN-5	2021	TW-1	27,65	< 11,45	11,42	40,7	18,8	9,78	< 0,02	0,004
		TW-2	25,1	< 11,45	11,93	38,41	15,6	9,36	< 0,02	0,001
		TW-3	25,07	< 11,45	11,29	32,34	19,55	7,66	< 0,02	0,001
		TW-4	28,3	1.145	18,4	61,33	32,67	16,45	< 0,02	0,002
	2022	TW-1	32,5	2.290	19,6	42,3	20,15	11,45	0,05	0,01
		TW-2	26,92	2.863	13,18	21,2	15,85	9,6	< 0,02	< 0,007

Parameter			SO_2	CO	NO_2	TSP	PM_{10}	$PM_{2,5}$	NH_3	H_2S
Threshold Limit			**150**	**10.000**	**200**	**230**	**75**	**55**	**2**	**0,02**
Unit			**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**ppm**	**ppm**
		TW-3	26,36	< 11	17,68	39,77	14,18	8,18	< 0,02	0,006
		TW-4	26,92	2.863	13,18	21,2	15,85	9,6	< 0,02	< 0,007
AQN-6	2021	TW-1	24,88	34,4	13,28	42,42	17,55	9,05	< 0,02	< 0,001
		TW-2	27,34	114,5	17,91	47,49	26,74	11,39	< 0,02	< 0,001
		TW-3	< 17	1.718	28,6	39,7	11,3	6,26	< 0,02	< 0,001
		TW-4	23,37	172	18,16	55,75	28,69	13,27	< 0,02	< 0,001
	2022	TW-1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AQN-7	2021	TW-1	27,5	114,5	15,27	50,21	32,5	13,3	< 0,02	< 0,001
		TW-2	26,74	57,3	15,94	53,72	25,13	11,29	< 0,02	< 0,001
		TW-3	< 17	3.550	40,5	67,6	14,5	7,93	< 0,02	< 0,001
		TW-4	22,81	115	15,11	46,81	24,9	11,03	< 0,02	< 0,001
	2022	TW-1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AQN-8	2021	TW-1	25,82	57,3	13,92	38,3	19,2	11,62	< 0,02	< 0,001
		TW-2	24,16	34,4	16,86	54,14	31,08	9,29	< 0,02	< 0,001
		TW-3	< 17	4.581	29,2	41,2	11,8	6,45	< 0,02	< 0,001
		TW-4	22,61	229	15,37	48,51	27,9	13,02	< 0,02	< 0,001
	2022	TW-1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AQN-9	2021	TW-1	32,4	183,2	16,24	51,73	30,5	14,64	< 0,02	< 0,001
		TW-2	29,27	858,9	18,96	62,14	32,61	13,86	< 0,02	< 0,001
		TW-3	< 17	8.589	42,3	93,6	24,4	13,4	< 0,02	< 0,001
		TW-4	26,76	1.145	19,68	63,43	33,06	16,31	< 0,02	< 0,001
	2022	TW-1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	31,21	1.059,30	27,58	47,65	23,86	11,3	< 0,02	< 0,001
		TW-4	30,42	1.145	26,99	49,14	23,12	10,56	< 0,02	< 0,001
AQN-10	2021	TW-1	28,21	183,2	15,22	51,73	30,5	14,64	< 0,02	< 0,001
		TW-2	30,31	858,9	18,52	62,14	32,61	13,86	< 0,02	< 0,001
		TW-3	< 17	8.589	47,1	93,6	24,4	13,4	< 0,02	< 0,001
		TW-4	25,36	1.145	17,8	63,43	33,06	16,31	< 0,02	< 0,001
	2022	TW-1	22,3	69	15,41	40,51	26,51	12,48	< 0,02	< 0,001

Parameter			SO_2	CO	NO_2	TSP	PM_{10}	$PM_{2,5}$	NH_3	H_2S
Threshold Limit			**150**	**10.000**	**200**	**230**	**75**	**55**	**2**	**0,02**
Unit			**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**μ/Nm³**	**ppm**	**ppm**
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-3	30,73	1.325,20	25,14	53,68	24,42	9,87	< 0,02	< 0,001
		TW-4	29,95	859	24,5	55,16	23,68	10,62	< 0,02	< 0,001
AQN-11	2022	TW-1	22,5	45,8	13,62	36,52	12,45	6,78	< 0,02	0,002
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	25,19	< 11	< 14	33,81	15,18	5,78	< 0,02	0,004
		TW-4	26,14	< 11	< 14	36,06	18,93	5,03	< 0,02	0,003
AQN-12	2022	TW-1	22,61	229	17,25	35,6	15,2	8,9	0,07	< 0,001
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	25,7	613,5	20,67	62,8	19,93	9,96	< 0,02	0,003
		TW-4	24,91	573	18,93	47,7	20,68	9,21	< 0,02	0,003
AQN-13	2022	TW-1	22,45	57,25	12,6	29,4	10,5	8,25	0,03	0,004
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	21,5	< 11	< 14	36,28	15,85	5,48	< 0,02	< 0,001
		TW-4	20,71	< 11	< 14	34,78	16,6	6,23	< 0,02	< 0,001
AQN-14	2022	TW-1	19,26	< 11,45	9,5	26,64	13,52	8,5	< 0,02	< 0,001
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	22,39	< 11	< 14	41,87	11,84	4,75	< 0,02	< 0,001
		TW-4	20,8	< 11	< 14	40,36	12,6	5,51	< 0,02	< 0,001
AQN-15	2022	TW-1	22,3	< 11,45	9,82	26,54	10,22	5,6	< 0,02	< 0,001
		TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	22,4	< 11	< 14	29,13	11,62	6,72	< 0,02	< 0,001
		TW-4	21,6	< 11	< 14	28,37	12,38	5,96	< 0,02	< 0,001
AQN-16	2022	TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AQN-17	2022	TW-2	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	< 0,005
		TW-3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		TW-4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AQN-18	2022	TW-4	n/a	n/a	n/a	n/a	n/a	n/a	< 0,02	0,003

Source : PT. Sucofindo Environmental Laboratory, 2021 – Q4, 2022

Remarks :

*Quality standard based on *) Government Regulation No. 22/2021,Appendix VII concerningAmbient Air Quality Standards; **) Ministry of Environment Decree No. 50 of 1996 concerning Odor Level Standards; n/a Measurements were not taken with the consideration that the sampling location was quite far from the project site and that the mobilization and demobilization of construction tools and materials had been completed*

Based on the measurement results in the table above, all parameters in all sampling stations still meet the required environmental quality standards based on the GR No. 22 Year 2021 concerning Implementation of Environmental Protection and Management, Appendix VII concerning Ambient Air Quality Standards.

Similarly, the measurements results of odor level in 18 sampling locations were monitored ranging from < 0,001 ppm to 0,005 ppm, where the values still comply to the quality standard required by KepMenLH No. 50 Year 1996.

Figure 6 Documentation of Ambient Air Quality and Odor Level Measurement

2. Noise Monitoring

The noise monitoring method is based on the Minister of Environment Decree No. Kep. 48 / MENLH / II / 1996 concerning Noise Level Standards. Air sampling is done using a *sound level meter*. Then it is compared with the quality standard to find out the noise quality at the monitoring location. Sampling locations based on AMDAL and IEE consist of 15 points:

- N-1 : Babakan Village (S 07°11’17,0” S - 107°25’00,4” E)
- N-2 : Nyingkur Village (07°11’43,3” S - 107°25’40,4” E)
- N-3 : Well PPL 04/G (LS 07°10’17,0” S - 107°25’09,5” E)
- N-4 : Patuha 2 (07°11’03,3” S - 107°25’21,0” E)
- N-5 : Well PTH-7 (07º10’48,62” S - 107º25’35,35” E)
- N-6 : Cibodas Village (07º08’17,6” S - 107º25’39,9” E)
- N-7 : Alamendah Village (07º07’59,9” S - 107º25’24,6” E)
- N-8 : Citiwu Village (07º07’29,4” S - 107º26’05,9” E)
- N-9 : Ciwidey – Rancabali Road (07º09’02,8” S - 107º22’51,8” E)
- N-10 : The road that connects the project site with the Ciwidey – Rancabali Road (07º06’55,5” S - 107º26’40,8” E)
- N-11 : Temporary Office (07º10’57,8” S - 107º25’16,4” E)
- N-12 : Access to Loc BB (07º10’18,2” S - 107º25’05,9” E)
- N-13 : Kendeng Village (07º10’55,1” S - 107º26’27,8” E)
- N-14 : Camara Village (07º11’01,6” S - 107º26’52,4” E)
- N-15 : Pasir Waas Village (07º11’17,0” S - 107º24’39,7” E)

The time measurements are carried out during 24 hour activity (L_{DN}) in a way during the day at the highest level of activity for 10 hours (L_D) at an interval of 6:00 to 22:00 and night activity for 8 hours (L_N) between 22.00 - 06.00, the measurement results at the project site are as follows:

Table 35 Measurement Result of Day-Night Average Noise Intensity (L_{DN}) Patuha Unit 2 Project

LOCATION	2021				2022				STANDARD LEVEL
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
N-1	44,7	43,5	44,2	46,4	40,9	42,2	42,8	45,7	55*
N-2	43,2	44,1	46,2	42,6	41,7	n/a	n/a	n/a	55*
N-3	50,3	45,7	43,8	49,3	53,9	n/a	69,5	46,3	70**
N-4	85,3^	70,1^	68,0	63,1	64,3	63,8	61,3	59,9	70**

LOCATION	2021				2022				STANDARD LEVEL
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
N-5	43,6	53,4	51,8	55,4	66,8	66,8	73,7^	66,8	70**
N-6	47,8	60,1^	49,4	68,4^	n/a	n/a	n/a	n/a	55*
N-7	52	66,2^	54,6	45	n/a	n/a	n/a	n/a	55*
N-8	42,9	70,2^	62,2^	70,5	n/a	n/a	n/a	n/a	55*
N-9	53,6	60,5^	62,8^	68,0^	n/a	53,4	56,5^	57,4^	55*
N-10	43,7	58,7^	65,3^	68,8^	56,9^	51,2	55,8^	57,6^	55*
N-11	n/a	n/a	n/a	n/a	53,0	51,7	50,1	52,9	70**
N-12	n/a	n/a	n/a	n/a	60,6	53,5	54,5	54,2	70**
N-13	n/a	n/a	n/a	n/a	44,9	45,2	44,2	46,5	55*
N-14	n/a	n/a	n/a	n/a	43,4	44,8	43,2	43,1	55*
N-15	n/a	n/a	n/a	n/a	40,9	45,6	40,7	46,8	55*

Source PT. Sucofindo Environmental Laboratory, 2021 – November 2022
Remarks :
*Noise level standard based on KepMenLH No. 48 Tahun 1996 concerning Standard Noise Level for *) Residential Area; **) Industrial Area;*
(n/a) Measurements were not taken with the consideration that the sampling location was quite far from the project site and that the mobilization and demobilization of construction tools and materials had been completed

(^)	*above threshold limit*

Locations with high noise levels are likely influenced by the loud sounds of passing vehicles, as these locations are close to village roads

Figure 7 Documentation of Noise Measurements

3. Surface Water Monitoring

During second semester of 2022, monitoring of surface water quality was carried out at 10 water points, as follows:

Table 36 Surface Water Monitoring

No	Sub Watershed	Sample Code	Coordinate Location
a.	**Ciwidey Sub-Watershed**		
1.	Cipadaruum River Km 8	RW-1	07°10’57,07” LS; 107°26’33,8” BT
2.	Upstream Cipadaruum River	RW-2	07°09’51,10” LS; 107°25’53,20” BT
3.	Downstream Cipadaruum River	RW-3	07°12’12,6” LS; 107°25’37,3” BT
4.	Cipadaruum River Access to Loc BB	RW-4	07°10’15,12” LS; 107°25’1,15” BT
5.	Upstream Ciwidey River	RW-5	07°07’11,4” LS; 107°26’25,9” BT

6	Ciputri River	RW-11	S 07°10’52,47” - E 107°25’29,42”
b.	**Cibuni Sub-Watershed**		
1.	Upstream Cibuni River	RW-6	07°10’29,6” LS; 107°22’25,1” BT
c.	**Cipandak Sub-Watershed**		
1.	Downstream Cipandak River	RW-7	07°16’39,0” LS; 107°21’43,9” BT
2.	East Cipandak River	RW-8	07^0 12' 10,8" LS - 107^0 26' 16,3" BT
3.	Curug Suren River	RW-9	07^0 12' 05,4" LS - 107^0 24' 16,0" BT
d.	**Cikahuripan Sub-Watershed**		
1.	Cikahuripan River	RW-10	$07^0$12'53,5" LS - $107^0$28'12,0" BT

The monitoring results of 2nd Semester of 2022 (**Error! Reference source not found.**22) period show that there are parameters that do not meet the quality standards of Government Regulation No. 22/2021 concerning Implementation of Environmental Protection and Management Appendix VI concerning National Water Quality Standards for class II, namely:

- TSS parameters in RW-6, RW-7 and RW-11;
- pH parameter in RW-1
- BOD_5 parameter in RW-1, RW-6, RW-9 and RW-11;
- COD parameters in RW-6;
- Total Phosphate in RW-1, RW-2, RW-5, RW-6, RW-7, RW-9, RW-10 and RW-11;
- Color parameter in RW-11;
- Fecal coliform in RW-3, RW-6, RW-7, RW-8 and RW-9;
- Total coliform in RW-3, RW-6 and RW-9.

The high parameters are inseparable from the contribution of domestic pollutant loads, agriculture, and livestock waste around the location of the Patuha Unit Geothermal Power Plant. The construction activity of the Patuha Unit 2 Geothermal Power Plant itself is not a source of pollution, considering that domestic wastewater generated from domestic activities during the construction phase is not discharged into the environment, but is collaborated with third parties.

Tabel 37 Surface Water Monitoring Result

PARAMETER	UoM	TEST RESULT IN 2022																				Threshold Limit	METHOD *)
		RW-1		RW-2		RW-3		RW-5		RW-6		RW-7		RW-8		RW-9		RW-10		RW-11			
		Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4		
Physical :																							
Temperature **$^{\Delta}$	°C	16,8	18,4	16,8	17,0	17,6	16,4	19,2	20,5	26,3	26,8	17,3	17,3	18,7	17,2	16,8	15,8	19,2	16,1	18,7	14,3	Normal $\pm$3	2550 B
TDS **	mg/L	38	151	82	73	33	72	216	202	199	209	37	40	67	36	32	30	33	27	105	120	1000	2540 C
TSS **	mg/L	17	3	6	2	14	2	21	21	4	**220**	6	**54**	10	18	7	4	24	9	15	**93**	50	2540 D
Inorganic Chemical :																							
pH **$^{\Delta}$	-	**5,84**	6,01	7,3	7,03	7,36	6,98	6,6	6,71	6,83	6,03	6,87	6,99	7,27	7,19	6,87	7,62	6,79	6,92	7	7,2	6 – 9	4500-H^+-B
BOD	mg/L	< 2	**5,81**	< 2	< 2	**4,23**	< 2	< 2	< 2	< 2	**8,49**	2,95	< 2	**5,87**	< 2	< 2	**3,2**	< 2	< 2	< 2	**7,05**	3	5210 B
COD **	mg/L	4,76	14,17	8	< 4,14	14,4	< 4,14	7,94	4,69	< 4,14	**26,56**	20,8	< 4,14	24	4,69	< 4,14	7,81	4,76	< 4,14	7,94	17,19	25	5220 B
Dissolved Oxygen (DO)	mg/L	4,65	4,17	4,57	4,36	4,35	4,51	4,52	4,26	4,6	4,17	4,52	4,32	4,35	4,26	4,58	4,32	4,35	4,53	4,32	4,27	4	4500-O-B
Total Phosphate as P	mg/L	**0,52**	<0,19	**0,61**	0,19	0,79	<0,19	**0,32**	< 0,19	**0,77**	<0,19	**0,35**	<0,19	< 0,19	< 0,19	**0,27**	<0,19	**2,66**	<0,19	**0,65**	<0,19	0,2	4500-PO_4-C
Nitrate (NO_3)**	mg/L	2,4	< 0,10	0,64	< 0,10	0,65	< 0,10	6,01	0,38	0,85	< 0,10	2,31	< 10	3,43	0,14	0,41	< 0,10	4,24	< 0,10	1,24	< 0,10	10	4500-NO_3-E
Ammonium**	mg/L	< 0,05	<0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	2,07	<0,05	0,2	4500-NH_3-F
Arsenic (As)	mg/L	< 0,002	<0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	<0,002	0,05	3114 C, 3030 B
Cobalt (Co)**	mg/L	< 0,04	<0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	<0,04	0,2	3111 B, 3030 B
Barium (Ba)	mg/L	< 0,12	<0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	< 0,12	<0,12	-	3111 D, 3030 B
Boron (B)	mg/L	< 0,05	<0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	<0,05	1	3500-B-C
Selenium (Se)	mg/L	< 0,001	<0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	<0,001	0,05	3114 C, 3030 B
Cadmium (Cd)	mg/L	<0,003	<0,003	<0,003	<0,003	<0,003	< 0,003	<0,003	<0,003	<0,003	< 0,003	<0,003	< 0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	0,01	3111 B, 3030 B
Chrom Heksavalen (Cr6+)	mg/L	< 0,02	<0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	< 0,02	<0,02	0,05	3500-Cr^{6+}-B
Copper (Cu)**	mg/L	< 0,04	<0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	<0,04	0,02	3111 B, 3030 B
Iron (Fe)**	mg/L	< 0,06	<0,06	< 0,06	0,21	< 0,06	0,06	< 0,06	0,25	< 0,06	0,28	< 0,06	< 0,06	< 0,06	0,1	< 0,06	< 0,06	< 0,06	< 0,06	< 0,06	<0,06	-	3111 B, 3030 B
Lead (Pb)**	mg/L	< 0,04	<0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	<0,04	0,03	3111 B, 3030 B
Manganese (Mn)**	mg/L	0,27	<0,04	< 0,04	< 0,04	< 0,04	< 0,04	0,27	0,22	0,07	0,13	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	1,64	<0,04	-	3111 B, 3030 B
Mercury (Hg)	mg/L	< 0,0008	<0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	< 0,0008	0,002	3112 B
Nickel (Ni)**	mg/L	< 0,04	<0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	<0,04	0,05	3111 B, 3030 B
Zinc (Zn)**	mg/L	< 0,04	<0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	0,05	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	< 0,04	<0,04	0,05	3111 B, 3030 B
Chloride (Cl)**	mg/L	27,92	32,03	21,59	4,43	26,43	4,93	52,86	49,28	30,52	15,28	14,14	13,3	11,17	< 2,10	8,19	< 2,10	10,05	< 2,10	27,54	3,45	300	4500-Cl-D
Cyanide (CN)	mg/L	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	<0,01	< 0,01	<0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,02	4500-CN-E
Flouride (F)**	mg/L	0,41	0,42	0,19	< 0,05	< 0,05	0,09	0,64	0,36	0,35	0,16	0,23	< 0,05	0,13	<0,05	0,28	<0,05	0,43	0,06	< 0,05	0,06	1,5	4500-F-B
Nitrite (NO_2)**	mg/L	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,01	0,01	0,01	< 0,01	0,02	< 0,01	0,02	< 0,01	<0,01	< 0,01	<0,01	< 0,01	< 0,01	0,04	0,02	0,06	4500-NO_2-B
Sulfate (SO_4)**	mg/L	3,79	3,81	2,8	3,5	3,34	3,69	7,74	5,75	18,12	18,47	0,42	1,22	0,48	1,22	< 0,20	0,57	< 0,20	1,17	2,28	2,83	300	4500-SO_4-E
Free Chlorine	mg/L	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,03	4500-Cl_2-B
Sulfur as H2S**	mg/L	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	0,002	4500-S-D
Colour**	Pt Co Scale	3,38	< 2,08	13,17	3,88	< 2,08	< 2,08	< 2,08	< 2,08	< 2,08	3,02	6,76	< 2,08	12,2	36,38	< 2,08	< 2,08	< 2,08	4,37	4,1	**53,62**	50	2120-C
Total Nitrogen	mg/L	2,46	< 0,01	0,7	< 0,01	0,72	0,03	6,1	0,41	0,89	0,04	2,42	0,04	3,5	0,16	0,5	< 0,01	4,32	< 0,01	3,45	0,04	15	Kalkulasi
Organic Chemical :																							
Oil & Grease**	mg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1	5520 D
Surfactans Anionic as MBAS**	mg/L	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	< 0,03	0,2	5540 C
Phenol**	mg/L	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	< 0,002	0,005	5530 C
BHC***	µg/L	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	210	US EPA SW-846-8081 B
Aldrin/Dieldrin***	µg/L	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	-	US EPA SW-846-8081 B
Chlordane***	µg/L	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	-	US EPA SW-846-8081 B
DDT***	µg/L	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	< 0,6	2	US EPA SW-846-8081 B
Heptachlor***	µg/L	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	-	US EPA SW-846-8081 B
Lindane***	µg/L	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	< 0,4	-	US EPA SW-846-8081 B
Methoxyctor***	µg/L	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	-	US EPA SW-846-8081 B
Endrin***	µg/L	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	4	US EPA SW-846-8081 B
Toxapan***	µg/L	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	-	US EPA SW-846-8081 B

PARAMETER	UoM	TEST RESULT IN 2022																				Threshold Limit	METHOD *)
		RW-1		RW-2		RW-3		RW-5		RW-6		RW-7		RW-8		RW-9		RW-10		RW-11			
		Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4		
Microbiologi :* **																							
Faecal Coliform	Per 100 mL	180	210	400	120	**1.900**	700	160	180	1.000	**1.200**	**1.800**	900	**1.100**	450	**1.800**	**1.200**	240	130	17	110	1.000	9222 B
Total Coliform	Per 100 mL	310	540	620	430	**5.300**	2.100	280	560	2.100	**6.500**	3.900	1.500	2.200	1.600	**6.600**	7.500	350	280	260	550	5.000	9222 D

Source : GDE Monitoring by 3rd party SUCOFINDO, Q3 – Q4 2022
Remarks : Quality standard based on Government Regulation No. 22/2021, Appendix VI concerning National Water Quality Standard;
-) Data not available
**) Standard methods 23rd edition 2017,APHA-AWWA-WEF,*
***) KAN Accreditation Parameter No. LP-781 -1IDN*
****) Based on the results of the analysis of the Sucofindo Cibitung Laboratory*
$^{\Delta}$) Measurements are made at the sampling site.
<)Less than the minimum detection limit

	above threshold limit

Evaluation of trends towards the quality of surface water (rivers and springs) is carried out by looking at the status of water quality referring to the Decree of the Minister of Environment Number 115 of 2003 concerning Guidelines for Determining Water Quality Status. Water quality status according to the Ministerial Decree is the level of water quality that indicates polluted conditions or good conditions at a water source for a certain time by comparing the established water quality standards. Guidelines for determining the status of water quality in this activity use the Pollution Index Method (PI). In principle, the PI method is used to determine the level of pollution relative to permissible water quality parameters (Nemerow, 1974 in Minister of Environment Decree No. 115 of 2003). The Pollution Index (PI) classifies the status of water quality into 4 (four) categories, as follows:

- $0 \leq PI < 1,0$: meets quality standard (good condition)
- $1,0 < PI \leq 5,0$: Lightly polluted
- $5,0 < PI \leq 10$: Moderately polluted
- $PI > 10$: Severely polluted

The results of calculating the status of river water quality using the Pollution Index (PI) method are presented in **Table 23**.

Table 38 Calculation Results of River Water Quality Status During the Construction Activities of the Patuha Unit 2 Geothermal Power Plant

YEAR	PERIOD	RW-1		RW-2		RW-3		RW-4		RW-5		RW-6		RW-7		RW-8		RW-9		RW-10		RW-11	
		PI	STATUS	IP	STATUS	PI	STATUS	PI	STATUS	PI	STATUS	PI	STATUS	PI	STATUS	PI	STATUS	PI	STATUS	PI	STATUS	PI	STATUS
2021	Q1	1,45	Lightly Polluted	-	-	-	-	-	-	0,56	Good	0,82	Good	1,48	Lightly Polluted	1,55	Lightly Polluted	0,70	Good	0,90	Good	0,57	Good
	Q2	0,66	Good	-	-	-	-	-	-	1,01	Lightly Polluted	0,84	Good	0,50	Good	0,49	Good	0,51	Good	0,53	Good	0,91	Good
	Q3	0,50	Good	-	-	-	-	-	-	0,53	Good	0,54	Good	0,51	Good	1,58	Lightly Polluted	0,49	Good	1,56	Lightly Polluted	0,56	Good
	Q4	0,71	Good	-	-	-	-	-	-	0,60	Good	0,85	Good	0,55	Good	0,77	Good	0,51	Good	2,17	Lightly Polluted	0,79	Good
2022	Q1	0,66	Good	0,70	Good	0,54	Good	0,70	-	-	-	-	-	-	-	0,54	Good	-	-	-	-	1,82	Lightly Polluted
	Q2	3,79	Lightly Polluted	0,62	Good	0,50	Good	0,50	Good	0,50	Good	0,52	Good	0,53	Good	0,51	Good	0,53	Good	0,56	Good	3,20	Lightly Polluted
	Q3	0,96	Good	0,52	Good	1,32	Lightly Polluted	0,52	Good	0,59	Good	0,53	Good	0,81	Good	1,86	Lightly Polluted	0,53	Good	0,58	Good	2,79	Lightly Polluted
	Q4	1,82	Lightly Polluted	0,52	Good	0,52	Good	0,52	Good	0,57	Good	3,43	Lightly Polluted	0,92	Good	0,53	Good	0,85	Lightly Polluted	0,53	Good	2,26	Lightly Polluted

Source: Calculation results, 2021 – 2022

Figure 8 illustrated trend of river water pollution index during construction activities of the Patuha Unit 2 Geothermal Power Plant

Based on

Figure able 23, it can be concluded that during the 2nd Semester of 2022 monitoring there were rivers with increased PI values, which meant that there was a decrease in the status of water quality from good to lightly polluted, which occurred in rivers RW-1, RW-6 and RW-9. Apart from that, there are also rivers with a decreased PI value which causes an increase in water quality status from lightly polluted to good condition which occurs in locations RW-3 and RW-8. In addition, there are also rivers with a decreased PI value which causes an increase in water quality status from lightly polluted to good condition which occurs in locations RW-3 and RW-8.

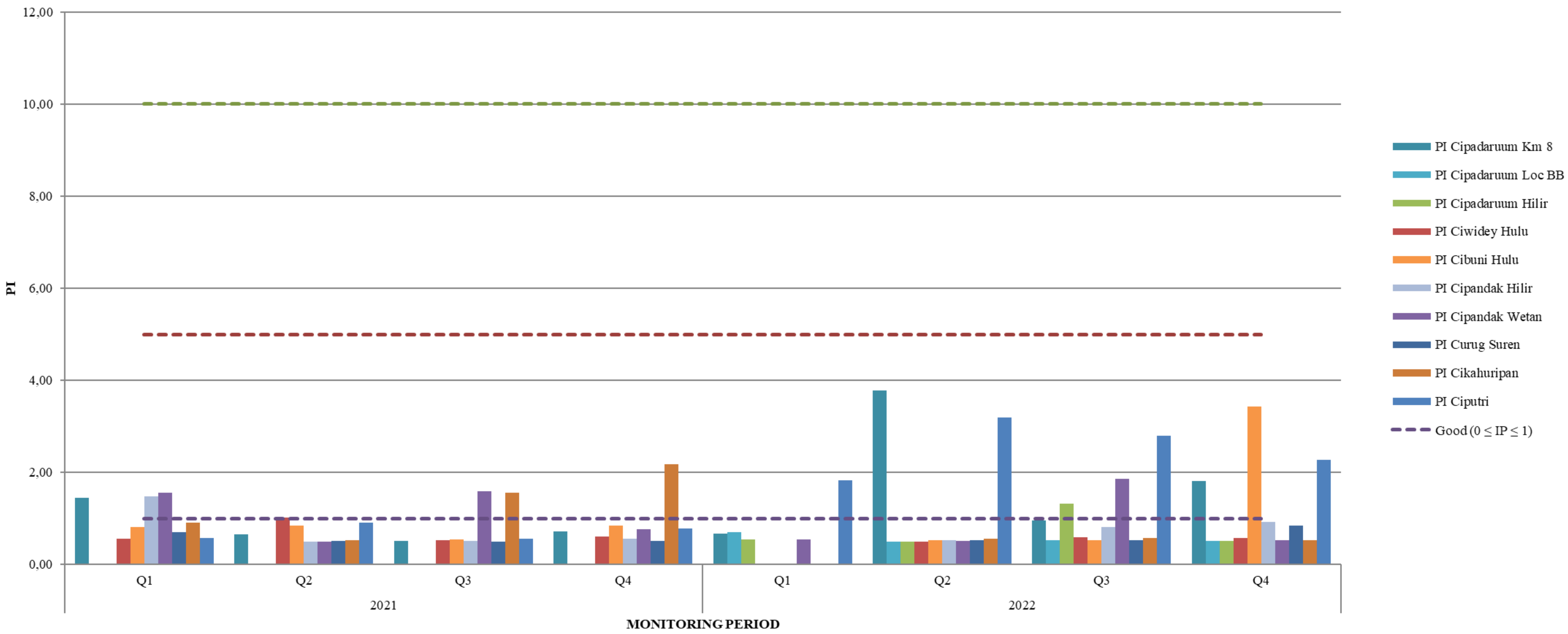


Figure 8 Trend of River Water Pollutant Index (PI) During Construction Activities of the Patuha Unit 2 Geothermal Power Plant

The concentration of parameters that exceed the quality standard is assumed to be a natural condition of the water body affected by natural processes such as seasons, where during the dry season, the river water quality usually deteriorates. The decrease in river water quality is not affected by the geothermal activities of PT Geodipa Energi, as the company does not dispose of waste into the surrounding waters. All of PT Geodipa Energi's wastewater is injected into the injection well.

4. Groundwater (Springwater) Monitoring

During this period of report, measurement of springwater qualities conducted at one location of the 3 monitoring locations in the previous study period, namely the Cihaliwung springwater (7°11'18.10"S - 107°25'0.30"E). The last samplings were taken in November 2022.The summary of laboratory test of Springwater quality can be found in the following table:

Table 39 Springwater Analysis Result

PARAMETER	UoM	RESULT	Threshold Limit	METHOD*)
Physical :				
Turbidity **	NTU	0,1	25	2130 B
Colour **	PtCo	< 2,08	50	2120 C
Total Dissolved Solid (TDS) **	mg/L	124	1.000	2540 C
Temperature **$^{\Delta}$	°C	16,3	± 3°C	2550 B
Odor	-	Odorless	Odorless	Organoleptik
Taste	-	Tasteless	Tasteless	Organoleptik
Microbiology :				
Total Coliform ***	CFU/100 mL	35	50	9222 B
E. Coli ***	CFU/100 mL	0	0	9222 G
Chemical:				
pH on site **$^{\Delta}$	mg/L	6,77	6,5 – 8,5	4500-H^+-B
Iron (Fe) **	mg/L	0,09	1	3111 B
Fluoride (F^-) **	mg/L	< 0,05	1,5	4500-F-D
Total Hardness as $CaCO_3$ **	mg/L	66,6	500	2340 B
Manganese (Mn) **	mg/L	< 0,04	0,5	3111 B
Nitrate (NO_3^- - N) **	mg/L	< 0,10	10	4500-NO_3-B
Nitrite (NO_2^- - N) **	mg/L	< 0,01	1	4500-NO_2-B
Cyanide (CN^-)	mg/L	< 0,01	0,1	4500-CN-E
Surfactan Anionic as MBAS **	mg/L	< 0,03	0,05	5540 C
Total Pesticide ***	mg/L	< 0,06	0,1	US EPA SW 846-8081 B
Additional Element :				
Merkury (Hg)	mg/L	< 0,0008	0,001	3112 B
Arsenic (As)	mg/L	< 0,002	0,05	3114 C

PARAMETER	UoM	RESULT	Threshold Limit	METHOD*)
Cadmium (Cd)	mg/L	< 0,003	0,005	3111 B
Chromium Hexavalent (Cr^{6+})	mg/L	< 0,02	0,05	3500-Cr-B
Selenium (Se)	mg/L	< 0,001	0,01	3114 C
Zinc (Zn) **	mg/L	< 0,04	15	3111 B
Sulfate (SO_4^{2-}) **	mg/L	0,36	400	4500-SO4-E
Lead (Pb)	mg/L	< 0,04	0,05	3111 B
Benzen ***	mg/L	< 0,001	0,01	US EPA SW 846-8015 C
KMnO4 **	mg/L	1,84	10	SNI 01-3554-2015

Source : Laboratory Analysis Result PT. Sucofindo, November 2022
Remarks : #) Minister of Health Regulation No 32/ 2017 concerning Environmental Health Quality Standards and Water Health Requirements for Sanitary Hygiene, Swimming Pools, Solus Per Aqua, and Public Baths as a reference for springwater quality (Appendix I Point A)
**) Standard methods 23rd edition 2017,APHA-AWWA-WEF,*
***) KAN Accreditation Parameter No. LP-781 -1IDN*
****) Based on the results of the analysis of the Sucofindo Cibitung Laboratory*
$^{\Delta}$) Measurements are made at the sampling site.
Colored values indicate parameters that do not fulfill the quality standards
<=Less than the minimum detection limit

The results of the monitoring for the second semester of 2022 (Table 23) show that the analyzed parameters, in general still fulfill the quality standards required by Minister of Health Regulation No. 32 year 2017 concerning Environmental Health Quality Standards and Water Health Requirements for Sanitary Hygiene, Swimming Pools, Solus Per Aqua, and Public Baths as a reference for Springwater quality (Appendix I Point A).

5. Domestic Wastewater

In the monitoring period of the second semester of 2022, the quality of domestic wastewater is taken from the STP unit located in the temporary office (DWW-1), lay down basecamp rig (DWW-2), basecamp rig PPL 4 (DWW-4) and Rig camp PPL 2 (DWW-5) with the results as presented in Table 24 below.

Table 40. Domestic Wastewater Analysis

PARAMETER	UoM	TEST RESULT IN 2022												GRL	METHOD *)
		TEMPORARY OFFICE (DWW-1)						LAYDOWN BASE CAMP RIG (DWW-2)							
		JUL	AGS	SEP	OCT	NOV	DEC	JUL	AGS	SEP	OCT	NOV	DEC		
pH **$^{\Delta}$	-	6,62	6,49	7,22	7,73	6,42	6,51	7,53	7,15	6,9	7,54	7,26	7,30	6,0 – 9,0	4500-H^+-B
TSS **	mg/L	26	53^	42^	29	44^	48^	38^	76^	39^	58^	38^	72^	30	2540 D
BOD	mg/L	57,16^	23,7	25,35	24,46	27.65	46,33^	47,44^	93,60^	39,95^	38,10^	26,08	44,52^	30	5210 B
COD **	mg/L	138^	552^	74,6	59,67	88,19	113^	115^	104^	99,85	95,16	67,72	106^	100	5220 B
Oil & Grease **	mg/L	< 3	3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	5	5520 B
NH_3^- - N **	mg/L	3,2	2,82	3,18	4,82	48,29^	4,32	3,21	14,84^	3,16	4,71	25,58^	4,68	10	4500-NH_3-F
Total Coliform ***	Per 100 mL	76.000^	79.000^	45.000^	70.000^	36.000^	98.000^	52.000^	29.000^	49.000^	61.000^	23.000^	75.000^	3.000	9222 B

PARAMETER	UoM	TEST RESULT IN 2022						GRL	METHOD *)
		BASE CAMP RIG PPL 4 (DWW-4)					RIG CAMP PPL 2 (DWW-5)		
		JUL	AGS	SEP	OCT	NOV	DEC		
pH **$^{\Delta}$	-	7,61	7,47	7,22	7,88	7,17	7,33	6,0 – 9,0	4500-H^+-B
TSS **	mg/L	10	102^	150^	44^	89^	71^	30	2540 D
BOD	mg/L	52,76^	291^	69,65^	57,55^	63,57^	33,99^	30	5210 B
COD **	mg/L	122^	632^	173^	137^	161^	80,95	100	5220 B
Oil & Grease **	mg/L	< 3	4	< 3	< 3	< 3	< 3	5	5520 B
NH_3^- - N **	mg/L	3,17	17,81^	3,19	4,60	26,59	4,89	10	4500-NH_3-F
Total Coliform ***	Per 100 mL	13.000^	34.000^	53.000^	65.000^	8.000^	32.000^	3.000	9222 B

Source: PT. Sucofindo Environmental Laboratory, Jul - Dec 2022
Remarks : Quality standard based on the Ministry of Environment and Forestry Regulation No. P.68/Menlhk/Setjen/Kum.1/8/2016 Year 2016 concerning Domestic Wastewater Quality Standards; (*) Standard methods 23rd edition 2017,APHA-AWWA-WEF; (**) KAN Accreditation Parameter No. LP-781-IDN; (***) Based on the results of the SBU analysis of the Sucofindo Cibitung Laboratory; ($^{\Delta}$) Measurements are made at the sampling site; (^) above regulation limits

	above threshold limit

The wastewater generated from camp and office in the Patuha2 project area undergoes treatment in a Sewage Treatment Plant (Septic Tank). Instead of being discharged into nearby streams, the wastewater is periodically collected by a third party and transported to the Waste Water Treatment Plant in Bandung for disposal.

6. Aquatic Biota Monitoring

The aquatic biota analyzed in this study include plankton (phytoplankton and zooplankton) and benthos. The location for sampling water biota is in the same place as the sampling of surface water quality.

Plankton

Based on the results of monitoring in Q3-2022 and Q4-2022, 28 types of Plankton were identified, consisting of 23 types of Phytoplankton and 5 types of Zooplankton. The abundance of phytoplankton ranged from 300 individuals/m^3 – 272.200 individuals/m^3 while the abundance of zooplankton ranged from 300 individuals/m^3 – 60.000 individuals/m^3. Phytoplankton is a biological parameter that can be used as an indicator to evaluate the quality and level of fertility of a water. Phytoplankton is also the largest contributor of oxygen in a water. The importance of the role of phytoplankton as the initial carrier of solar energy makes phytoplankton important for aquatic life (Fachrul, 2005).

The biological indices observed were the diversity index (H') and the dominance index (D). Phytoplankton diversity index (H') ranged from 0,00 – 1,43 while zooplankton diversity index (H') ranged from 0,00 – 0,64. This value indicates that the plankton community at the study site is quite stable and classified as having moderate diversity.

The dominance index (D) of phytoplankton ranged from 0,00 to 1,00, as well as the zooplankton dominance index. The value of D ranges from 0 to 1. The smaller the value of D, it indicates that there is no dominant species, on the contrary, the larger the value indicates that there are certain dominant species. This value indicates that there is no dominant species in the waters at the study site.

Table 41 Plankton Composition in River Water Samples Around the Patuha Geothermal Power Plant Area (1st Semester-2022)

ORGANISM	CIPUTRI		CIPADARUUM KM. 7		CIPADARUUM UPSTREAM-LOC BB		CIPADARUUM DOWNSTREAM-LOC BB		CIWIDEY UPSTREAM		CIBUNI UPSTREAM		CIPANDAK HILIR		CIPANDAK WETAN		CURUG SUREN		CIKAHURPIAN		METHOD
	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	
PHYTOPLANKTON																					Enumeration (Sensus-SRC) / APHA 2017 (10200 F)
BACILLARIOPHYCEAE																					
Amphora sp.			2.000										1.000		1.000		1.000				
Coscinodiscus sp.		300														600			1.000	600	
Cyclotella sp.			1.000						1.000						1.000				1.000		
Cymbella sp.																			2.000		
Melosira sp.																			19.000		
Navicula sp.	2.000			300	25.000		16.000			600			3.000	900			8.000		5.000		
Cocconeis sp.					1.000	300	1.000	600				600				600		300			
Guinardia sp.					2.000		2.000														
Nitzschia sp.	3.000		1.000		8.000		3.000						2.000		1.000		5.000				
Surirella sp.					3.000		2.000		1.000												
Pleurosigma sp.	1.000																				
Lauderia sp.			4.000								78.000				35.000		90.000				
Synedra sp.			1.000	300				300		300	1.000			600	3.000		40.000				
Fragillaria sp.									32.000		1.000					600	272.000				
Pinnularia sp.																	3.000				
Leptocylindricus sp.				300																	
Rhizosolenia sp.												300		3.300							
DINOPHYCEAE																					
Dissodinium sp.					1.000		1.000														
Ceratium sp																600					
Noctiluca sp										300											
ZYGNEMATOPHYCEAE																					
Cosmarium sp.	2.000																				
Closterium sp.		300																		600	
CHLOROPHYCEAE																					
Scenedesmus sp.													5.000								
Taxa (S)	**4**	**2**	**5**	**3**	**6**	**1**	**6**	**2**	**3**	**3**	**3**	**2**	**4**	**3**	**5**	**4**	**7**	**1**	**5**	**2**	
Abundance (Cell/m³)	**8.000**	**600**	**9.000**	**900**	**40.000**	**300**	**25.000**	**900**	**34.000**	**1.200**	**80.000**	**900**	**11.000**	**4.800**	**41.000**	**2.400**	**419.000**	**300**	**28.000**	**1.200**	
Diversity Index (H')	**1,32**	**0,69**	**1,43**	**1,01**	**1,14**	**0**	**1,00**	**0,64**	**0,26**	**1,04**	**0,13**	**0,64**	**1,24**	**0,83**	**0,60**	**1,39**	**1,01**	**0**	**1,00**	**0,69**	
Equitability Index (E)	**0,95**	**0,5**	**0,89**	**0,67**	**0,64**	**0**	**0,52**	**0,55**	**0,24**	**0,63**	**0,12**	**0,55**	**0,89**	**0,48**	**0,37**	**0,75**	**0,52**	**0**	**0,62**	**0,5**	
Dominance Index (D)	**0,28**	**0,5**	**0,28**	**0,33**	**0,44**	**1**	**0,24**	**0,45**	**0,89**	**0,37**	**0,95**	**0,44**	**0,32**	**0,52**	**0,74**	**0,25**	**0,48**	**0**	**0,5**	**0,5**	
ZOOPLANKTON																					Enumeration (Sensus-SRC) / APHA 2017 (10200 G)
CILIATA	60.000		1.000		10.000		8.000		1.000				5.000				13.000		16.000		
OLIGOTRICHEA																					
Codonellopsis sp.																			1.000		
Tintinnopsis sp.										600											
OLIGOHYMENOPHOREA																					
Colpidium sp.				600		300		600						7.200				2.100			
TUBULINEA																					
Arcella sp.										300											
Taxa (S)	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**2**	**0**	
Abundance (Ind/m³)	**60.000**	**0**	**1.000**	**600**	**10.000**	**300**	**8.000**	**600**	**1.000**	**900**	**0**	**0**	**0**	**7.200**	**0**	**0**	**13.000**	**2.100**	**17.000**	**0**	
Diversity Index (H')	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,64**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,22**	**0**	
Equitability Index (E)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,56**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,32**	**0**	
Dominance Index (D)	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**	**0,44**	**0,00**	**0,00**	**1,00**	**1,00**	**0,00**	**0,00**	**1,00**	**1,00**	**0,89**	**0**	
TOTAL H'	**1,32**	**0,69**	**1,43**	**1,01**	**1,14**	**0,00**	**1,00**	**0,64**	**0,26**	**1,68**	**0,13**	**0,64**	**1,24**	**0,83**	**0,60**	**1,39**	**1,01**	**0,00**	**1,22**	**0,69**	
TOTAL D	**1,28**	**1,50**	**1,28**	**1,33**	**1,44**	**2,00**	**1,24**	**1,45**	**1,89**	**0,81**	**0,95**	**0,44**	**1,32**	**1,52**	**0,74**	**0,25**	**1,48**	**1,00**	**1,39**	**0,50**	

Source : Laboratory analysis results of PT. Sucofindo (Persero), S2-2022

Benthos

Based on the results of monitoring in the second semester of 2022, 10 types of benthos were identified. The abundance of benthos only ranges from 4 – 200 ind/m^2. The diversity index (H') of benthos ranges from 0,00 – 1,50 which indicates that the diversity is low to moderate. In general, the diversity of benthos in the study area is moderate and has an unstable community. Judging from the diversity index and dominance index, the benthos community structure generally shows an unstable condition. The dominance index (D) of benthos ranges from 0,00 – 1,00 which means that in general the distribution of benthos individuals in the study location is evenly distributed. The complete condition of aquatic biota in the waters of the rivers around the Patuha PLTP location is presented in Table 26 below.

Table 42 Benthos Composition in River Water Samples (Second Semester-2022)

ORGANISM	CIPUTRI		CIPADARUUM KM. 7		CIPADARUUM UPSTREAM-LOC BB		CIPADARUUM DOWNSTREAM-LOC BB		CIWIDEY UPSTREAM		CIBUNI UPSTREAM		CIPANDAK HILIR		CIPANDAK WETAN		CURUG SUREN		CIKAHURPIAN		METHOD
	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	Q3	Q4	
COLEOPTERA (Larva)			4																		SNI 03-3401-1994
OLIGOCHAETA	22												4						4		
HEMIPTERA (Larva)					4		4														
TRICHOPTERA (Larva)	4		7		15		18		7		7				15		7				
HIRUDINEA																					
Hirudo sp.									4												
DIPTERA																	4				
Chironomus sp.									4												
CERATOPOGONIDAE																	4				
TABANIDAE											4										
GASTROPODA																					
Neritina sp.										100											
ANNELIDA																					
Tubifex sp.		200																		200	
Taxa (S)	**2**	**1**	**2**	**0**	**2**	**0**	**2**	**0**	**3**	**1**	**2**	**0**	**1**	**0**	**1**	**0**	**3**	**0**	**1**	**1**	
Abundance (Ind/m²)	**26**	**200**	**11**	**0**	**19**	**0**	**22**	**0**	**15**	**100**	**11**	**0**	**4**	**0**	**15**	**0**	**15**	**0**	**4**	**200**	
Diversity Index (H')	**0,59**	**0**	**0,92**	**0**	**0,72**	**0**	**0,65**	**0**	**1,5**	**0**	**0,92**	**0**	**0**	**0**	**0**	**0**	**1,5**	**0**	**0**	**0**	
Equitability Index (E)	**0,59**	**0**	**0,92**	**0**	**0,72**	**0**	**0,63**	**0**	**0,95**	**0**	**0,92**	**0**	**0**	**0**	**0**	**0**	**0,95**	**0**	**0**	**0**	
Dominance Index (D)	**0,76**	**1**	**0,56**	**0,00**	**0,68**	**0**	**0,58**	**0**	**0,38**	**1**	**0,56**	**0**	**1,00**	**0**	**1,00**	**0**	**0,38**	**0**	**1,00**	**1,00**	

Source : Laboratory analysis results of PT. Sucofindo (Persero), S2-2022

7. Solid Waste Management

During the construction phase of the Patuha Unit 2 Geothermal Power Plant, waste in the form of drilling mud and cuttings was generated from the drilling activities of the Patuha Unit 2 Geothermal Power Plant. The drill cutting generated from drilling activity has been managed and utilized such as for the bricks making, lining materials for road base and road pavements, untill December 2022, it was recorded that 4.514,1 m^3 of waste from drilling activities in the Patuha 2 Geothermal Power Plant steam field had been utilized as presented in the following table.

Table 431 Types of Utilization of Waste from Drilling Activities During 2022

PERIOD IN 2022	VOLUME (M^3)			TOTAL (M^3)
	BRICK MAKING	ROAD BASE	ROAD PAVEMENT	
JAN	0,3	26,5	60,2	87,0
FEB	17,4	46,7	252,0	316,1
MAR	32,7	47,5	312,2	392,4
APR	9,7	42,0	60,2	111,9
MAY	24,6	256,0	316,4	597,0
JUN	40,0	256,8	316,4	613,2
JUL	16,7	4,4	557,2	578,3
AGS	36,8	16,4	831,6	884,8
SEP	4,8	-	96,6	101,4
OCT	22,3	-	196,0	218,3
NOV	37,8	20,4	445,2	503,4
DEC	15,9	13,2	81,2	110,3
TOTAL	**259,0**	**729,9**	**3.525,2**	**4.514,1**

Source: Geo Dipa Energi, Dec 2022

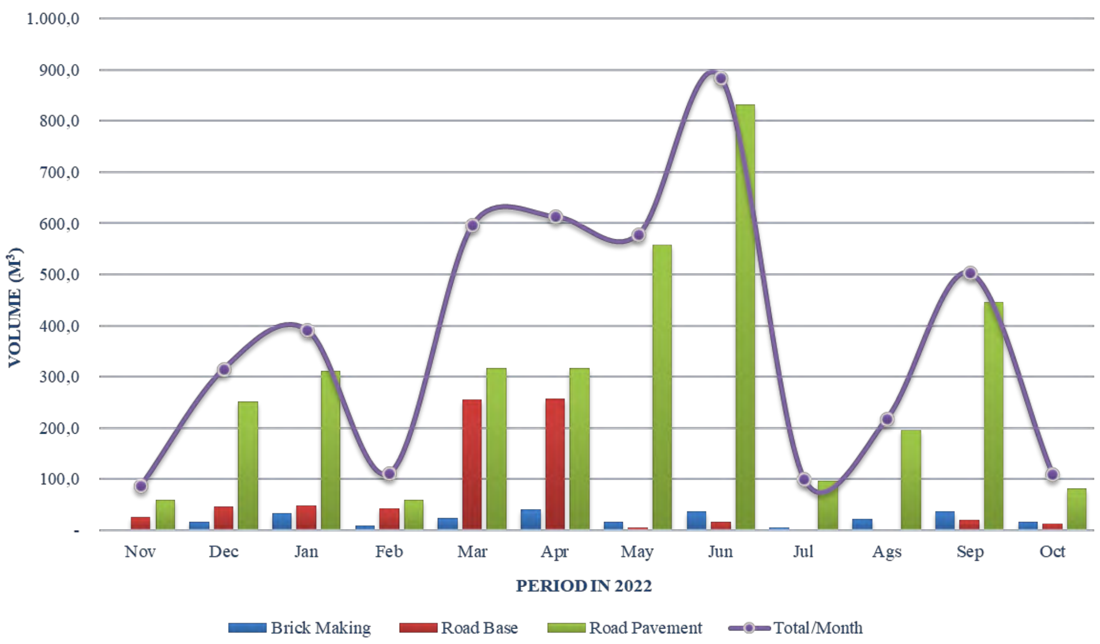


Figure 9 Graph of Waste Utilization Volume from Steam Field Drilling Activities

Meanwhile, the volume of domestic waste during the period November 2021 to December 2022 was 826 m^3 which was sourced from the Rig Area, Base Camp, 3 units of stalls and 1 unit of PPL. The volume of domestic waste that has been generated is presented in the following table.

Table 44 Domestic Solid Waste Volume

YEAR	MONTH	VOLUME (M^3)
2021	Nov	21
	Dec	50
2022	Jan	55
	Feb	65
	Mar	85
	Apr	64
	May	71
	Jun	64
	Jul	60
	Ags	63
	Sep	61
	Oct	62
	Nov	62
	Dec	43
TOTAL		**826**

Source: Geo Dipa Energi, Dec 2022

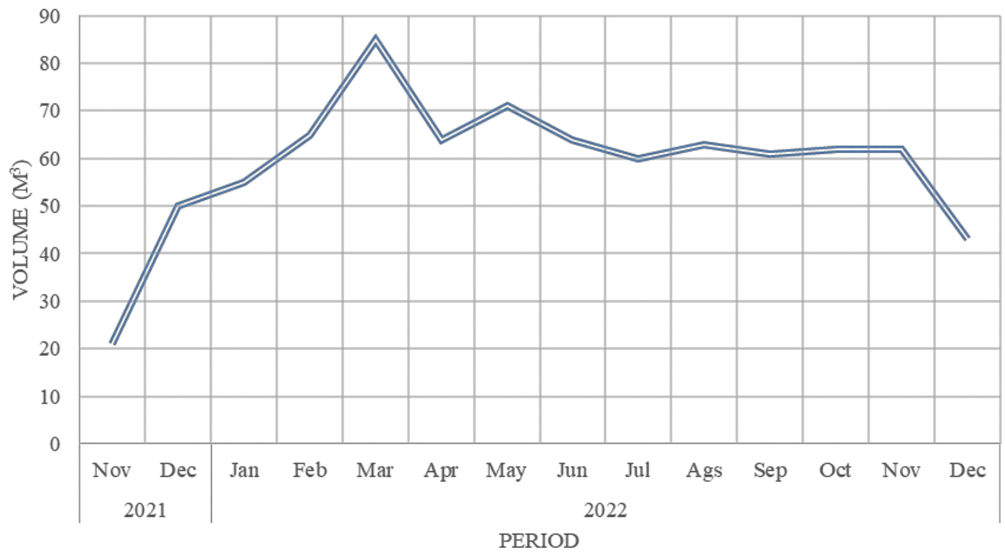


Figure 10 Domestic Waste Volume Trends

The drill cutting waste is temporarily stored in the laydown area, while domestic waste is placed in a temporary waste storage area before being transported by a third party. Waste management is quite good, where 3-colored trash cans are available in areas that produce waste, there is no scattered waste, piles of garbage are neatly wrapped in plastic bags which are placed in temporary waste collection sites.

Figure 11 Trash Cans at Multiple Source Locations

In addition, since the monitoring period for the third Quarter of 2021, there has been an integrated waste management unit building around the Patuha Geothermal Power Plant location. Solid waste transportation from the construction areas to the Sugihmukti Integrated Waste Treatment Site, is carried out routinely every Tuesday and Friday every week.

Figure 12 Sugihmukti Integrated Waste Management Area

8. Biodiversity Monitoring

The observations of flora and fauna conditions were carried out in locations around Areas BB, U and H intended to determine the existing conditions before the Patuha Unit 2 Geothermal Power Plant was built. Locations for observing flora and fauna around Areas BB, U and H are presented in the following figure.

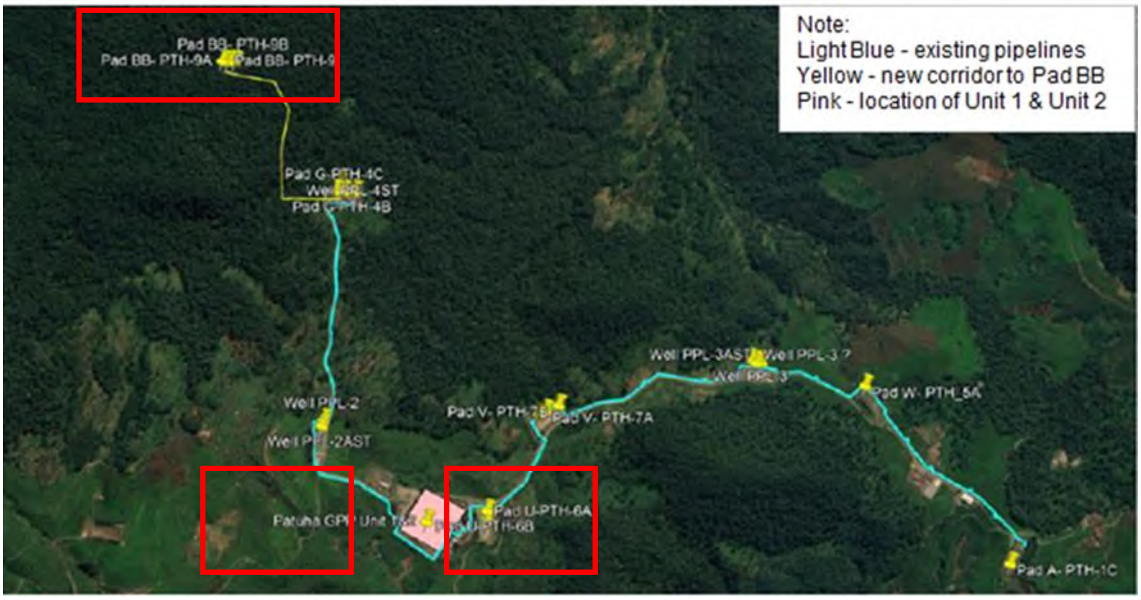


Figure 13 Observation Location of Flora and Fauna Around Area BB, U and H

8.1 Terrestrial Flora

Observations of flora conditions were carried out at several points at BB location, that are U area and H area. Observations were focused on the inventory of species and environmental conditions. Based on the results of observations at the study site, several typologies of vegetation were recorded as described below.

Area BB and Its Surroundings

Environmental monitoring at the BB location is monitored by looking at the location of the road paths and the BB area itself. Monitoring is focused on observing changes in the composition and structure of vegetation as a result of land clearing for access roads and loc BB. The entrance to the BB location is in front of area G to the west.

The Patuha Geothermal Power Plant area itself is in the area of the mountainous vegetation zone/mountain zone where the trunk diameter is above 30 cm with continuous tree crowns, composed by the main plants Kihujan, Puspa and Katulampa. The tree trunks are covered with moss, lichen and there are many epiphytic plants, both ferns and orchids that stick to the stems which are characteristic of the lower montane forests. Epiphytic orchids endemic to Java and Bali are also found in this area, namely *Oberonia similis* and *Schoenorchis juncifolia*.

In the monitoring period of Semester II in 2022, the activities of cutting plant stands have been completed where land clearing is only in the areas needed. At the edge of the access road, the road walls were tidied with soil, which resulted in several areas being buried by soil and exposed to sediment flow from the heap of soil on the road walls.

Changes that occur as a result of land clearing can change the composition and structure of the vegetation on the edges. In addition, the presence of material entering the road body can result in the carrying of plant seeds from the location of the material's origin so that it will cause invasive species to enter the natural vegetation structure. The length of the impact depends on the high intensity of incoming sunlight and the condition of the structure on the forest floor. High competition on the forest floor as a result of increasing coverground and the emergence of invasive species can increase competition on the forest floor, especially in woody plants in the study area. The impact length from the edge of the opening/border of the opening can be up to 25 m or more. The intensity of the sun, which was initially restrained by the dense canopy during the day, is now getting bigger. Plants with a diameter of more than 15 cm are relatively undisturbed because naturally plants of that size are considered stable.

The BB area has an inclination of 5°- 40°. In open areas it is generally overgrown by Kirinyuh (*Austroeupatorium inulifolium*). Based on monitoring results up to Semester II of 2022, 32 types of vegetation were found in Area BB. The following is a list of the types of flora found in the natural forest around Area BB.

Table 45 List of Plant Species Around BB Area

NO.	LOCAL NAME	SCIENTIFIC NAME	CONSERVATION STATUS		
			IUCN	CITES	RI
1	Anggrek tanah	*Calanthe flava*			UP
2	Bubukuan	*Strobilanthes paniculata*			UP
3	Cerem	*Macropanax dispermum*			UP
4	Congkok	*Molinera capitulata*			UP
5	Hariang beureum	*Begonia robusta*			UP
6	Hariang hejo	*Begonia isoptera*			UP
7	Hiur	*Castanopsis cuspidata*	LC		
8	Huru	*Litsea fulva*			UP
9	Huru batu	*Actinodaphne glomerata*	LC		
10	Huru koneng	*Litsea angulata*			UP
11	Jambu alas	*Syzygium densilflorum*			UP
12	Jamuju	*Dacrycarpus imbricatus*			UP
13	Kadanca	*Platea latifolia*			UP
14	Katulampa	*Acer laurinum*			UP
15	Ki hujan	*Engelhardia spicata*			UP
16	Ki jeruk	*Acronychia lauriflora*			UP

NO.	LOCAL NAME	SCIENTIFIC NAME	CONSERVATION STATUS		
			IUCN	CITES	RI
17	Ki mangkok	*Hellicia serrata*			UP
18	Ki putri	*Podocarpus neriifolius*	LC	III	
19	Ki sireum	*Syzygium lineatum*			UP
20	Ki tambaga	*Syzygium antisepticum*			UP
21	Ki tiwu	*Meliosma sumatrana*			UP
22	Kirinyuh	*Austroeupatorium inulifolium*			UP
23	Pasang	*Lithocarpus sundaica*			UP
24	pereng	*Psychotria montana*			UP
25	Puspa	*Schima wallichii*	LC		
26	Ramo telu	*Schefflerea divaricata*			UP
27	Sintok	*Cinnamomum sintoc*			UP
28	Sisik penyu	*Elatostema strigosum*			UP
29	Teklan	*Ageratina adenophora*			UP
30	Teklan	*Ageratina riparia*			UP
31	Tepus	*Ammomum cardamomum*			UP
32	Walen	*Ficus ribes*			UP

Source: Primary Data, S2-2022

Remarks:
1) *RI: Minister of Environment and Forestry Regulation No. 106 of 2018 concerning Protected Types of Plants and Animals (P (Protected), UP (Unprotected)*
2) *IUCN (International Union for Conservation of Nature):*
   - *DD = data deficiency*
   - *LC = least concern*
   - *NT = near threatened*
   - *VU = vulnerable*
   - *EN = endangered*
   - *CR = critacally endangered*
3) *CITES (Convention of International Trade in Endangered Species of Wild Fauna and Flora):*
   - *I (Apendiks I): a list of all wild plant and animal species prohibited in all forms of international trade*
   - *II (Apendiks II): List of wildlife species that can be traded internationally with certain quota restrictions based on accurate data on populations and trends in nature*
   - *III (Apendiks III): a list of protected wild plant and animal species in certain countries within the boundaries of their habitat areas, and at some point their ranking may be raised to Appendix II or Appendix I*

Up to Semester 2 of 2022, land preparation is underway, where the cutting of plants has been completed. Some of the unused soil was piled up on the sides of the road and the BB area, causing a small amount of vegetation to be covered in that location. Some of the erosion that carried the soil by running water was seen covering the forest floor so that it slightly affected the individual composition, but the species composition was still relatively the same.

It has been stated previously that the existence of clearings or open areas in a natural forest area will result in changes in the composition and structure of the vegetation therein. These changes also more or less affect the presence of animals that occupy the area. There was also an increase in shrubs and cover ground, which was the result of the opening of the tree canopy so that the intensity of light entering the forest floor was greater than usual. The height of shrubs can cause seedlings/saplings of large trees to stunt their growth.

The BB area itself is overgrown with large trees with a trunk diameter of up to 150cm or more. There is no significant change in the types of plants that dominate the BB area, but visually it can be seen from the increase in the group of shrubs. The dominating plants can be seen from the IVI values in the results of the following vegetation analysis: Trees, namely, Puspa (*Schima wallichii*) Ki hujan (*Engelhardia spicata*), and Cerem (*Macropanax dispermum*); The poles, namely Cerem (*Macropanax dispermum*), Jambu Alas (*Syzygium sp*), and Ki jeruk (*Acronychia pedunculata*); Saplings, namely Cerem (*Macropanax dispermum*), Jambu alas (*Syzygium sp*) and Ki jeruk (*A. pedunculata*); Shrubs, namely Bukukuan Biru (*Dichroa febrifuga*), Bulubunan (*Strobilanthes cernua*), Kiseureuh (*Piper sulcatum*); The seedlings and cover ground are Cyrtandra (*Cyrtandra picta*), Bubukuan Biru (*D. febrifuga*), and Elatostema (*Elatostema lineolatum*).

The diversity index value (H') at BB locations for the tree category was 1,76; poles were 2,356; sapling was 2,30; shrub by 1,52; seedling and ground cover were 2,065. The value of diversity (H') at the BB location ranged from 1,42 – 2,36, this value indicates that the diversity of flora at this location is moderate (1 < H' < 3).

The results of the analysis of vegetation showed a slight increase in shrubs and cover ground, this was the result of land preparation activities where the intensity of the sun entering the forest floor increased and accelerated the growth of shrubs. Apart from that, there is another potential, namely the potential for invasive/alien species seeds carried from material for building roads.

Pruning is done as a pre-cleaning stage. So far, thorough clearing of vegetation from trees to seedlings as part of land preparation for the access road to the BB area has so far been completed for ± 580 meters with a width of 10m. Partial clearing of seedlings, shrubs and undergrowth for the access road measurement survey was found at several points along the proposed road alignment leading to the BB location.

Table 46 Vegetation Analysis Around BB Area

NO	LOCAL NAME	SCIENTIFIC NAME	FR	KR	DR	IVI	H'
	TREE						
1	Puspa	*Schima walichii*	25,00	35	60,94	120,94	0,37
2	Ki hujan	*Engelhardia spicata*	18,75	20	20,17	58,92	0,32
3	Cerem	*Macropanax dispermum*	12,50	10	7,05	29,55	0,23
4	Kadanca	*Platea latifolia*	12,50	10	5,09	27,59	0,23
5	Kawoyang	*Prunus arborea*	12,50	10	2,78	25,28	0,23
6	Pasang	*Lithocarpus pallidus*	12,50	10	2,39	24,89	0,23
7	Jambu alas	*Syzygium sp.*	6,25	5	1,59	12,84	0,15
	Total		**100**	**100**	**100**	**300**	**1,760**
	POLE						
1	Cerem	*Macropanax dispermum*	22,73	20,00	30,16	72,89	0,32
2	Jambu alas	*Syzygium sp.*	13,64	12,00	9,06	34,69	0,25
3	Ki jeruk	*Acronychia pedunculata*	9,09	8,00	7,75	24,84	0,20
4	Huru dapung	*Litsea resinosa*	9,09	8,00	5,09	22,18	0,20
5	Ki bancet	*Turpinia sphaerocarpa*	4,55	8,00	4,76	17,31	0,20
6	Pasang gebod	*Lithocarpus sp.*	4,55	8,00	4,44	16,98	0,20
7	Ki hujan	*Engelhardia spicata*	4,55	8,00	3,54	16,08	0,20
8	Sintok	*Cinnamomum sintoc*	4,55	4,00	3,54	12,08	0,13

NO	LOCAL NAME	SCIENTIFIC NAME	FR	KR	DR	IVI	H'
9	Puspa	*Schima walichii*	13,64	12,00	24,65	50,29	0,25
10	Jamuju	*Dacrycarpus imbricatus*	4,55	4,00	5,09	13,64	0,13
11	Heas	*Syzygium sp.*	4,55	4,00	1,11	9,65	0,13
12	Kareumbi	*Homalanthus populneus*	4,55	4,00	0,81	9,36	0,13
	Total		**100**	**100**	**100**	**300**	**2,356**
	SAPLING						
1	Cerem	*Macropanax dispermum*	13,64	18,75	21,38	53,76	0,31
2	Jambu alas	*Syzygium sp.*	13,64	18,75	12,35	44,73	0,31
3	Kareumbi	*Homalanthus populneus*	13,64	9,38	16,55	39,57	0,22
4	Ki hujan	*Engelhardia spicata*	9,09	6,25	9,88	25,23	0,17
5	Bubukuan	*Dichroa febrifuga*	4,55	6,25	1,23	12,03	0,17
6	Sintok	*Cinnamomum sintoc*	4,55	6,25	1,23	12,03	0,17
7	Talingkup	*Claoxylon longifolium*	4,55	6,25	0,55	11,34	0,17
8	Kibancet	*Turpinia sphaerocarpa*	4,55	3,13	0,31	7,98	0,11
9	Ki putri	*Podocarpus neriifolius*	4,55	3,13	2,19	9,86	0,11
10	Jamuju	*Dacrycarpus imbricatus*	9,09	6,25	5,43	20,77	0,17
11	Puspa	*Schima walichii*	13,64	12,50	28,76	54,90	0,26
12	Pasang	*Lithocarpus pallidus*	4,55	3,13	0,14	7,81	0,11
	Total		**100**	**100**	**100**	**300**	**2,301**
	SEEDLING						
1	bubukuan biru	*Dichroa febrifuga*	21,74	44,68	35,00	101,42	0,36
2	Bubukuan bulu	*Strobilanthes cernua*	13,04	25,53	31,67	70,24	0,35
3	Ki sereuh	*Piper sulcatum*	13,04	13,83	10,00	36,87	0,27
4	pohpohan	*Pilea melastomoides*	17,39	7,45	8,33	33,17	0,19
5	Kores	*Psychotria montana*	13,04	3,19	5,00	21,23	0,11
6	Bingbin	*Pinanga coronata*	4,35	1,06	3,33	8,74	0,05
7	Harendong	*Melastoma affine*	4,35	1,06	1,67	7,08	0,05
8	Solanaceae	*Solanum sp.*	4,35	1,06	1,67	7,08	0,05
9	Pining	*Hornstedtia sp.*	4,35	1,06	1,67	7,08	0,05
10	Breynia	*Breynia racemosa*	4,35	1,06	1,67	7,08	0,05
	Total		**100**	**100**	**100**	**300**	**1,527**
	COVER GROUND						
1	Cyrtandra	*Cyrtandra picta*	15,63	30,30	17,65	63,58	0,36
2	bubukuan biru	*Dichroa febrifuga*	12,50	22,22	11,76	46,49	0,33
3	Elatostema	*Elatostema lineolatum*	12,50	8,08	15,69	36,27	0,20
4	Pohpohan	*Pilea melastomoides*	9,38	14,14	11,76	35,28	0,28
5	Sisik penyu	*Elatostema erigosim*	3,13	2,02	3,92	9,07	0,08
6	Hariag bodas	*Begonia multiangula*	9,38	3,03	9,80	22,21	0,11
7	Tepus	*Ammommum cardamomum*	3,13	1,01	1,96	6,10	0,05
8	Congkok	*Curculiogo latifolia*	9,38	5,05	7,84	22,27	0,15
9	Hariang bereum	*Begonia robusta*	6,25	2,02	3,92	12,19	0,08
10	Kores	*Psychotria montana*	3,13	5,05	3,92	12,10	0,15
11	Jamuju	*Dacrycarpus imbricatus*	6,25	2,02	3,92	12,19	0,08
12	Ilat	*Carex baccans*	3,13	1,01	3,92	8,06	0,05
13	Elatostema 2	*Elatostema sp.*	3,13	3,03	1,96	8,12	0,11
14	Anggrek kalanthe	*Calanthe flava*	3,13	1,01	1,96	6,10	0,05
	Total		**100**	**100**	**100**	**300**	**2,065**

Source: Primary Data, Semester 2-2022

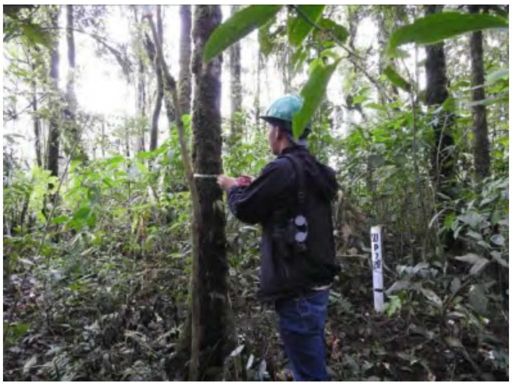



Figure 14 Condition of Vegetation Around BB Area

Vegetation cleaning on the access road to the BB location

Road access to loc BB in the third quarter of 2022

Boundary cleared area and natural forest

Land Cleared at Loc BB

Figure 15 Condition of Vegetation Around BB Area

Area U and Its Surrounding

The location of the U area well is adjacent to the Power Plant Unit 1 Patuha. Environmental monitoring of the flora aspect carried out in area U shows the condition of the plants around the well area area U and the reforestation efforts carried out by PT. Geo Dipa Energi Compliance Unit. The main monitoring point is in the eastern area of location U which borders the PHBM land, while reforestation efforts are carried out in the area near the fence surrounding the area U well.

This location is expected to be exposed to a lot of H_2S gas generated from cooling tower operations. Apart from being a well area, activities in area U include temporary storage of goods and large vehicle parking. Currently around area U has been reforested. The types of green plants used are Ki badak (*Alnus japonica*) and Cemara (*Cupressus sempervirens*).

Based on the monitoring results, visually there is no visible disturbance to the greenery around the operation area U. Besides being directly adjacent to the Power Plant, Area U is also bordered by tea gardens and PHBM land where many hard plants grow on the PHBM land, starting from Ki badak (*Alnus japonica*), Cemara (*Cupressus sempervirens*), Kayu putih (Eucalyptus alba), Kayu manis (Cinnamomum verum) and other plants. Basically, PHBM land is a natural forest buffer area that has hardwood and can be utilized.

There was no significant change in the plants around area U. The species composition obtained tended to be the same, but there were slight changes at the level of seedlings and shrubs but did not affect the structure significantly. The dominating plants are Kibadak in the tree category with an IVI value of 230,53%; Likewise in the category of the highest IVI poles are the types of Kibadak, Kayuputih and Salam; in the sapling category, coffee plants dominate with an IVI value of 145,87%. Plants in this sapling category are plants that are deliberately planted to improve the quality of PHBM land; in the shrub category it was dominated by Kirinyuh and in the seedlings and coverground it was dominated by Teklan. Based on the results of the vegetation analysis conducted in the nearest PHBM area to Area U, the following results were obtained.

Table 47 Vegetation Analysis Around U Area

NO	LOCAL NAME	SCIENTIFIC NAME	FR	KR	DR	INP	H'
	TREE						
1	Cemara	*Cupressus sampevirens*	28,57	28,57	12,33	69,47	0,36
2	Kibadak	*Alnus japonica*	71,43	71,43	87,67	230,53	0,24
	Total		**100**	**100**	**100**	**300**	**0,60**
	POLE						
1	Cemara	*Cupressus sampevirens*	15,38	13,33	3,85	32,57	0,27
2	Kibadak	*Alnus japonica*	38,46	40,00	69,87	148,33	0,37
3	Salam	*Syzygium densiflorum*	15,38	13,33	8,63	37,34	0,27
4	Kaletes/Kayu putih	*Eucalyptus alba*	15,38	20,00	12,29	47,68	0,32
5	Slamaner	*Grevillea robusta*	15,38	13,33	5,36	34,08	0,27
	Total		**100**	**100**	**100**	**300**	**1,49**
	SAPLING						
1	Kayu manis	*Cinnamomum verum*	15,79	13,16	17,16	46,11	0,27
2	Kopi	*Coffea sp*	26,32	52,63	66,92	145,87	0,34
3	Damar	*Agathis damara*	10,53	5,26	1,55	17,34	0,15
4	Kibadak	*Alnus japonica*	10,53	10,53	3,41	24,46	0,24
5	Kaletes/Kayu putih	*Eucalyptus alba*	5,26	2,63	1,99	9,89	0,10
6	Suren	*Toona sureni*	15,79	7,89	5,07	28,75	0,20
7	Cemara	*Cupressus sampevirens*	5,26	2,63	1,91	9,80	0,10
8	Slamaner	*Grevillea robusta*	10,53	5,26	1,99	17,78	0,15
	Total		**100**	**100**	**100**	**300**	**1,54**
	SHRUB						
1	Kirinyuh	*Austroeupatorium inulifolium*	45,45	57,69	74,35	177,49	0,32
2	Kaliandra	*Caliandra calothyrsus*	18,18	19,23	11,52	48,93	0,32
3	Harendong	*Melastoma affine*	18,18	7,69	7,17	33,05	0,20
4	Totongoan	*Debregeasia sp.*	18,18	15,38	6,96	40,52	0,29
	Total		**100**	**100**	**100**	**300**	**1,12**
	SEEDLING &						

NO	LOCAL NAME	SCIENTIFIC NAME	FR	KR	DR	INP	H'
	COVERGROUND						
1	Teklan	*Ageratina riparia*	15,63	42,02	19,80	77,44	0,36
2	Babadotan	*Ageratum conyzides*	12,50	7,56	10,56	30,62	0,20
3	Hareuga	*Bidens pilosa*	9,38	4,20	8,25	21,83	0,13
4	Teki	*Cyperus digittatus*	6,25	2,52	6,93	15,70	0,09
5	Tapak liman	*Elephantopus scaber*	9,38	4,20	8,25	21,83	0,13
6	Jukut Karukuan	*Eragrostis tenella*	9,38	12,61	13,20	35,18	0,26
7	Jenteng	*Erigeron sumatrensis*	6,25	2,52	4,95	13,72	0,09
8	Alang-alang	*Imperata cylindrica*	6,25	13,45	13,20	32,90	0,27
9	Murbai	*Rubus reflexus*	3,13	0,84	1,65	5,62	0,04
10	Tempuyung	*Sonchus arvinensis*	6,25	4,20	3,30	13,75	0,13
11	Bunga seruni	*Sphagneticola* sp.	3,13	0,84	1,65	5,62	0,04
12	Jarong	*Taraxacum officinale*	6,25	1,68	4,95	12,88	0,07
13	Sirih cina	*Paperomia pellucida*	6,25	3,36	3,30	12,91	0,11
	Total		**100**	**100**	**100**	**300**	**1,94**

Source : primary data, S2-2022

Figure 16 Vegetation Cover in Area U

The reforestation plants planted around area U are in good condition, there is no indication of disturbance such as dry and wilted leaves due to the distribution of H_2S gas from cooling tower activities. In addition to greenery, in area U also found potentially invasive plant species. This species can grow rapidly and massively in open areas such as in the U area. The following table are the types of plants that are potentially invasive in the U area.

Table 48 List of Potentially Invasive Plant Species in the U Area

NO.	LOCAL NAME	SCIENTIFIC NAME	VEGETATION CATEGORY
1	Teklan	*Ageratina riparia*	Bush
2	Babadotan	*Ageratum conyzides*	Bush
3	Kirinyuh	*Austroeupatorium inulifolium*	Herbs
4	Hareuga	*Bidens pilosa*	Bush
5	Teki	*Cyperus digittatus*	Bush
6	Tapak liman	*Elephantopus scaber*	Bush
7	Jukut Karukuan	*Eragrostis tenella*	Bush
8	Jenteng	*Erigeron sumatrensis*	Bush
9	Alang-alang	*Imperata cylindrica*	Bush
10	Sirih cina	*Paperomia pellucida*	Bush
11	Murbai	*Rubus reflexus*	Herbs
12	Tempuyung	*Sonchus arvinensis*	Bush
13	Bunga seruni	*Sphagneticola* sp.	Bush
14	Jarong	*Taraxacum officinale*	Bush

Source : primary data, Semester 2 2022

Area H and Its Surrounding

Environmental monitoring of the flora aspect is also carried out in Area H which is to the west of the Power Plant (F1) location. Similar to area U, around area H reforestration has also been carried out by planting coffee plants. Another type of greenery used is Ki badak (*Alnus japonica*). The vegetation cover around area H is tea gardens and PHBM land where there are still Puspa, Ki hujan and other plants, while the lower part is planted with coffee, chili, and other plants.

Table 49 Vegetation Analysis Around H Area

NO	LOCAL NAME	SCIENTIFIC NAME	FR	KR	DR	INP	H'
	TREE						
1	Kibadak	*Alnus japonica*	22,22	58,82	81,63	162,67	0,31
2	Puspa	*Schima walichii*	33,33	17,65	7,76	58,74	0,31
3	Kihujan	*Engelhardia spicata*	22,22	11,76	8,16	42,15	0,25
4	Pinus	*Pinus merkusii*	11,11	5,88	1,15	18,14	0,17
5	eukaliptus	*Eucaliptus alba*	11,11	5,88	1,31	18,30	0,17
	Total		**100,00**	**100,00**	**100**	**300,00**	**1,20**
	POLE						
1	Ki hujan	*Engelhardia spicata*	28,57	22,22	9,63	60,43	0,33
2	Kibadak	*Alnus japonica*	28,57	44,44	70,37	143,38	0,36
3	eukaliptus	*Eucaliptus alba*	14,29	11,11	3,10	28,50	0,24
4	Puspa	*Schima walichii*	28,57	22,22	16,90	67,69	0,33
	Total		**100,00**	**100,00**	**100**	**300**	**1,27**
	SAPLING						
1	Ki hujan	*Engelhardia spicata*	5,26	2,78	2,68	10,72	0,05
2	Kibadak	*Alnus japonica*	10,53	16,67	32,93	60,13	0,18
3	Albasia	*Albizia chinensis*	10,53	5,56	1,99	18,07	0,09
4	kopi	*Coffea sp*	15,79	27,78	6,21	49,78	0,25
5	Kayu manis	*Cinnamomum verum*	15,79	11,11	12,42	39,32	0,14
6	Suren	*Toona sureni*	10,53	8,33	5,13	23,99	0,12
7	Salamaner	Grevillea robusta	15,79	16,67	27,94	60,39	0,18
8	Puspa	*Schima walichii*	15,79	11,11	10,71	37,61	0,14
	Total		**100**	**100,00**	**100**	**300**	**1,15**
	Semak						
1	Kirinyuh	*Austroeupatorium inulifolium*	22,22	40,00	73,91	136,14	0,37
2	Bandotan gunung	*Ageratina adenophora*	22,22	28,00	10,87	61,09	0,36

NO	LOCAL NAME	SCIENTIFIC NAME	FR	KR	DR	INP	H'
3	Harendong	*Melastoma affine*	11,11	2,00	6,52	19,63	0,08
4	Totongoan	*Debregeasia sp.*	11,11	2,00	6,52	19,63	0,08
5	Teklan	*Ageratina riparia*	33,33	28,00	2,17	63,51	0,36
	Total		**100**	**100,00**	**100**	**300**	**1,24**
	SEEDLING & COVERGROUND						
1	Teklan	*Ageratina riparia*	20,00	41,76	25,93	87,68	0,36
2	Jukut Karukuan	*Eragrostis tenella*	12,00	8,79	14,81	35,61	0,21
4	Jenteng	*Erigeron sumatrensis*	4,00	4,40	7,41	15,80	0,14
5	Alang-alang	*Imperata cylindrica*	12,00	5,49	9,26	26,75	0,16
6	Sirih cina	*Paperomia pellucida*	4,00	3,30	5,56	12,85	0,11
7	Congkok	*Curculigo latifolia*	8,00	3,30	5,56	16,85	0,11
8	Bandotan gunung	*Ageratina adenophora*	12,00	16,48	16,67	45,15	0,30
9	Murbai	*Rubus reflexus*	4,00	2,20	3,70	9,90	0,08
10	Tempuyung	*Sonchus arvinensis*	4,00	2,20	1,85	8,05	0,08
11	Bunga seruni	*Sphagneticola* sp.	12,00	8,79	7,41	28,20	0,21
12	Jarong	*Taraxacum officinale*	8,00	3,30	1,85	13,15	0,11
	Total		**100**	**100**	**100**	**300**	**1,89**

Source : primary data, Semester 2 2022

Figure 9 Vegetation Cover in H Area

Based on the monitoring results, visually there is no visible disturbance to the greenery and tea plantations around the H area operations. The greenery planted around H area is in good condition, there are no indications of disturbances such as drying and wilting of leaves due to the distribution of H_2S gas from cooling tower activities. In addition to reforestation plants, in area H also found potentially invasive plant species. This species can grow rapidly and massively in open areas such as in area H. The following table presents potentially invasive plant species in area H.

Table 50 List of Potentially Invasive Plant Species in the H Area

NO.	LOCAL NAME	SCIENTIFIC NAME	VEGETATION CATEGORY
1	Teklan	*Ageratina riparia*	Bush
2	Babadotan	*Ageratum conyzides*	Bush
3	Kirinyuh	*Austroeupatorium inulifolium*	Herbs
4	Hareuga	*Bidens pilosa*	Bush
5	Jukut Karukuan	*Eragrostis tenella*	Bush
6	Jenteng	*Erigeron sumatrensis*	Bush
7	Alang-alang	*Imperata cylindrica*	Bush
8	Sirih cina	*Paperomia pellucida*	Bush
9	Murbai	*Rubus reflexus*	Herbs
10	Tempuyung	*Sonchus arvinensis*	Bush
11	Bunga seruni	*Sphagneticola* sp.	Bush
12	Jarong	*Taraxacum officinale*	Bush

Source : Primary data, Semester 2 2022

Comparison of Flora Conditions in the Patuha Geothermal Power Plant Area with Previous Studies

In Table 35 it is explained that the plants that dominate in the Loc BB area are relatively the same in Quarter 1 to Quarter 4 of 2021, this is because the average addition to tree diameter is usually 0,49 – 0,79 cm/year for hard wood trees (Qirom, 2002). The changes that will occur in 2021 are only at the level of the shrubs and coverground category. Meanwhile, in monitoring Quarter 1 of 2022, there are very significant differences in plants. This is due to clearing of forest areas for access and Loc BB. Logging is carried out in areas that are only used but the direction of the fall partially hits other forest areas so that the intensity of light entering is quite large on the forest floor. At the monitored location, some of the trees that were cut down had stem diameters that were quite large, even reaching 100cm.

Table 51 Importance Value Index (IVI) Comparison of Each Monitoring Period at BB Area

NO.	LOCAL NAME	SCIENTIFIC NAME	IVI							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
A	**TREE**									
1	Ki hujan	*Engelhardia spicata*	34,69	34,69	34,69	34,69	53,87	53,87	53,87	58,92
2	Puspa	*Schima wallichii*	30,43	30,43	30,43	30,43	136,43	136,43	136,43	120,94
3	Pasang	*Lithocarpus sundaicus*	28,2	28,2	28,2	28,2				24,89
4	Cerem	*Macropanax dispermum*	16,75	16,75	16,75	16,75	29,84	29,84	29,80	29,55
B	**POLE**									
1	Puspa	*Schima wallichii*	44,59	44,59	44,59	44,59	12,26	12,26	12,26	50,29
2	Huru	*Litsea fulva*	30,54	30,54	30,54	30,54				
3	Huru koneng	*Litsea angulata*	27,24	27,24	27,24	27,24				
4	Cerem	*Macropanax dispermum*	26,11	26,11	26,11	26,11	85,8	85,8	85,60	72,89
5	Jambu alas	*Syzygium densiflorum*	20,1	20,1	20,1	20,1	39,71	39,71	39,71	34,69
6	Ki jeruk	*Acronychia pedunculata*	18,85	18,85	18,85	18,85	28,68	28,68	28,68	24,84
C	**SAPLING**									
1	Puspa	*Schima wallichii*	39,24	39,24	39,24	40,09	8,94	8,94	8,94	54,90
2	Kirinyuh	*Austroeupatorium inulifolium*	38,74	38,74	38,74	39,62				
3	Ki hujan	*Englehardia spicata*	35,57	35,57	35,57	36,4	31	31	31,00	25,23
4	Cerem	*Macropanax dispermum*	29,08	29,08	29,08	29,58	65,79	65,79	65,79	53,76
8	Jambu alas	*Syzygium densiflorum*	22,53	22,53	22,53	22,94	35,46	35,46	53,46	44,73
9	Kareumi	*Homalanthus populneus*	21,18	21,18	21,18	21,55	48,86	48,86	48,86	39,57
D	**COVERGROUND**									
1	Bubukuan biru	*Dichroa febrifuga*					91,43	91,43	98,89	101,42
2	Bubukuan bulu	*Strobilanthes cernua*					90,97	90,97	79,42	70,24
3	Kirinyuh	*Austroeupatorium inulifolium*	38,74	38,74	38,74	39,62				
4	Ki sereuh	*Piper sulcatum*					31,89	31,89	33,79	36,87

NO.	LOCAL NAME	SCIENTIFIC NAME	IVI							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
E	**SEEDLING**									
1	Puspa	*Schima wallichii*	42,09	42,09	42,09	61,54				
2	Ki mangkok	*Hellicia serrata*	15,61	15,61	15,61	46,15				
3	Ki sireum	*Syzygium lineatum*	25,16	25,16	25,16	30,77				
4	Teklan	*Ageratina adenophora*	30,77	30,77	30,77	49,49				
5	Sisik penyu	*Elatostema strigosum*				44,85	7,99	7,99	9,28	9,07
6	Cyrtandra	*Cyrtandra picta*					99,23	99,23	64,62	63,58
7	bubukuan biru	*Dichroa febrifuga*					38,43	38,43	47,32	46,49
8	Elatostema	*Elatostema lineolatum*					31,98	31,98	37,10	36,27

Source: Monitoring analysis from 2021 to Quarter IV of 2022

8.2 Terrestrial Fauna

This sub-chapter will explain the condition of terrestrial fauna at locations BB, U and H and the surrounding environment, where terrestrial fauna are animals that usually roam on the ground. The following is an explanation of the condition of the terrestrial fauna in the study area.

Area BB and Its Surroundings

The area around Location BB is quite close to Area F5 (area G), located about 1 km north of Area F5. Similar to area G, area BB is a natural forest. Stand stability at this location is very good, as can be seen from the canopy cover which is quite dense, ranging from 50-80%. Until the monitoring period of Semester II in 2022, work on land preparation and construction of an access road to Loc BB has been carried out.

Avifauna

There are 39 species of avifauna around the BB area recorded in the monitoring in S2-2022, with a Shannon-Wieners species diversity index value of 3,554 as shown in **Error! Reference source not found.**. This still indicates that the avifauna population around the BB Area is quite large and spread equally, also indicates that the vegetation in this area is suitable as avifauna habitat.

Table 52 Number of Species and Avifauna Diversity Index in Location BB

MONITORING PERIOD		DESCRIPTION	
		NUMBER OF TYPES	DIVERSITY INDEX
2021	Q1	41	3,423
	Q2	42	3,455
	Q3	43	3,320
	Q4	41	3,100
2022	Q1	39	3,297
	Q2	39	3,383
	Q3	39	3,553
	Q4	39	3,554

Source : Inventory and data analysis for 2021 to S2-2022

Based on the abundance value, there are 4 species of avifauna which are the dominant species, 20 species are considered sub-dominant and 13 species are not dominant as shown in the following table.

Table 53 Abundance Value and Avifauna Diversity Index in the BB Area in the Semester 2 of 2022

NO.	NAMA INDONESIA	NAMA ILMIAH	AA	RA	AF	RF	DOMINANCE
1	Burungmadu Gunung	*Aethopyga eximia (Horsfield, 1821)*	1	0.806	1	1.818	ND
2	Burungmadu Kelapa	*Anthreptes malacensis (Scopoli, 1786)*	2	1.613	1	1.818	ND
3	Burungmadu Sepah-raja	*Aethopyga siparaja (Raffles, 1822)*	1	0.806	1	1.818	ND
4	Caladi Ulam	*Dendrocopos macei (Vieillot, 1818)*	4	3.226	2	3.636	VD
5	Ceret Gunung	*Cettia vulcania (Blyth, 1870)*	4	3.226	2	3.636	VD
6	Cikrak Muda	*Seicercus grammiceps (Strickland, 1849)*	2	1.613	1	1.818	ND
7	Cinenen Pisang	*Orthotomus sutorius (Pennant, 1769)*	3	2.419	1	1.818	VD
8	Cipoh Kacat	*Aegithina tiphia (Linnaeus, 1758)*	5	4.032	2	3.636	VD
9	Ciu Kunyit	*Pteruthius aenobarbus (Temminck, 1836)*	2	1.613	1	1.818	ND
10	Cucak Gunung	*Pycnonotus bimaculatus (Horsfield, 1821)*	5	4.032	2	3.636	VD
11	Cucak Kutilang	*Pycnonotus aurigaster (Jardine & Selby, 1837)*	4	3.226	2	3.636	VD
12	Jingjing Batu	*Hemipus hirundinaceus (Temminck, 1822)*	7	5.645	2	3.636	D
13	Kangkok Ranting	*Cuculus saturatus (Blyth, 1843)*	1	0.806	1	1.818	ND
14	Kapinis Rumah	*Apus nipalensis (Hodgson, 1837)*	0	0.000	0	0.000	NC
15	Kehicap Ranting	*Hypothymis azurea (Boddaert, 1783)*	2	1.613	1	1.818	VD
16	Layanglayang Batu	*Hirundo tahitica (Gmelin, 1789)*	5	4.032	2	3.636	VD
17	Merbah Cerukcuk	*Pycnonotus goiavier (Scopoli, 1786)*	7	5.645	2	3.636	D
18	Munguk Loreng	*Sitta azurea (Lesson, 1830)*	4	3.226	1	1.818	VD
19	Pelanduk Semak	*Malacocincla sepiarium (Horsfield, 1821)*	3	2.419	2	3.636	VD
20	Philentoma Sayap-merah	*Philentoma pyrhopterum (Temminck, 1836)*	1	0.806	1	1.818	ND
21	Pijantung Kecil	*Arachnothera longirostra (Latham, 1790)*	1	0.806	1	1.818	ND
22	Sempurhujan Rimba	*Eurylaimus javanicus (Horsfield, 1821)*	3	2.419	2	3.636	VD
23	Sepah Hutan	*Pericrocotus flammeus (J. R. Forster, 1781)*	17	13.710	2	3.636	D
24	Sikatan Belang	*Ficedula westermanni (Sharpe, 1888)*	2	1.613	1	1.818	VD
25	Sikatan Bodoh	*Ficedula hyperythra (Blyth, 1843)*	4	3.226	2	3.636	VD
26	Sikatan Dada-merah	*Ficedula dumetoria (Wallace, 1864)*	1	0.806	1	1.818	ND
27	Sikatan Kepala-abu	*Culicicapa ceylonensis (Swainson, 1820)*	1	0.806	1	1.818	ND
28	Sikatan Mugimaki	*Ficedula mugimaki (Temminck, 1836)*	1	0.806	1	1.818	ND
29	Sikatan Ninon	*Eumyias indigo (Horsfield, 1821)*	2	1.613	1	1.818	VD
30	Srigunting Kelabu	Dicrurus leucophaeus (Vieillot, 1817)	4	3.226	2	3.636	VD
31	Takur Tenggeret	*Megalaima australis (Horsfield, 1821)*	1	0.806	1	1.818	ND
32	Takur Tohtor	*Megalaima armillaris (Temminck, 1821)*	2	1.613	1	1.818	VD
33	Tekukur Biasa	*Streptopelia chinensis (Scopoli, 1786)*	3	2.419	2	3.636	VD
34	Tepus Pipi-perak	*Stachyris melanothorax (Temminck, 1823)*	3	2.419	2	3.636	VD
35	Tesia Jawa	*Tesia superciliaris (Bonaparte, 1850)*	6	4.839	2	3.636	VD
36	Walet Linci	*Collocalia linchi (Horsfield & F. Moore, 1854)*	0	0.000	0	0.000	NC
37	Wergan Coklat	*Alcippe brunneicauda (Salvadori, 1879)*	7	5.645	2	3.636	D
38	Wiwik Kelabu	*Cacomantis merulinus (Scopoli, 1786)*	2	1.613	2	3.636	VD
39	Wiwik Uncuing	*Cacomantis sepulcralis (S. Müller, 1843)*	1	0.806	1	1.818	ND
Total			**124**	**100**	**55**	**100**	
H'			**3.554**				

Source : Inventory and data analysis for S2-2022

Remarks: AA = Absolute Abundance; AF = Absolute Frequency; RA = Relative Abundance; RF = Relative Frequency; D = Dominant; ND = Not Dominant; VD = Very Dominant; NC = Not Calculated

Mammals

As many as 10 species of mammals were recorded around Location BB in the S2-2022 monitoring, of which 4 species were recorded through direct observation, 2 species through camera trap, while the remaining 4 species were recorded based on the results of interviews with local residents.

Table 54 The types of Mammals Around Location B

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Babi hutan	*Sus scrofa*	IN	IN	IN	IN	IN	IN	IN	IN
2	Bajing kelapa	*Callosciurus notatus*	O,IN	O,IN	O,IN	O,IN	O,IN	O	O	O
3	Garangan	*Herpestes javanicus*	W	W	W	W	W	W	W	W
4	Kelelawar/codot	*Cynopterus minutus*	W	W	W	W	W	W	W	-
5	Kijang	*Muntiaus muntjak*	-	-	-	-	-	-	-	CT
6	Kucing hutan	*Prionailurus bengalensis*	IN	IN	IN	IN	IN	IN	IN	CT
7	Linsang	*Prionodon linsang*	IN	IN	IN	IN	IN	IN	IN	-
8	Lutung	*Trachypithecus auratus*	IN	IN	IN	IN	IN	O	O	O
9	Monyet ekor panjang	*Macaca fascicularis*	IN	IN	IN	IN	IN	O	W	-
10	Musang Luwak	*Paradoxurus hermaphroditus*	IN	IN	IN	IN	IN	IN	IN	IN
11	Sigung	*Mydaus javanensis*	IN	IN	IN	IN	IN	IN	IN	-
12	Surili	*Presbytis comata*	O,IN	O,IN	O,IN	O,IN	O,IN	O	O	O
13	Tikus	*Rattus exulans*	IN	-	-	-	-	IN	IN	-
14	Tikus belukar	*Rattus tiomanicus*	IN	O,W	O,W	O,W	O,W	O	IN	W
15	Tupai	*Tupaia javanicus*	-	IN	IN	IN	IN	IN	IN	O

Source : Inventory and data analysis for 2021 to S2-2022
Observation method : O = Observation, IN = Interview, CT = Camera Trap

Herpetofauna

There were 14 types of herpetofauna recorded in the S2-2022 monitoring at around location BB, consisting of 2 types of amphibians and 12 species of reptiles. 8 of these species were recorded through direct observation, while the remaining 6 species were obtained from interviews with local residents.

Table 55 The Types of Herpetofauna Around Location B

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Amphibian										
1	Bangkong	*Bufo sp.*	O	-	-	-	-	O	O	-
2	Katak bibir putih	*Chalcorana chalconota*	-	O	O	O	O	-	-	O
3	Katak pohon bergaris	*Polypedates leucomystax*	-	O	-	-	-	-	-	-
4	Katak Tanduk	*Megophrys montana*	-	-	-	-	-	O	-	O
5	Kodok Tegalan	*Fejervarya limnocharis*	O	O	O	O	O	O	O	-
Reptile										
6	Bunglon	*Bronchocela cristatella*	O	-	-	-	-	-	-	O
7	Cecak rumah	*Hemidactylus frenatus*	O	O,IN	O,IN	O,IN	O,IN	O	O	O
8	Cekibar	*Draco volans*	O	O,IN	O,IN	O,IN	O,IN	O	W	O
9	Kadal kebun	*Eutropis multifasciata*	O	O	O	O	O	O	O	O
10	Kadal rumput	*Takydromus sexlineatus*	O	O	O	O	O	O	O	O
11	Sanca bodo	*Python morulus*	IN	IN	IN	IN	IN	IN	IN	IN
12	Sanca kembang	*Python reticulatus*	IN	IN	IN	IN	IN	-	IN	IN
13	Tokek	*Gekko gecko*	IN	O,IN	O,IN	O,IN	O,IN	O	IN	O
14	Ular cabe	*Calliophis intertinalis*	IN	IN	IN	IN	IN	-	IN	-
15	Ular gibug	*Agkistrodon rodhostoma*	IN	IN	IN	IN	IN	IN	IN	-
16	Ular jali	*Ptyas korros*	IN	-	-	-	-	O	-	-
17	Ular pelangi	*Xenopeltis unicolor*	IN	IN	IN	IN	IN	IN	IN	-
18	Ular picung	*Rhabdophis subminiatus*	IN	IN	IN	IN	IN	O	IN	-

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
19	Ular pucuk	*Ahaetulla prasina*	IN	IN	IN	IN	IN	O	IN	IN
20	Ular sapi	*Coelognathus radiatus*	IN	IN	IN	IN	IN	-	IN	-
21	Ular sendok jawa	*Naja sputatrix*	IN	IN	IN	IN	IN	IN	IN	IN
22	Ular tambang	*Dendrelaphis pictus*	IN	-	-	-	-	O	-	IN
23	Ular weling	*Bungarus candidus*	IN	IN	IN	IN	IN	IN	IN	IN

Source : Inventory and data analysis for 2021 to S2-2022

Observation method : O = Observation, IN = Interview

Well U and Its Surroundings

The area around the location of Well U is quite close to Area F6 (Location of Wells V). The following describes the condition of the fauna at the location of Well U in the second semester of 2022 monitoring.

Avifauna

The total number of avifauna species recorded around the area around the location of Well U in the S2-2022 monitoring was 23 species with a Shannon-Wieners species similarity index value of 2,881 as shown in **Error! Not a valid bookmark self-reference.56**. This value indicates that the avifauna population around this area is quite large and evenly distributed, also indicates that the vegetation in this area is suitable as an avifauna habitat.

Table 56 Number of Species and Avifauna Diversity Index in U Area

MONITORING PERIOD		DESCRIPTION	
		NUMBER OF TYPES	DIVERSITY INDEX
2021	Q1	25	2,38
	Q2	23	2,49
	Q3	25	2,56
	Q4	25	2,13
2022	Q1	23	2,38
	Q2	21	2,400

Source : Inventory and data analysis for2021 to S1-2022

Based on the abundance value, there are 2 types of avifauna which are the dominant species, namely the Layang-layang Batu (*Hirundo tahitica*) and the Kerek Kerbau (*Acridotheres javanicus*), as shown in **Table 57.**

Table 57 Abundance Value and Avifauna Diversity Index in Well U Area in S2-2022

NO	LOCAL NAME	SCIENTIFIC NAME	AA	RA	AF	RF	DOMINANCE
1	Bentet Kelabu	*Lanius schach Linnaeus, 1758*	2	4.255	1	3.125	VD
2	Bondol Jawa	*Lonchura leucogastroides (Horsfield & Moore, 1858)*	4	8.511	2	6.250	D
3	Bondol Peking	*Lonchura punctulata (Linnaeus, 1758)*	4	8.511	2	6.250	VD
4	Bubut Alang-alang	*Centropus bengalensis Gmelin, 1788*	1	2.128	1	3.125	VD
5	Cabai Bunga-api	*Dicaeum trigonostigma (Scopoli, 1786)*	1	2.128	1	3.125	VD
6	Caladi Ulam	*Dendrocopos macei Vieillot, 1818*	1	2.128	1	3.125	VD
7	Cekakak Jawa	*Halcyon cyanoventris (Vieillot, 1818)*	2	4.255	2	6.250	VD
8	Ceret Gunung	*Cettia vulcania (Blyth, 1870)*	3	6.383	2	6.250	VD
9	Cicakoreng Jawa	*Megalurus palustris Horsfield, 1821*	2	4.255	2	6.250	VD
10	Cinenen Jawa	*Orthotomus sepium Horsfield, 1821*	1	2.128	1	3.125	VD
11	Cucak Gunung	*Pycnonotus bimaculatus (Horsfield, 1821)*	4	8.511	2	6.250	D
12	Cucak Kutilang	*Pycnonotus aurigaster (Jardine & Selby, 1837)*	3	6.383	2	6.250	VD
13	Elangular Bido	*Spilornis cheela (Latham, 1790)*	1	2.128	1	3.125	VD
14	Gemak Loreng	*Turnix suscitator (Gmelin, 1789)*	1	2.128	1	3.125	VD
15	Jingjing Batu	*Hemipus hirundinaceus (Temminck, 1822)*	1	2.128	1	3.125	VD
16	Kapinis Rumah	*Apus nipalensis (Hodgson, 1837)*	0	0	0	0	NC
17	Kerak Kerbau	*Acridotheres javanicus Cabanis, 1850*	2	4.255	2	6.250	VD
18	Layanglayang Batu	*Hirundo tahitica Gmelin, 1789*	4	8.511	2	6.250	D
19	Merbah Cerukcuk	*Pycnonotus goiavier (Scopoli, 1786)*	2	4.255	1	3.125	VD
20	Tekukur Biasa	*Streptopelia chinensis (Scopoli, 1786)*	5	10.638	2	6.250	D
21	Tesia Jawa	*Tesia superciliaris (Bonaparte, 1850)*	2	4.255	2	6.250	VD

NO	LOCAL NAME	SCIENTIFIC NAME	AA	RA	AF	RF	DOMINANCE
22	Walet Linci	*Collocalia linchi (Horsfield & F. Moore, 1854)*	0	0	0	0	NC
23	Wiwik Kelabu	*Cacomantis merulinus (Scopoli, 1786)*	1	2.128	1	3.125	VD
Total			**47**	**100**	**32**	**100**	
H'				**2.881**			

Source : Inventory and data analysis for Semester 2-2022
Remarks: AA = Absolute Abundance; AF = Absolute Frequency; RA = Relative Abundance; RF = Relative Frequency; D = Dominant; ND = Not Dominant; VD = Very Dominant; NC = Not Calculated

Mammals

There were 7 species of mammals recorded in the environmental monitoring S1-2022 period in the area around Well U, of which 2 species were recorded through direct observation, while the remaining 5 other species were obtained from interviews with local communities.

Table 58 The types of Mammals Around Location U

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Babi hutan	*Sus scrofa*	IN	IN	IN	IN	IN	IN	IN	IN
2	Bajing kelapa	*Callosciurus notatus*	O,IN	O	O	O	O	O	O	O
3	Garangan	*Herpestes javanicus*	IN	O	O	O	O	W	O	W
4	Kelelawar/codot	*Cynopterus minutus*	IN	O	O	O	O	IN	O	-
5	Kucing hutan	*Prionailurus bengalensis*	IN	-	-	-	-	-	-	-
6	Linsang	*Prionodon linsang*	IN	IN	IN	IN	IN	-	IN	-
7	Lutung	*Trachypithecus auratus*	IN	IN	IN	IN	IN	IN	IN	IN
8	Monyet ekor panjang	*Macaca fascicularis*	IN	IN	IN	IN	IN	O	IN	-
9	Musang Luwak	*Paradoxurus hermaphroditus*	IN	IN	IN	IN	IN	-	IN	IN
10	Sigung	*Mydaus javanensis*	IN	IN	IN	IN	IN	-	IN	-
11	Surili	*Presbytis comata*	O,IN	-	-	-	-	IN	-	O
12	Tikus	*Rattus exulans*	IN	-	-	-	-	-	-	-
13	Tikus belukar	*Rattus tiomanicus*	IN	O,IN	O,IN	O,IN	O,IN	-	IN	IN

Source : Inventory and data analysis for 2021 to S2-2022
Observation method : O = Observation, IN = Interview

Herpetofauna

As many as 17 types of herpetofauna were recorded in S2-2022 environmental monitoring in the area around the location of Well U, which are reptile species. Where 7 species were recorded through direct observation and the remaining 10 species were obtained through interviews with local communities.

Table 59 Types of Herpetofauna Around Well U

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Amphibian										
1	Bangkong	*Bufo sp.*	O	O	O	O	O	O	O	O
2	Katak pohon bergaris	*Polypedates leucomystax*	-	-	-	-	-	O	-	-
3	Kodok Tegalan	*Fejervarya limnocharis*	O	O	O	O	O	O	O	O
Reptile										
4	Bunglon	*Bronchocela cristatella*	O	-	-	-	-	O	-	O
5	Cecak rumah	*Hemidactylus frenatus*	O	O,IN	O,IN	O,IN	O,IN	O	IN	O
6	Cekibar	*Draco volans*	O	O,IN	O,IN	O,IN	O,IN	O	IN	O
7	Kadal kebun	*Eutropis multifasciata*	O	O	O	O	O	O	O	O
8	Kadal rumput	*Takydromus sexlineatus*	O	O	O	O	O	O	O	O

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
9	Sanca bodo	*Python morulus*	IN	IN	IN	IN	IN	IN	IN	IN
10	Sanca kembang	*Python reticulatus*	IN	IN	IN	IN	IN	IN	IN	IN
11	Tokek	*Gekko gecko*	IN	O,IN	O,IN	O,IN	O,IN	IN	IN	IN
12	Ular cabe	*Calliophis intertinalis*	IN	IN	IN	IN	IN	IN	IN	IN
13	Ular gibug	*Agkistrodon rodhostoma*	IN	IN	IN	IN	IN	IN	IN	IN
14	Ular jali	*Ptyas korros*	IN	-	-	-	-	-	-	-
15	Ular mock viper	*Psammodynastes pulverulentus*	-	O	-	-	-	-	-	-
16	Ular pelangi	*Xenopeltis unicolor*	IN	IN	IN	IN	IN	IN	IN	IN
17	Ular picung	*Rhabdophis subminiatus*	IN	IN	IN	IN	IN	IN	IN	-
18	Ular pucuk	*Ahaetulla prasina*	IN	IN	IN	IN	IN	IN	IN	IN
19	Ular sapi	*Coelognathus radiatus*	IN	IN	IN	IN	IN	IN	IN	-
20	Ular sendok jawa	*Naja sputatrix*	IN	IN	IN	IN	IN	IN	IN	IN
21	Ular tambang	*Dendrelaphis pictus*	IN	IN	IN	IN	IN	O	IN	IN
22	Ular weling	*Bungarus candidus*	IN	IN	IN	IN	IN	IN	IN	IN

Source : Inventory and data analysis for 2021 to S2-2022
Observation method : O = Observation, IN = Interview

Well H and Its Surrounding

The area around the location of Well H is quite close to Area F6 (area V). The following is an explanation of the condition of the fauna at the location of Well H in the first semester of 2022 monitoring.

Avifauna

There are as many as 29 species of avifauna around Well H recorded in the Q2-2022 monitoring, with a Shannon-Wieners species diversity index value of 3,244 as shown in **Error! Reference source not found.60.** This still indicates that the population of avifauna around the location of well H is quite large and spread out, also indicates that the vegetation in this area is suitable as a habitat.

Table 602 Number of Species and Avifauna Diversity Index in H Area

MONITORING PERIOD		DESCRIPTION	
		NUMBER OF TYPES	DIVERSITY INDEX
2021	Q1	29	3,222
	Q2	30	3,078
	Q3	31	3,114
	Q4	31	2,870
2022	Q1	29	2,859
	Q2	18	2,651
	Q3	29	3,249
	Q4	29	3,244

Source : Inventory and data analysis for 2021 to S2-2022

Based on the abundance value, there are 5 types of avifauna which are included as dominant species, 12 species are classified as sub-dominant species and 10 species are not dominantas shown in **Table 45**.

Table 61 Abundance Value and Avifauna Diversity Index in Well H Area in S2-2022

NO.	LOCAL NAME	SCIENTIFIC NAME	AA	RA	AF	RF	DOMINANCE
1	Bentet Kelabu	*Lanius schach (Linnaeus, 1758)*	1	1.961	1	3.030	ND
2	Bondol Jawa	*Lonchura leucogastroides (Horsfield & Moore, 1858)*	2	3.922	1	3.030	VD
3	Bondol Peking	*Lonchura punctulata (Linnaeus, 1758)*	2	3.922	1	3.030	VD
4	Bubut Besar	*Centropus sinensis (Stephens, 1815)*	1	1.961	1	3.030	ND
5	Burungmadu Sepah-raja	*Aethopyga siparaja (Raffles, 1822)*	1	1.961	1	3.030	BD
6	Burungmadu Sriganti	*Cinnyris jugularis (Linnaeus, 1766)*	2	3.922	1	3.030	VD
7	Cabai Bunga-api	*Dicaeum trigonostigma (Scopoli, 1786)*	1	1.961	1	3.030	ND
8	Cabai Gunung	*Dicaeum sanguinolentum Temminck, 1829*	2	3.922	1	3.030	VD
9	Cabai Jawa	*Dicaeum trochileum (Sparrman, 1789)*	1	1.961	1	3.030	ND
10	Cekakak Jawa	*Halcyon cyanoventris (Vieillot, 1818)*	1	1.961	1	3.030	ND
11	Ceret Gunung	*Cettia vulcania (Blyth, 1870)*	2	3.922	2	6.061	VD
12	Cicakoreng Jawa	*Megalurus palustris Horsfield, 1821*	2	3.922	1	3.030	VD
13	Cucak Gunung	*Pycnonotus bimaculatus (Horsfield, 1821)*	3	5.882	1	3.030	D
14	Cucak Kutilang	*Pycnonotus aurigaster (Jardine & Selby, 1837)*	1	1.961	1	3.030	ND
15	Jingjing Batu	*Hemipus hirundinaceus (Temminck, 1822)*	2	3.922	1	3.030	VD
16	Kapinis Rumah	*Apus nipalensis (Hodgson, 1837)*	0	0	0	0	NC
17	Kerak Kerbau	*Acridotheres javanicus (Cabanis, 1850)*	3	5.882	2	6.061	D
18	Kicuit Batu	*Motacilla cinerea (Tunstall, 1771)*	2	3.922	2	6.061	VD
19	Layanglayang Asia	*Hirundo rustica (Linnaeus, 1758)*	4	7.843	2	6.061	D
20	Layanglayang Batu	*Hirundo tahitica (Gmelin, 1789)*	5	9.804	2	6.061	D
21	Merbah Cerukcuk	*Pycnonotus goiavier (Scopoli, 1786)*	2	3.922	1	3.030	VD
22	Pijantung Kecil	*Arachnothera longirostra (Latham, 1790)*	1	1.961	1	3.030	ND
23	Sempurhujan Rimba	*Eurylaimus javanicus (Horsfield, 1821)*	1	1.961	1	3.030	VD
24	Sikatan Kepala-abu	*Culicicapa ceylonensis (Swainson, 1820)*	2	3.922	1	3.030	VD
25	Srigunting Kelabu	*Dicrurus leucophaeus (Vieillot, 1817)*	1	1.961	1	3.030	ND
26	Takur Tohtor	*Megalaima armillaris (Temminck, 1821)*	2	3.922	1	3.030	VD
27	Tekukur Biasa	*Streptopelia chinensis (Scopoli, 1786)*	3	5.882	2	6.061	D
28	Tesia Jawa	*Tesia superciliaris (Bonaparte, 1850)*	1	1.961	1	3.030	ND
29	Walet Linci	*Collocalia linchi (Horsfield & F. Moore, 1854)*	0	0	0	0	NC
		TOTAL	**51**	**100**	**33**	**100**	
		H'				**3.244**	

Source : Inventory and data analysis for S2-2022
Remarks: AA = Absolute Abundance; AF = Absolute Frequency; RA = Relative Abundance; RF = Relative Frequency; D = Dominant; ND = Not Dominant; VD = Very Dominant; NC = Not Calculated

Mammals

As many as 6 species of mammals were recorded around the Well H area in the S2-2022 environmental monitoring, of which 3 species were recorded through direct observation, while the remaining 3 species were recorded based on interviews with local residents

Table 62 The types of Mammals Around Location H

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Babi hutan	*Sus scrofa*	IN	IN	IN	IN	IN	IN	IN	IN
2	Bajing kelapa	*Callosciurus notatus*	O,IN	O	O	O	O	O	O	O
3	Garangan	*Herpestes javanicus*	IN	-	-	-	-	-	IN	IN
4	Kelelawar/codot	*Cynopterus minutus*	IN	O		O	O	IN	O	-
5	Kucing hutan	*Prionailurus bengalensis*	IN	-	-	-	-	IN	-	-
6	Linsang	*Prionodon linsang*	IN	IN	IN	IN	IN	IN	-	-
7	Lutung	*Trachypithecus auratus*	IN	-	-	-	-	-	-	-
8	Monyet ekor panjang	*Macaca fascicularis*	IN	-	-	-	-	O	-	-

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
9	Musang Luwak	*Paradoxurus hermaphroditus*	IN	IN	IN	IN	IN	IN	IN	IN
10	Sigung	*Mydaus javanensis*	IN	-	-	-	-	-	IN	-
11	Surili	*Presbytis comata*	O,IN	O	O	O	O	IN	O	O
12	Tikus	*Rattus exulans*	IN	-	-	-	-	-	-	-
13	Tikus belukar	*Rattus tiomanicus*	IN	O,IN	O,IN	O,IN	O,IN	O	O	O

Source : Inventory and data analysis for 2021 to S2-2022
Observation method : O = Observation, IN = Interview

Herpetofauna

There were as many as 15 types of herpetofauna recorded in the S2-2022 environmental monitoring around the Well H area, consisting of 2 types of amphibians and 13 species of reptiles. Where 8 types of them were recorded through direct observation, the remaining 7 species were obtained from interviews with local residents.

Table 63 The Types of Herpetofauna Around Well H

NO	LOCAL NAME	SCIENTIFIC NAME	MONITORING PERIOD							
			2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Amphibian										
1	Bangkong	*Bufo sp.*	O	O	-	-	-	O	-	O
2	Katak bibir putih	*Chalcorana chalconota*	-	O	O	IN	-	-	O	-
3	Kodok Tegalan	*Fejervarya limnocharis*	O	O	O	O	O	O	O	O
Reptile										
4	Bunglon	*Bronchocela cristatella*	O	O	O	O	O	O	O	O
5	Cecak rumah	*Hemidactylus frenatus*	O	O,IN	O,IN	O,IN	O,IN	O	IN	O
6	Cekibar	*Draco volans*	O	O,IN	O,IN	O,IN	O,IN	O	IN	O
7	Kadal	*Calotes versicolor*	-	O	O	O	O	O	-	-
8	Kadal kebun	*Eutropis multifasciata*	O	O	O	O	O	O	O	O
9	Kadal rumput	*Takydromus sexlineatus*	O	O	O	O	O	O	O	O
10	Sanca bodo	*Python morulus*	IN	IN	IN	IN	IN	IN	IN	-
11	Sanca kembang	*Python reticulatus*	IN	IN	IN	IN	IN	IN	IN	IN
12	Tokek	*Gekko gecko*	IN	O	O	O	O	O	IN	O
13	Ular cabe	*Calliophis intertinalis*	IN	IN	IN	IN	IN	IN	IN	IN
14	Ular gibug	*Agkistrodon rodhostoma*	IN	IN	IN	IN	IN	IN	IN	IN
15	Ular jali	*Ptyas korros*	IN	-	-	-	-	-	-	-
16	Ular pelangi	*Xenopeltis unicolor*	IN	IN	IN	IN	IN	IN	IN	IN
17	Ular picung	*Rhabdophis subminiatus*	IN	IN	IN	IN	IN	IN	IN	-
18	Ular pucuk	*Ahaetulla prasina*	IN	IN	IN	IN	IN	IN	IN	IN
19	Ular sapi	*Coelognathus radiatus*	IN	IN	IN	IN	IN	IN	IN	-
20	Ular sendok jawa	*Naja sputatrix*	IN	IN	IN	IN	IN	IN	IN	IN
21	Ular tambang	*Dendrelaphis pictus*	IN	IN	IN	IN	IN	O	IN	IN
22	Ular weling	*Bungarus candidus*	IN	IN	IN	IN	IN	IN	IN	-

Source : Inventory and data analysis for 2021 to S2-2022
Observation method : O = Observation, IN = Interview

Comparison of Fauna Conditions in the Patuha Geothermal Power Plant Area with Previous Studies

The trend of diversity of bird species and other fauna shows fluctuations in index values. The ups and downs of diversity values do not come from the influence of steam field development activities and the construction of the Patuha Unit 2 Geothermal Power Plant, but plant phenology, vegetation structure, feed availability, home range, climate and ecological conditions that occur in plants and the seasons during monitoring. The existence of hunting also affects the existence and diversity of wild animals.

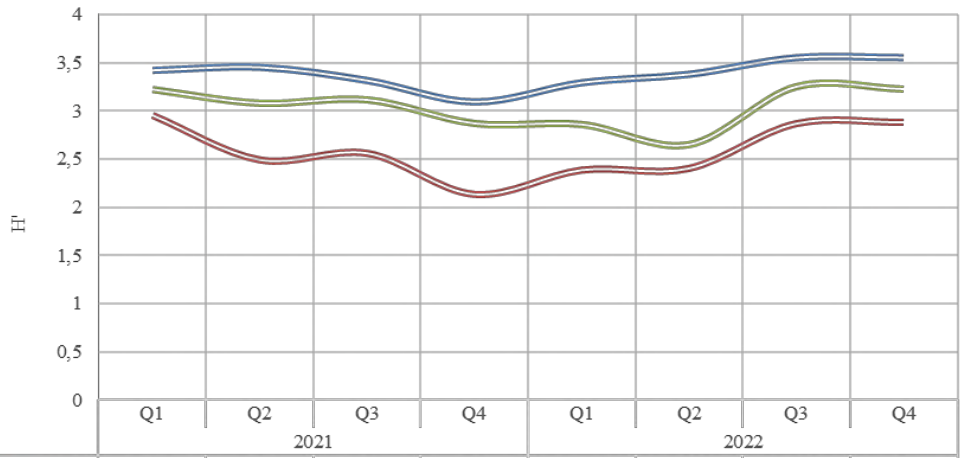
Monitoring of fauna diversity in the planned area of the Patuha Unit 2 Geothermal Power Plant has been carried out continuously since 2021. In general, there have been fluctuations both in terms of the diversity index and the number of findings of fauna species in each monitoring period. The fluctuations that occurred did not have a significant impact. Fluctuations that occur as a result of different responses to habitat conditions. The following is an explanation of the fauna condition based on taxa:

The trend of diversity of bird species and other fauna shows fluctuations in index values. The ups and downs of diversity values do not come from the influence of steam field development activities and the construction of the Patuha Unit 2 Geothermal Power Plant, but plant phenology, vegetation structure, feed availability, home range, climate and ecological conditions that occur in plants and the seasons during monitoring. The existence of hunting also affects the existence and diversity of wild animals.

Monitoring of fauna diversity in the planned area of the Patuha Unit 2 Geothermal Power Plant has been carried out continuously since 2021. In general, there have been fluctuations both in terms of the diversity index and the number of findings of fauna species in each monitoring period. The fluctuations that occurred did not have a significant impact. Fluctuations that occur as a result of different responses to habitat conditions. The following is an explanation of the fauna condition based on taxa:

a. Avifauna

The presence of various types of avifauna in each monitoring period illustrates the diverse habitat conditions and changing land cover conditions. In the monitoring of avifauna conducted at the Patuha 2 Geothermal Power Plant from 2021 to 2022, there were 56 types of avifauna recorded. Changes in species diversity that have been recorded during monitoring from 2021 to 2022 along with their diversity index can be seen in **Figure 10**.



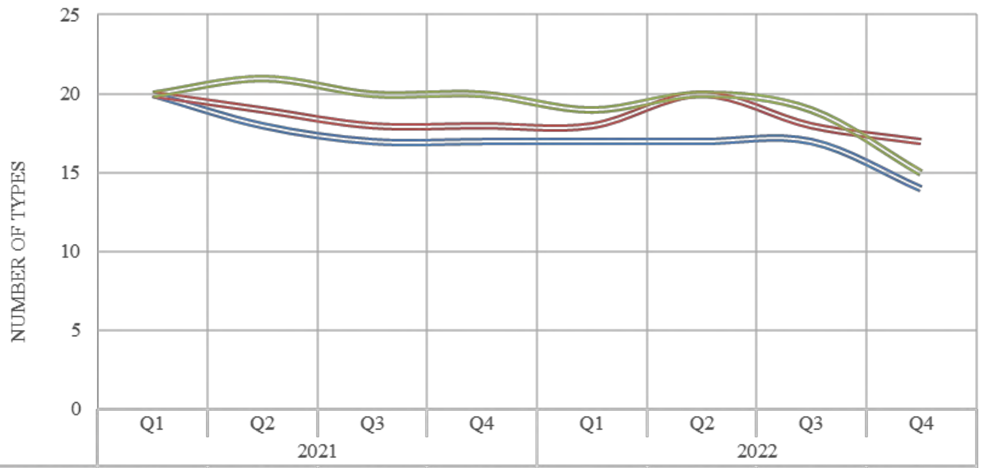
	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4
LOC BB	3,423	3,455	3,32	3,1	3,297	3,383	3,553	3,554
AREA U	2,954	2,489	2,558	2,13	2,383	2,4	2,868	2,881
AREA H	3,22	3,078	3,114	2,87	2,859	2,651	3,249	3,224

Figure 10 Trend of Change in Avifauna Diversity Index (H') Around the Planned Location of the Patuha Unit 2 Geothermal Power Plant

During each monitoring period, the species encounters and avifauna diversity index values (H') move dynamically. This is common and one of the reasons is because of the different responses to different habitat conditions such as plant phenology, climate and ecological conditions. In general, changes in avifauna species richness in each monitoring period are still in a fluctuating range that is still safe.

b. Herpetofauna (Amphibian & Reptile)

Monitoring of biodiversity, especially herpetofauna in the Patuha Unit 2 Geothermal Power Plant area, has been carried out from 2021 to 2022. During this monitoring period, 27 types of herpetofauna were recorded. Based on **Figure** , it appears that there are fluctuations in the number of mammalian species found each year. In general, changes in the number of mammalian species for each monitoring period are still within a fluctuating range that is still safe.

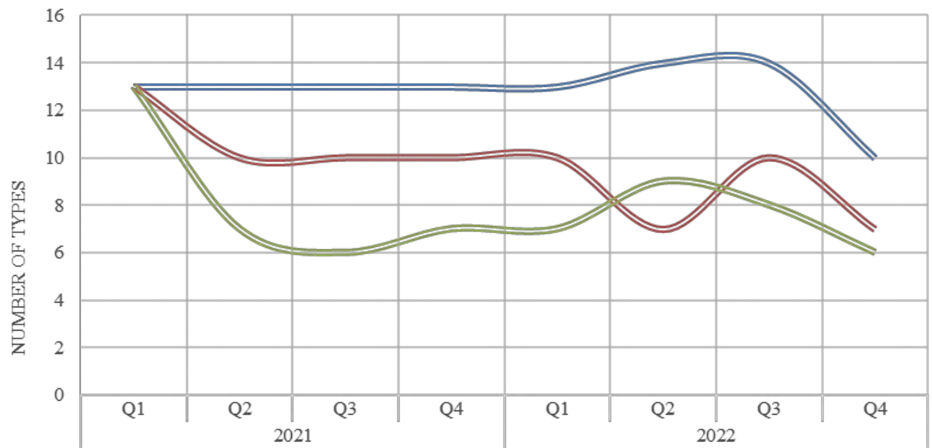


	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4
LOC BB	20	18	17	17	17	17	17	14
AREA U	20	19	18	18	18	20	18	17
AREA H	20	21	20	20	19	20	19	15

Figure 11 Trend of Change in the Number of Herpetofauna Types Around the Planned Location of the Patuha Unit 2 Geothermal Power Plant

c. Mammalia

Monitoring of biodiversity for mammal species in the Patuha Unit 2 Geothermal Power Plant area has been carried out from 2021 to 2022. During this monitoring period, 16 species of mammals were recorded. Based on **Figure** , it appears that there are fluctuations in the number of mammalian species found each year. In general, changes in the number of mammalian species for each monitoring period are still within a fluctuating range that is still safe.



	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4
LOC BB	13	13	13	13	13	14	14	10
AREA U	13	10	10	10	10	7	10	7
AREA H	13	7	6	7	7	9	8	6

Figure 12 Trend of Change in the Number of Mammalia Types Around the Planned Location of the Patuha Unit 2 Geothermal Power Plant

Cica koreng jawa (Megalurus palustris)

Bentet kelabu (Lanius schach)

Srigunting kelabu (Dicrurus leucophaeus)

Sepah gunung *(Pericrocotus miniatus*)

Sikatan bodoh (Ficedula hyperythra)

Anis hutan (*Zoothera andromedae*)

Celepuk (Ottus sp.)

Kijang (Muntiacus muntjak)

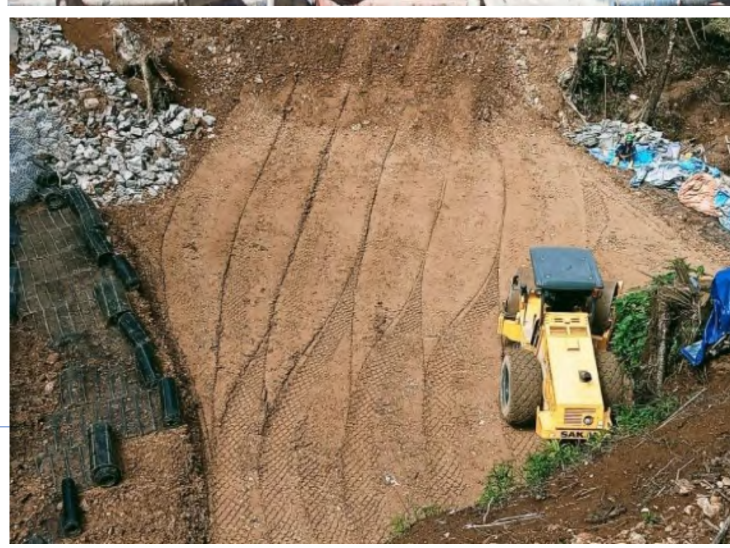
Kucing hutan (Prionailurus bengalensis)

Biul (Melogale orientalis)

Figure 13 Several Types of Fauna Found at the Monitoring Site

Appendix 3 Photolog

Road and Well Pad Preparation for Drilling Campaign in Patuha 2

Location	Activities	Images
Pad BB	Access Road construction, retaining wall construction, gabion installation.	  

Location	Activities	Images
		  

Location	Activities	Images
		 

Location	Activities	Images
		  

Location	Activities	Images
KM 6 Access Road Patuha	Access road reinforcement work	   

Location	Activities	Images

Operating, Maintenance and Utilities Supporting Service Project Patuha 2

Location	Activities	Images
Waterline pipe, Laydown area, Temporary office	Grass cutting	  

Location	Activities	Images
PPL 7	Drain water pond	 

Location	Activities	Images
		
KM 6 Patuha Access Road	repair plate of access roads	 

Location	Activities	Images
		
PPL 7	Waterline Installation	

Location	Activities	Images
		
Waterline Access	Check clamp pipe joint	

Location	Activities	Images
		

Logistic Activities

Location	Activities	Images
Dieng	- Daily routine logistic activity (HSE, drilling, welltest, waterline, and supporting equipment). - Maintenance conductor pipe 30” - Backload welltest equipment from Pad 31 to temporary warehouse -Installation support of fuel tank	 

Location	Activities	Images
		 

Location	Activities	Images
Patuha	- Daily routine logistic activity (drilling, welltest, waterline, and gasoline). - Hand over explosive from Dahana - Preparation storage at Laydown Area for rejected casing. Moving from PPL 6	  

Location	Activities	Images
		 

Operation & Maintenance Supporting Drilling Dieng 2

Location	Activities	Images
WPS Siterus & Temporarry Office	-Removing Clamps and Moving waterline siterus pipes - drainage contruction for fuel tank area	  

Location	Activities	Images
		

Landslide Barrier Wall of Silica Pond in Sileri Landfill

Location	Activities	Images
TPS Sileri	Compacting Acces pond	

Location	Activities	Images
		 

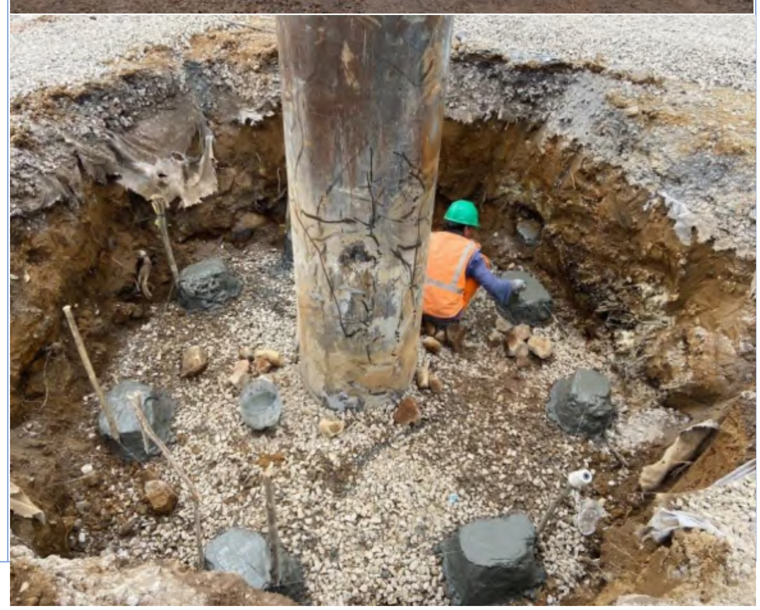
Road and Well Pad Preparation for Drilling Campaign in Patuha 2

Location	Activities	Images
Pad BB	Compacting well pad area, levelling area, Cellar box construction, Installation of pipe drainage, Conductor pipe installation	  

Location	Activities	Images
		  

Location	Activities	Images
		  

Location	Activities	Images

Location	Activities	Images
		  

Location	Activities	Images
		 

Operating, Maintenance and Utilities Supporting Service Project Patuha 2

Location	Activities	Images
PPL 6 & Cipaku	Pumping at PPL 6, Cleaning Cipaku River	 

Location	Activities	Images
		 

Location	Activities	Images
Temporary Office & laydown area, KM 9 Access Road	Electrical Work	 

Location	Activities	Images
		 

Location	Activities	Images
Cipadaruum River KM 9	Supporting activity	  

Location	Activities	Images
		  

Location	Activities	Images
PPL 7 and PPL 2	Installation Water line pipe	  

Location	Activities	Images
		  

Pond PPL 6 Repairs of Geomembrane Works

Location	Activities	Images
Pond PPL 6	Repairs of Geomembrane	  

Location	Activities	Images
		  

Location	Activities	Images

Logistic Activities

Location	Activities	Images
Dieng	Daily routine activity logistic (Drilling, well testing, waterline, HSE, and supporting equipment)	 

Location	Activities	Images
	Casing perforated 10 ¾" and 8 5/8" batch 3 by NMS	 

Location	Activities	Images
Dieng	Moving of drilling material for Well SLR-G-29B	 

Location	Activities	Images
		
Dieng	Annual Physical Check Inventory for Drilling Material by Material Man Drilling, Logistic, and Finance	 

Location	Activities	Images
		 

Location	Activities	Images
Patuha	Daily routine activity logistic (Drilling, well testing, waterline, HSE, and supporting equipment)	 
Patuha	Stringing waterline pipe 8” from PPL 02 to Pad BB	

<table>
<tr><th>Location</th><th>Activities</th><th>Images</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Patuha</td><td>Moving of drilling material for Well SLR-G-29B</td><td></td></tr>
<tr><td>Patuha</td><td>Annual Physical Check Inventory Drilling Material by Material Man Drilling, Logistic, and Finance</td><td>


</td></tr>
</table>

Location	Activities	Images
		  

Road and Wellpad Preparation Dieng 2

<table>
<tr><th>Location</th><th>Activities</th><th>Images</th></tr>
<tr><td>Wellpad 29</td><td>Installation Pipe Drainage 8”</td><td>
</td></tr>
<tr><td></td><td>Installation BRC Area Water Pond</td><td>
</td></tr>
<tr><td></td><td>Continue Installation Pipe Support</td><td></td></tr>
</table>

<table>
<tr><th>Location</th><th>Activities</th><th>Images</th></tr>
<tr>
<td></td>
<td>Prepare Installation Control Box

Installation Drainage Uditch 40x60</td>
<td>


</td>
</tr>
</table>

Location	Activities	Images
	Welding Joint 34,35	3. Welding Joint 34,35  5. Clearing Area Zone 5 
	Compaction Soil Zone 3,4	7. Compaction Soil Zone 3,4 

Location	Activities	Images
	Compaction Soil Surface Course	
	Rockwool Insulation 10cm + Aluminum	
	Finishing BRC	

Location	Activities	Images
	Pouring Concrete	 5. Pouring Concrete Added 1m Clean Water Pond
	Plaster Acian Control Box	 1. Plester Acian Control Box Area Brine Pond
	Plaster Pipe Shoe	 2. Plester Pipe Shoe

Location	Activities	Images
	Patching the Wall (Cellar Box)	
	Alumunium Cladding Outer Separator	

Operation & Maintenance Supporting Drilling Dieng 2

Location	Activities	Images
Wellpad 09	Electrical Maintenance	 

Location	Activities	Images
Wellpad 31	New well valves maintenance	 

Location	Activities	Images
Pad 07, Pad 14, pad 15	Maintenance service for civil facilities project, wellpad area & water supply drilling area.	 

Location	Activities	Images
		 

Location	Activities	Images
Pad 29, pad 31,TPS Sileri, WPS Sidolok, Pad 38, temporary office	Dewatering, Cleaning mud pond area	 

Location	Activities	Images
		 

Location	Activities	Images
		 

Location	Activities	Images
		 

Location	Activities	Images
		 

Location	Activities	Images
		 

Location	Activities	Images
Stokyard area pad 28, pad 18, pad 07	Wellpad area repairing	 

Location	Activities	Images
		
Wellpad 29 & pad 07	Water supply installation & removal	

Location	Activities	Images
		 

Lightning Protection Installation Service at Temporary Office Project Area – Dieng

Location	Activities	Images
Temporary Office	Installation of External & Internal Protection	   

Location	Activities	Images
		  

Location	Activities	Images
		   

Location	Activities	Images
		  

Landslide Wall Repairing Services for Pond Sileri – Dieng

Location	Activities	Images
TPS Sileri	Geotextile & Gabion Installation	 

Location	Activities	Images
		 

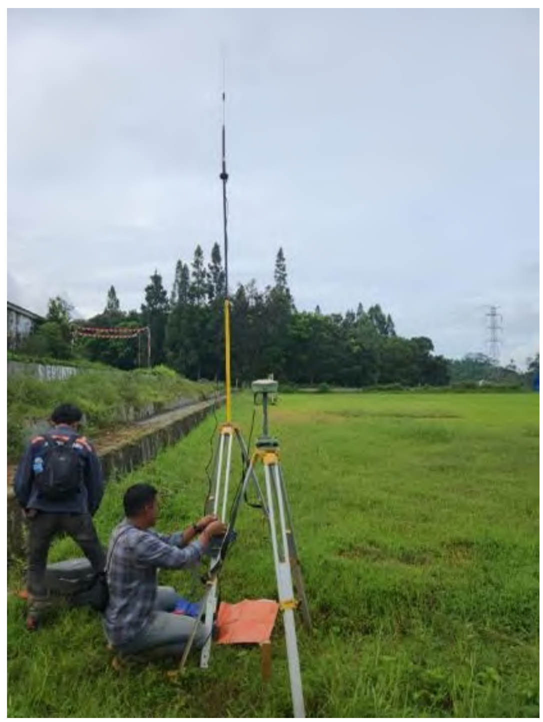
TPS Sileri	Land Fill & Compaction	 

Location	Activities	Images
		

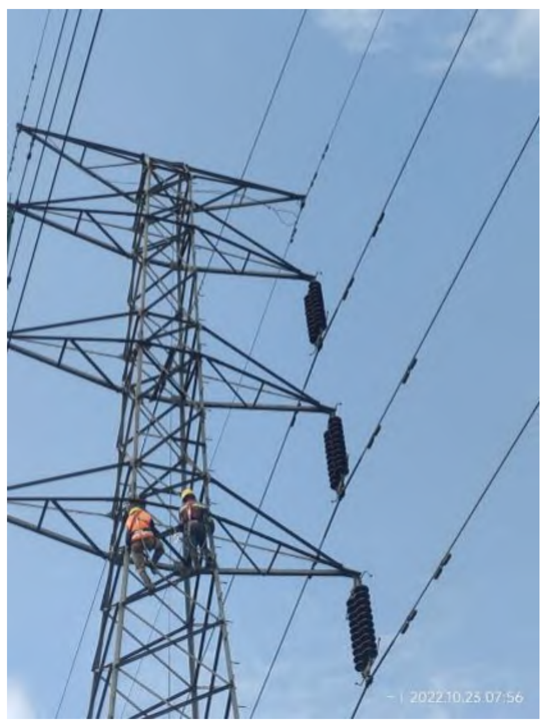
Assessment Tower in Dieng

Location	Activities	Images
Wonosobo	Toolbox Meeting	 

Location	Activities	Images
Wonosobo	Topography Survey	 

Location	Activities	Images
		 

Location	Activities	Images
Wonosobo	Tower Dimension Survey	   

Location	Activities	Images
Wonosobo	Profile Tower Survey	 

<table>
<tr><th>Location</th><th>Activities</th><th>Images</th></tr>
<tr><td></td><td></td><td>


</td></tr>
</table>

Appendix 4 H_2S Dispersion and Noise Modelling of Well Testing Activity at Well SLR-T-9C

STUDY OF THE H2S EMISSIONS DISPERSION OF WELL TESTING ACTIVITIES OF WELL 9C

Study Report

December, 2022

Jakarta

Table of Content

List of Table

List of Figure

21 Introduction

21.1 background

In order to define potential and capacity of the well which has been drilled and to develop plan for geothermal production, PT Geo Dipa plans to carry out well testing work for the SLR 9C well. In well testing activities, fluid flowing from the reservoir layer will carry out and release of NCG (Non Condensable Gas) which contains H2S and CO2 into the air. Considering that H2S is a gas that smells and is toxic, it is necessary to evaluate the potential for interference due to the release of gas from well testing activities. Evaluation is done by making a gas dispersion model.

21.2 Purpose

The purpose of this study are as follows:

Identify and understand the concentration distribution of H2S and CO2 emission parameters by conducting modeling to predict the distribution of these emissions around the 9C Well.

Identify and understand the fulfillment of emission distribution simulation results against the applicable regulatory Quality Standards and their impact on human health.

21.3 Scope of Work

The scope of work is as follows.

Conducting emission distribution modeling during the well testing activity at Well 9C. This emission distribution modeling study was carried out using the SCREEN View and AERMOD View air distribution models.

Modeling is done for 2 parameters: H2S and CO2.

For SCREEN View, the concentration predictions obtained are presented in the form of a profile according to the distance and concentration curve.

For AERMOD View the concentration predictions obtained are presented in concentration contours (isopleth). For discrete receptor points, an impact assessment was carried out on sensitive receptors around Well 9C.

Modeling is done for 4 activity scenarios:

a. Scenario 1: failure in bleed facilities

b. Scenario 2: Bleed NCG Without NCG Tank

c. Scenario 3: Bleed NCG With NCG Tank

d. Scenario 4: Monitoring phase for 30 days.

22 METHODOLOGY

22.1 Dispersion Model

Dispersion modeling is done with the SCREEN View model for scenarios 1-3; to see the short-term spread (≤ 4 hours). SCREEN View is Lakes Environmental's Windows interface for the US EPA's SCREEN software. SCREEN View modeling is intended to see the profile of pollutant distribution in certain classes of atmospheric stability and wind speed.

Meteoblue prediction results for the first week of June in Dieng (Figure 1) show cloudy weather with wind speeds ranging from 3-7 km/hour. On that basis, the atmospheric stability class taken for SCREEN View modeling is Class D.

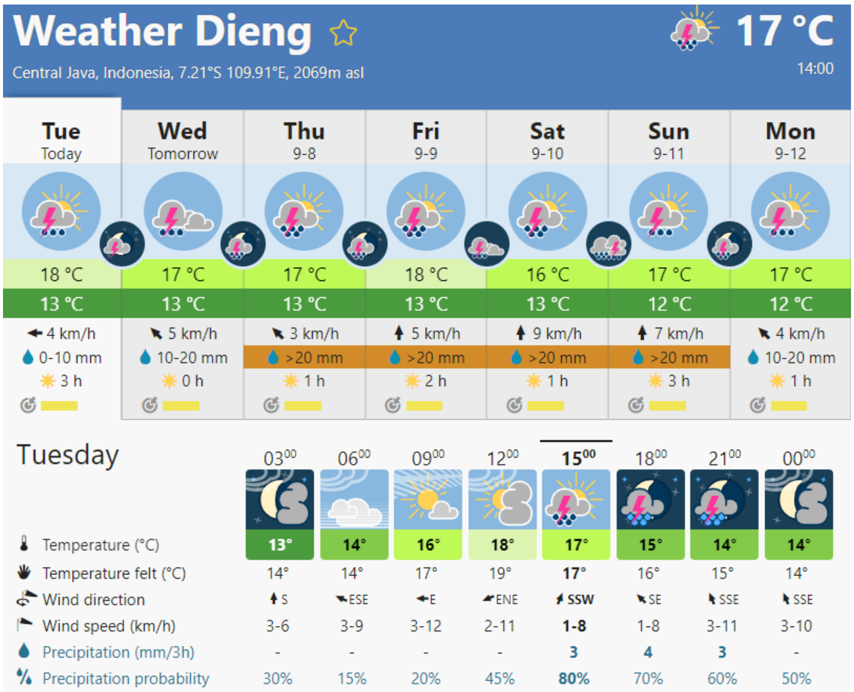


Figure 1. Dieng Weather Prediction (Meteoblue, 2021)

To see the effect of wind speed, SCREEN View modeling scenarios 1-3 is carried out for wind speeds of 1 m/s; 4m/s; and 7m/s. The combination of activity scenarios and the SCREEN View modeling wind speed is presented in Table 1.

Table 1. Combination of SCREEN View Modeling Scenarios

Scenario	H2S	CO2
1	1A1, 1A4, 1A7	1B1, 1B4, 1B7
2	2A1, 2A4, 2A7	2B1, 2B4, 2B7
3	3A1, 3A4, 3A7	3B1, 3B4, 3B7

For Scenario 4 (Monitoring Phase 30 days) AERMOD View is used. The AERMOD View model is Lake Environmental's Windows interface for AERMOD models recommended by the US EPA. AERMOD View uses the AERMET meteorological processor and the AERMOD dispersion model (BC Ministry Of Environment, 2015). Summary of data and parameters used are presented in Table 2.

Table 2. Summary of Source Parameters

Componen	**Unit**	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**
Temperature	˚C	30	30	30	98
Gas flow	m3/s	0,065	0,00271	0,00054	85,00
H_2S	kg/hour	14	1,75	0,35	84
CO_2	kg/hour	174	21,75	21,75	5022

AERMET is a meteorological model that calculates hourly wind and temperature parameters on a three-dimensional grid. Related two-dimensional parameters such as mixing height, surface characteristics, and dispersion properties are also displayed by AERMET. AERMET product is a meteorological file used by AERMOD to predict the movement of air pollutants.

AERMOD is a three-dimensional non-steady-state Gaussian puff model developed by the US Environmental Protection Agency (USEPA) for use in conditions where the basic Gaussian model is ineffective. This condition includes stagnant conditions, which are characterized by conditions with no wind or very low wind speeds with changing directions. The AERMOD modeling system can model wind changes and spatial turbulence. This is important for modeling in sites with complex topography, long-distance transport, and near windless or calm conditions. Thus AERMOD is used for modeling in this study.

22.2 Determination of Model Input

In the study there was 1 point source, namely the 9C well. Source emission rates were assessed based on the fourth activity scenario, namely the 30-day monitoring phase, with an H2S emission rate of 23.33 g/s.

Emission sources are modeled as point sources. The stack parameters used as input for modeling are the physical characteristics of the stack, which are 3.257 m high and 0.1016 m in diameter. Input for the AERMOD View Model is presented in Table 2 2.

Table 1. AERMOD View Parameter

Parameter	Data Input
AERMET	
Meteorological grid	12 km x 12 km
Grid center reference coordinates	378255; 9203648 (Zona: 49S)
Vertical grid cell height (m)	0, 20, 40, 80, 160, 300, 600, 1000, 1500, 2200 dan 3000
Simulation time	1 tahun (2021)
Surface meteorological station	The output of the AERMET numerical prediction model
Upper air meteorological station	The output of the AERMET numerical prediction model
Topographic Data	The altitude is taken from SRTM1, resolution of 30 meters
Land use data	Land use data based on generic data from the Ministry of Forestry of the Republic of Indonesia
AERMOD	
Modeling Domains	Computing Grids: 5 km x 5 km
Modeling grid resolution for mapping	Grid Resolution: 50 m
Number of discrete receptors	Total 5 discrete receptors around Well 9C
Dispersion Algorithm	Turbulence based coefficients
Number of modeling hours	720 hour
Modeling period	1 month (June)

22.3 Meteorological Conditions

Meteorological conditions determine the direction of movement and distribution of wind-borne emissions. Key meteorological parameters include air temperature, wind direction and speed, and mixing height. For modeling purposes, hourly data is required in the modeling period for each key parameter. For this reason, the WRF model prognostic data was used obtained from Lakes Environmental, for the period January 1 2021 to December 31 2021 (1 year). This data is then processed by AERMET, which is a meteorological data processor for AERMOD.

22.4 Modeling Regions and Representative Receptor Networks

For this study, the emission distribution was modeled in a 5.0 km x 5.0 km area with Well 9C as the center. The scope of this area includes all nearby settlements in the study area.

For Aermod input purposes, the receptor points are modeled in the form of a representative receptor network (grid). The pollutant concentration distribution is calculated based on this receptor network. In this model, the receptor network is modeled as a cartesian network with Well 9C as the center point, and the receptor points are placed in a 50 m x 50 m grid. Thus there are 10,000 representative receptor points.

22.5 Sensitive Receptors

The impact of emissions on sensitive receptors has received major attention. For this reason, an impact assessment was carried out on sensitive receptors in Well 9C (Figure 22). These receptors are added to the model in the form of discrete receptors. Thus there are 5 (five) discrete receptors in the model.

22.6 Topography

Topography affects the distribution of pollutant concentrations at certain points. For this reason, topographic data is needed to input the AERMOD model. For this study topographical data was taken from SRTM1.

22.7 Threshold Value

Predicted ambient air H2S and Cl2 concentrations were compared with threshold values, both nationally and internationally.

For H2S the standards used are:

- The H2S nuisance level standard refers to the Decree of the Minister of Environment No. 50 of 1996 concerning Odor Level Standards. Based on this regulation, the H2S quality standard is 0.02 ppm (State Minister for the Environment, 1996) or 30 μg/m3.
- Regulation of the Minister of Manpower and Transmigration (Permenaker) No. 5 of 2018 concerning Threshold Values for Physical and Chemical Factors in the Workplace (Ministry of Manpower and Transmigration, 2011): Hydrogen sulfide (7783-06-4): 1 ppm.
- Eye Irritation Threshold: 2-5 mg/m3 (1.34-3.35 ppm) (OSHA, 2016)

For CO2 the standards used are:

- Threshold for breathlessness 10% (100,000 ppm) (OSHA, 1996).

Figure 2. Location of Well 9C and Discrete Receptors

23 RESULT AND DISCUSSION

23.1 H_2S Modelling Result

The results of H2S distribution modeling for each scenario are presented in Figure 3 to Figure 11. At low wind speeds (1 m/s) Scenario 1 gives a maximum concentration of 16,280 µg/m3 (10.91 ppm) at a distance of 81 m; Scenario 2 gives a maximum concentration of 6950 µg/m3 (4.66 ppm) at a distance of 50 m; Scenario 3 gives a maximum concentration of 1,525 µg/m3 (1.02 ppm) at a distance of 40 m.

For the location of the nearest settlement (Pawuhan Village) which is 300 m from the ALR-Q-31A Well, at low wind speeds (1 m/s) Scenario 1 gives a maximum concentration of 4,054 µg/m3 (2.72 ppm); Scenario 2 gives the maximum concentration of 547.2 µg/m3 (0.37 ppm); Scenario 3 gives a maximum concentration of 109.5 µg/m3 (0.07 ppm). At low wind speeds, all scenarios provide concentrations above 0.02 at the nearest settlement location.

.

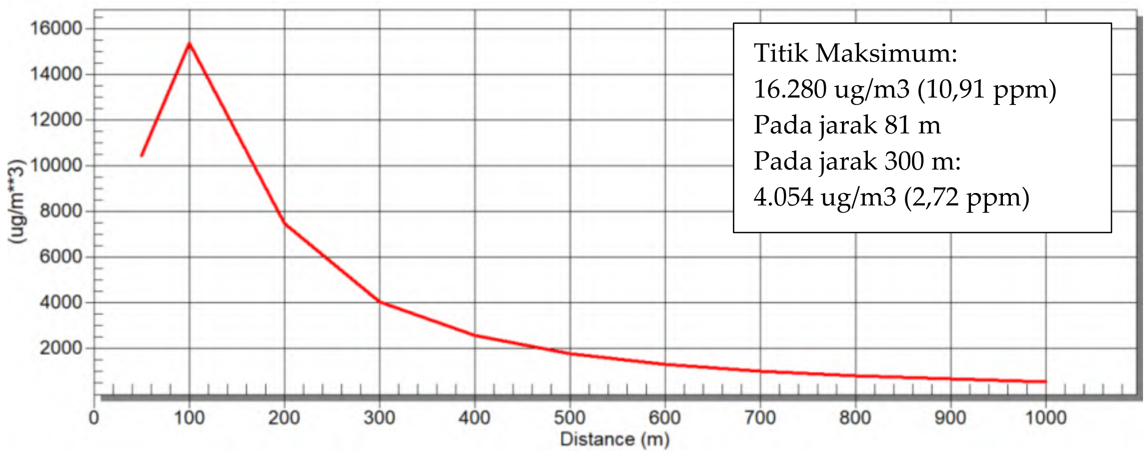


Figure 3. Profile of H2S concentration based on scenario 1A1.

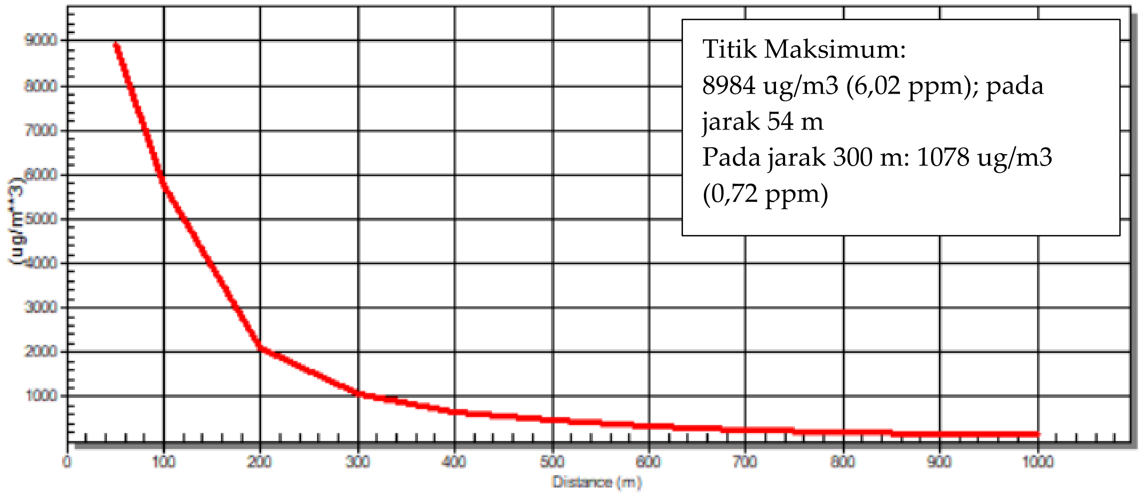


Figure 2. H2S concentration profile based on 1A4 scenario

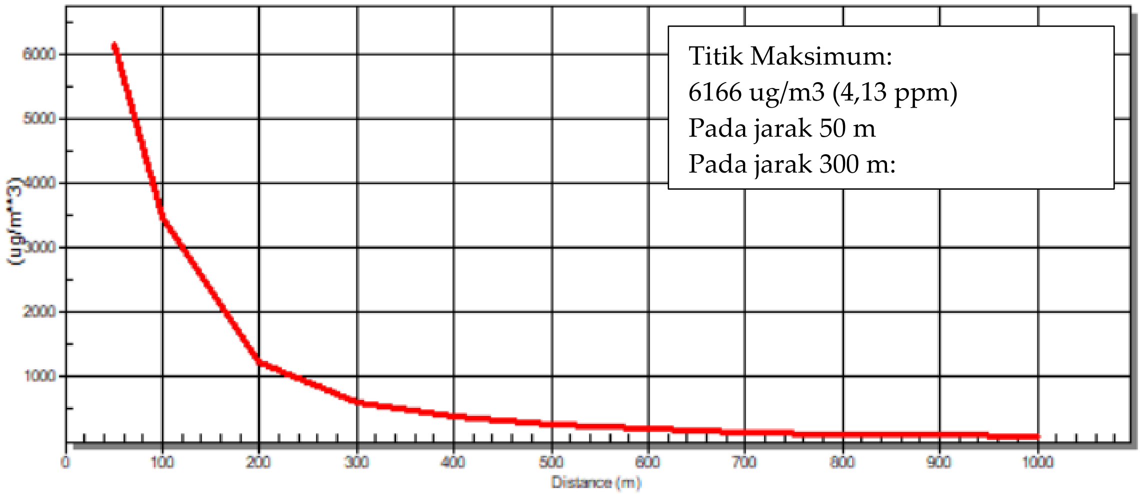


Figure 3. H2S concentration profile based on 1A7 scenario

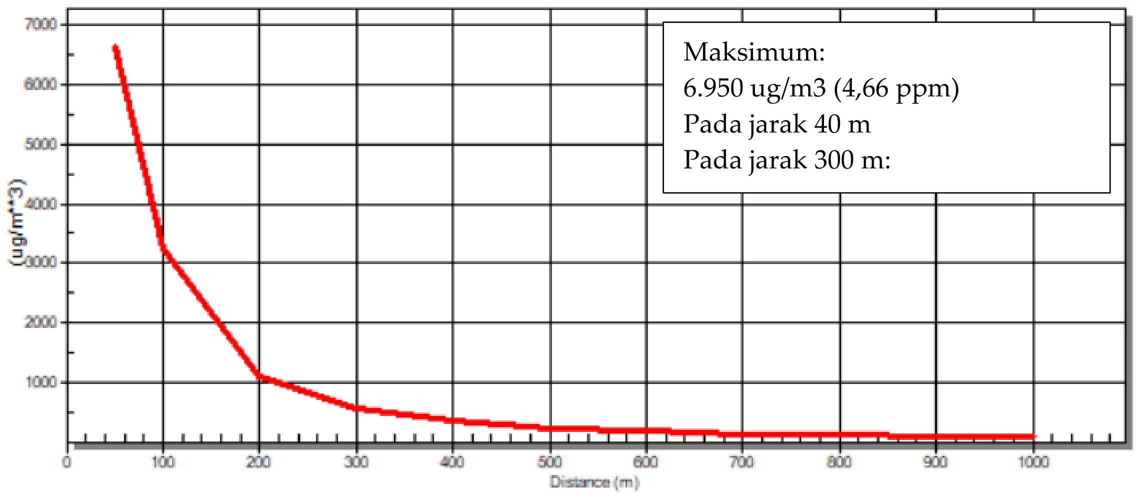


Figure 4. H2S concentration profile based on 2A1 scenario

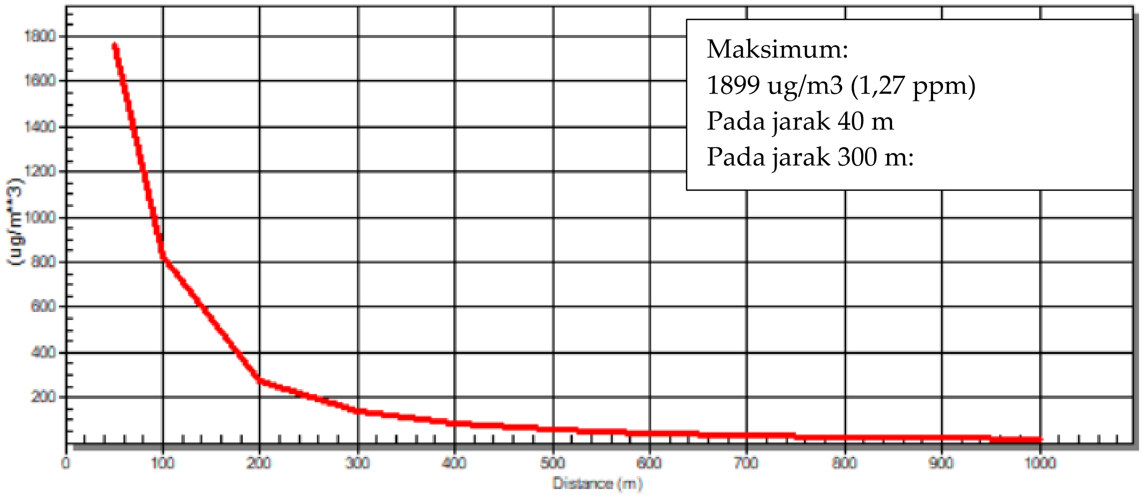


Figure 5. H2S concentration profile based on 2A4 scenario

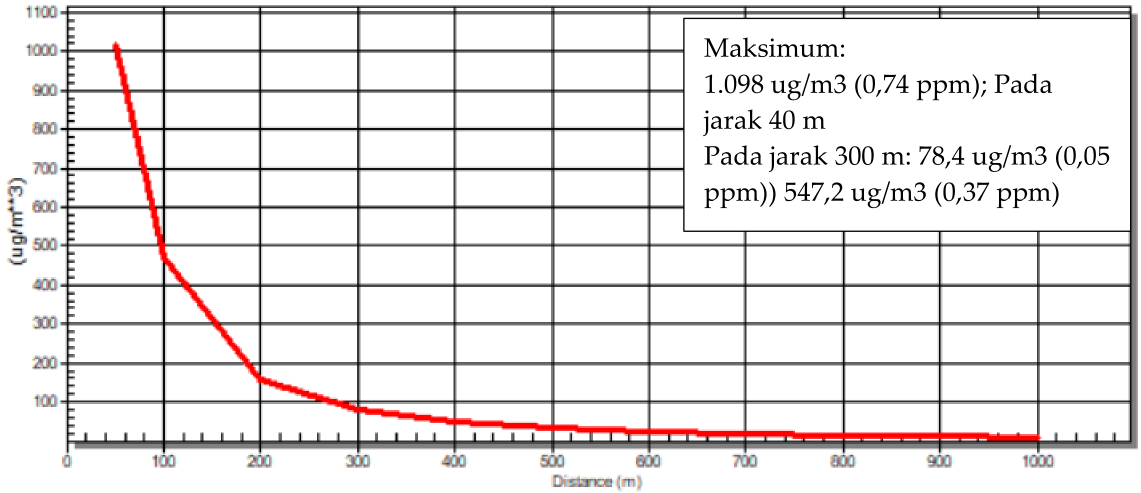


Figure 8. Profile of H2S concentration based on scenario 2A7

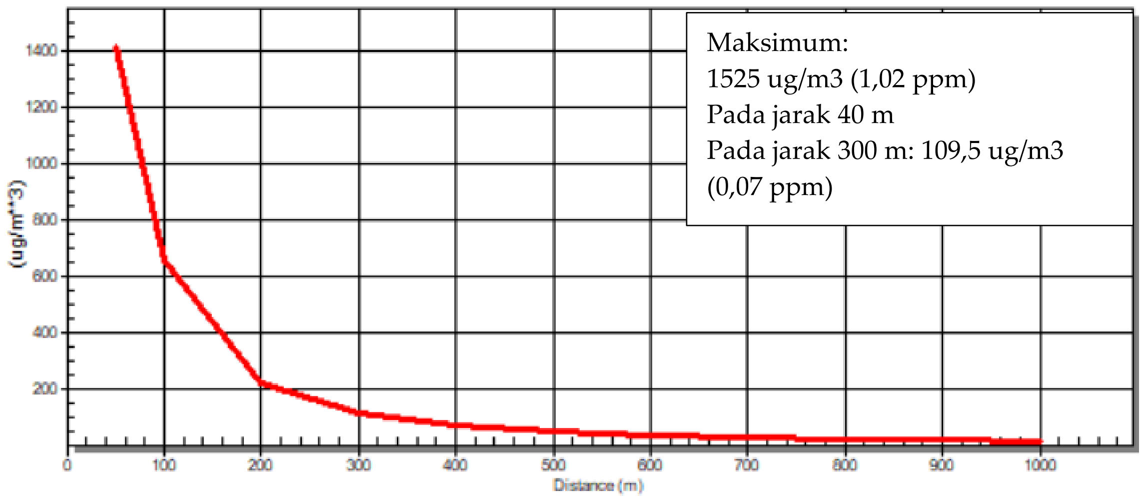


Figure 9. Profile of H2S concentration based on scenario 3A1

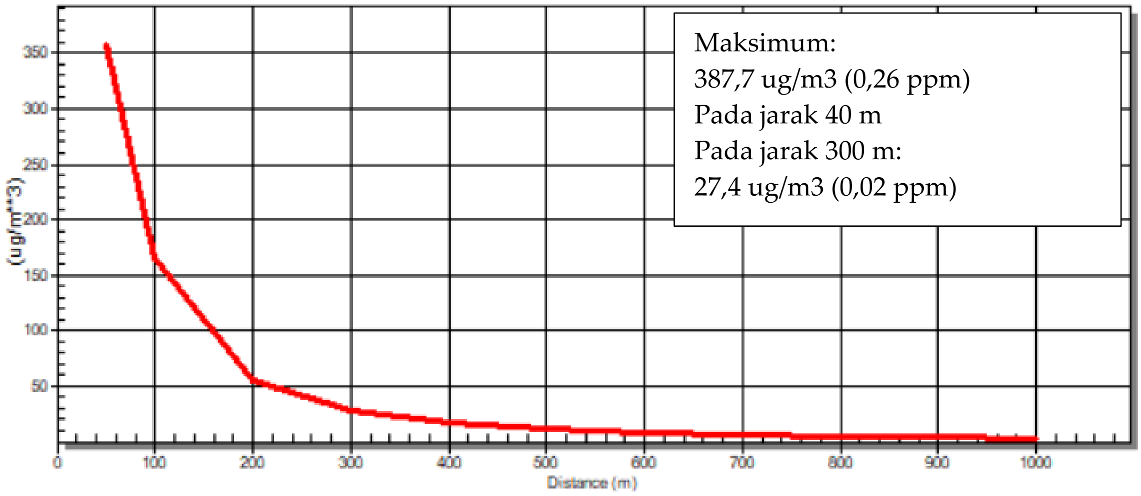


Figure 10. Profile of H2S concentration based on scenario 3A4

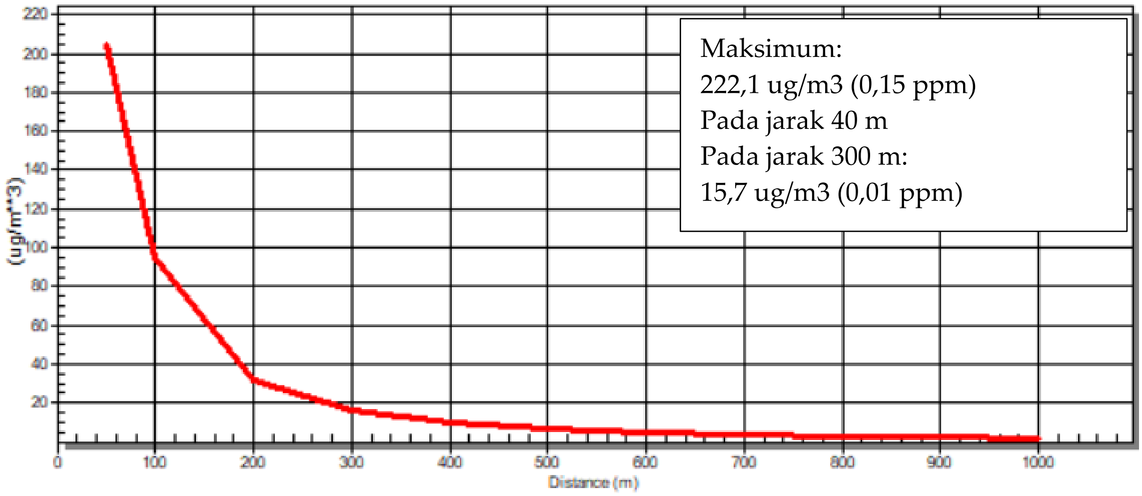


Figure 11. Profile of H2S concentration based on scenario 3A7

The recapitulation of the SCREEN View modeling results for H2S is presented in Table 3 1. All scenarios modeled provide maximum concentrations that exceed the standard odor level according to Minister of Environment Decree No. 50 of 1996, whose value is 0.02 ppm (30 μg/m3). While at a distance of 300 m except for Scenario 3 with a wind speed of 7 m/s, all other scenarios give concentrations > 0.02 ppm. In low wind conditions, the radius of influence is presented in Figure 12. At a distance of 400-500 m the H2S concentration ranges from 0.03-0.05 ppm..

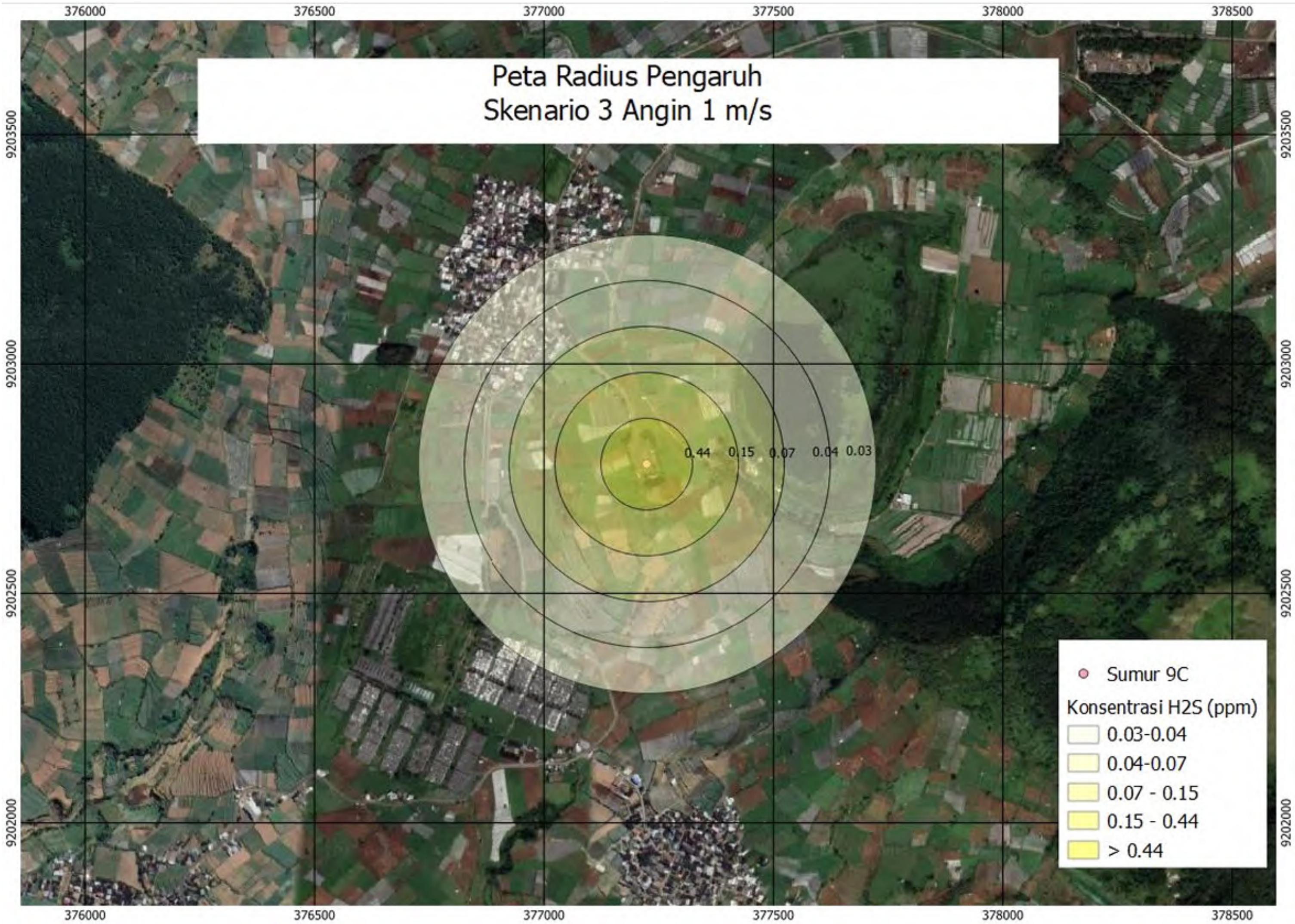


Figure 6. Radius of Influence of Normal Well Testing Scenario

Table 4. Recapitulation of SCREEN View modeling results for H2S

No.	Scenario	Wind Speed (m/s)	Maximum Concentration		Distance To Maximum Concentration (km)	Concentration On Distance 300 m	
			μg/m³	ppm (x 10^{-3})		μg/m³	ppm (x 10^{-3})
1	Scenario 1	1	16280	10,91	81	4054	2.72
		4	8984	6.02	54	1078	0.72
		7	6166	4.13	50	621.3	0.42
2	Scenario 2	1	6950	4.66	50	547.2	0.37
		4	1899	1.27	40	137.2	0.09
		7	1098	0.74	40	78.4	0.05
3	Scenario 3	1	1525	1.02	40	109.5	0.07
		4	387.7	0.26	40	27.4	0.02
		7	222.1	0.15	40	15.7	0.01

23.2 CO_2 Modelling Result

The results of CO2 distribution modeling for scenario 1 at low wind speeds (1 m/s) are presented in Figure 13. The maximum concentration obtained was 101,800 ug/m3 (106.95 ppm) at a distance of 81 m; while at a distance of 300 m, the concentration of CO2 is 50,260 μg/m3 (26.64 ppm). The concentration of CO2 in ambient air is an average of 0.041% or 410 ppm. This means that the maximum contribution from the worst activity scenario (Scenario 1, with equipment malfunction) is still relatively small compared to the natural concentration of CO2. In addition, this maximum concentration is also far below the concentration with a danger of health problems (suffocation) which is 10% (100,000 ppm). Thus CO2 is not a parameter that needs to be considered in this activity, and other scenarios do not need to be modeled again.

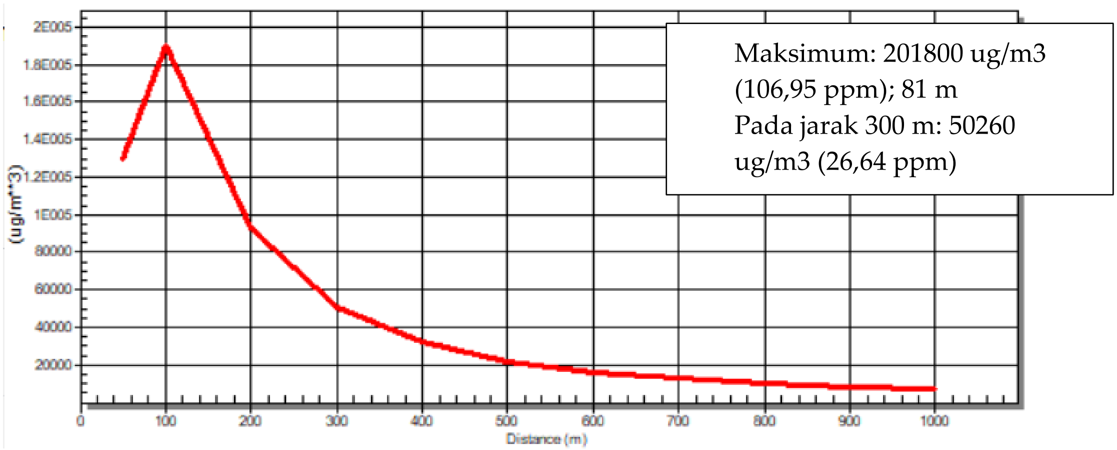


Figure 13. CO2 concentration profile based on scenario 1A1

23.3 AERMOD View Result

The results of emission distribution modeling based on AERMOD View are presented in Table 5 and Figure 14. In Table 5 it can be seen that the maximum concentration of H2S for receptors in the grid is 1,725 ug/m3 (1.15 ppm) which exceeds the standard odor level for H2S of 0.02 ppm. This maximum concentration point is found at coordinates x: 377926; y: 9202532 which is ± 725 m on the southeast side of the source. There are no settlements in this location. The land use in this location is agriculture.

For receptors in settlements, the maximum contribution was found at point R3 of 175.5 ug/m3 (0.117 ppm) which exceeds the standard odor level of 0.02 ppm. Point R3 is the closest settlement to the location of Well 9C. Point R3 is on the North side, ± 500 m from Well 9C. For other receptors around the maximum concentration ranges from 27.0-40.5 ug/m3 (0.018-0.027 ppm). Point R1 gives the maximum concentration that meets the H2S odor level standard of 0.02 ppm; while points R2, R4, and R5 give a maximum concentration of slightly above 0.02 ppm.

Table 5. Maximum Concentration AERMOD View Running 30 Days Recapitulation

Receptor	H_2S	
	ug/m^3	ppm
Maximum in Grid	1.725	1,15
R1	27,0	0,018
R2	31,5	0,021
R3	175,5	0,117
R4	40,5	0,027
R5	34,5	0,023

The H2S concentration profile from the emission source to the nearest settlement in Pawuhan Village (900 m to the north) is presented in Figure 15. It can be seen that the concentration at the source point decreased to a minimum at a distance of 100 m, then increased again and reached a maximum at a distance of 200 m.

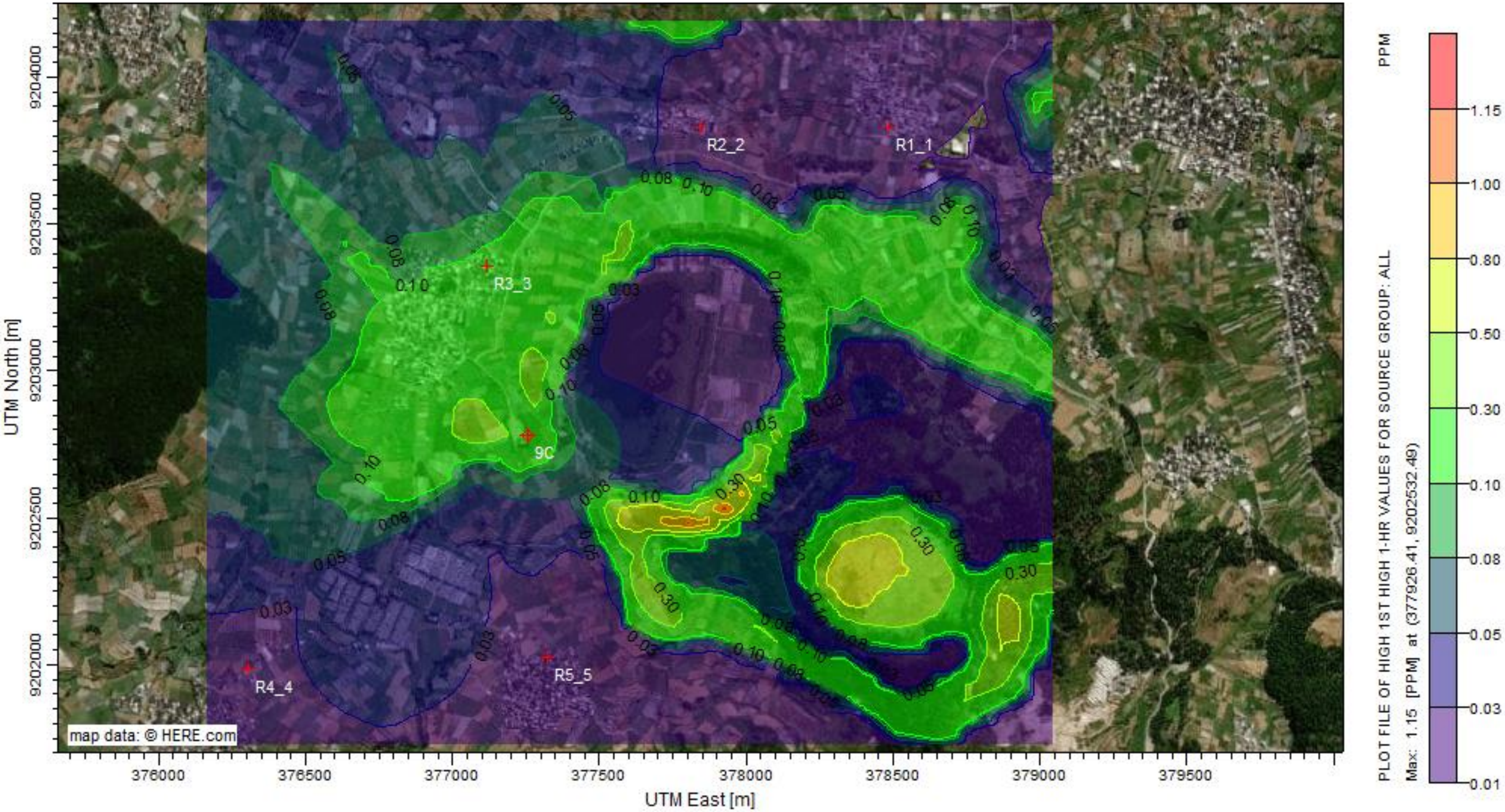


Figure 14. Isopleth H2S Average 1 hour Scenario 4

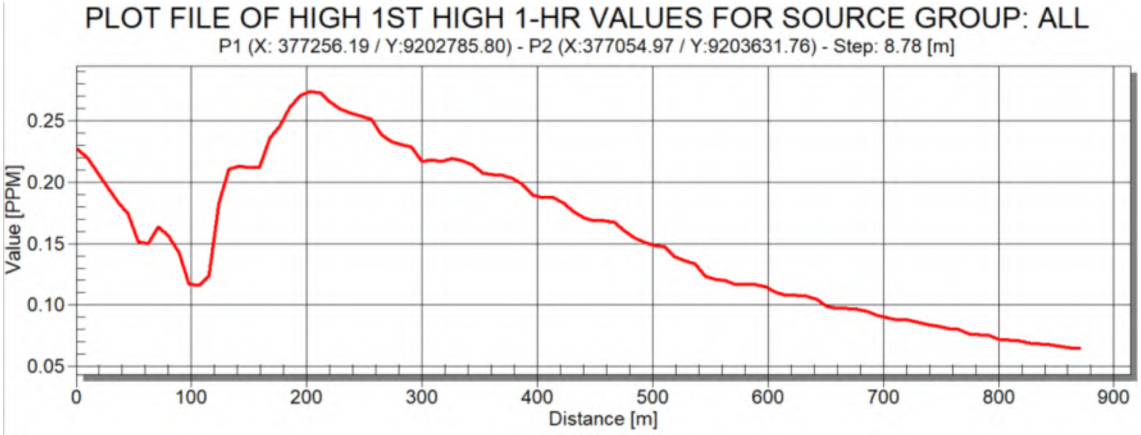


Figure 15. Profile of H2S Concentration Towards Settlements in the North

24 Conclusion

In the Bleed NCG With NCG Tank well testing scenario with a wind speed of 1 m/s the potential for odor reaches a distance of 500 m. At wind speeds of 4 m/s and 7 m/s there is no odor potential.

For the monitoring phase running for 30 days, the odor potential reaches a distance of 1.5 km.

There is a potential for odor in all settlements around Well 9C.

APPENDIX: AERMOD View Modeling Results

```
**
****************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 10.2.1
** Lakes Environmental Software Inc.
** Date: 9/4/2022
** File: D:\Amdal\Well Testing Geodipa\Well Pad 9C\Model\Aermod Skenario 4\Aermod
Skenario 4.ADI
**
****************************************
**
**
****************************************
** AERMOD Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel
   MODELOPT DFAULT CONC VECTORWS
   AVERTIME 1
   POLLUTID H2S
   RUNORNOT RUN
   ERRORFIL "Aermod Skenario 4.err"
CO FINISHED
**
****************************************
** AERMOD Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION 9C           POINT      377255.000  9202782.000     2038.700
** Source Parameters **
   SRCPARAM 9C              33.333     3.257   371.150 10484.35284     0.102
   CONCUNIT 670.0 GRAMS/SEC PPM
   SRCGROUP ALL
SO FINISHED
**
****************************************
** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
   INCLUDED "Aermod Skenario 4.rou"
RE FINISHED
**
****************************************
** AERMOD Meteorology Pathway
****************************************
**
**
ME STARTING
   SURFFILE "D:\Amdal\Aecom\Geodipa\Met
File\MET2221112_MMIF_AERMET\MET2221112_AERMET_2021-2021.SFC"
   PROFFILE "D:\Amdal\Aecom\Geodipa\Met
File\MET2221112_MMIF_AERMET\MET2221112_AERMET_2021-2021.PFL"
   SURFDATA 0 2021
   UAIRDATA 99999 2021
   SITEDATA 99999 2021
   PROFBASE 2077.0 METERS
   DAYRANGE 9/8-10/7
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
```

```
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
   MAXIFILE 1 ALL 3.5 "AERMOD SKENARIO 4.AD\H2S Well Testing.MAX" 31
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST "AERMOD SKENARIO 4.AD\01H1GALL.PLT" 32
   SUMMFILE "Aermod Skenario 4.sum"
OU FINISHED


  *** Message Summary For AERMOD Model Setup ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            5 Warning Message(s)
 A Total of            0 Informational Message(s)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 CO W116      20       MODOPT: Vector Wind Speeds specified on MODELOPT Keyword
VECTORWS
 SO W320      37        PPARM: Input Parameter May Be Out-of-Range for Parameter
VS
 ME W187      64       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET
 ME W182      64       MEOPEN: MMIF-generated meteorological inputs were used
 ME W181      64       MEOPEN: BULKRN Delta-T & SolarRad option for SBL was used
with MMIF

 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                            ***     MODEL SETUP OPTIONS SUMMARY
***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         ADJ_U*   - Use ADJ_U* option for SBL in AERMET
         MMIFData - Use MMIF met data inputs
                    MMIF VERSION 3.4 2018-07-18
         BULKRN   - Use BULKRN Delta-T and SolarRad option for SBL with MMIF
         VECTORWS - User specifies that input wind speeds are VECTOR means
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  H2S

 **Model Calculates  1 Short Term Average(s) of:   1-HR

 **This Run Includes:      1 Source(s);       1 Source Group(s); and    2505 Receptor(s)

                with:      1 POINT(s), including
                           0 POINTCAP(s) and      0 POINTHOR(s)
                 and:      0 VOLUME source(s)
                 and:      0 AREA type source(s)
                 and:      0 LINE source(s)
                 and:      0 RLINE/RLINEXT source(s)
                 and:      0 OPENPIT source(s)
                 and:      0 BUOYANT LINE source(s) with a total of     0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  21112

 **Output Options Selected:
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE
Keyword)
          Model Outputs External File(s) of Threshold Violations (MAXIFILE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =  2077.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
```

```
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =    670.00
                  Output Units   = PPM

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          aermod.inp
 **Output Print File:             aermod.out

 **Detailed Error/Message File:   Aermod Skenario 4.err
 **File for Summary of Results:   Aermod Skenario 4.sum
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE   2
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data


                                                 *** POINT SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE     STACK   STACK    STACK
STACK    BLDG   URBAN  CAP/  EMIS RATE
   SOURCE       PART. (USER UNITS)     X         Y      ELEV.    HEIGHT  TEMP.   EXIT
VEL. DIAMETER  EXISTS SOURCE HOR   SCALAR
     ID         CATS.               (METERS) (METERS) (METERS) (METERS) (DEG.K)  (M/SEC)
(METERS)                     VARY BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9C              0   0.33333E+02  377255.0 9202782.0  2038.7     3.26   371.15 10484.35
0.10    NO      NO    NO
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE   3
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data


                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

 SRCGROUP ID                                         SOURCE IDs
 -----------                                         ----------


  ALL        9C          ,
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE   4
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                          *** GRIDDED RECEPTOR NETWORK SUMMARY ***

                                    *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                            *** X-COORDINATES OF GRID ***
                                                      (METERS)

       376163.9,  376222.7,  376281.4,  376340.2,  376398.9,  376457.7,  376516.4,
376575.2,  376633.9,  376692.7,
       376751.4,  376810.2,  376868.9,  376927.7,  376986.4,  377045.2,  377103.9,
377162.7,  377221.4,  377280.2,
       377338.9,  377397.7,  377456.4,  377515.2,  377573.9,  377632.7,  377691.4,
377750.2,  377808.9,  377867.7,
       377926.4,  377985.2,  378043.9,  378102.7,  378161.4,  378220.2,  378278.9,
378337.7,  378396.4,  378455.2,
       378513.9,  378572.7,  378631.4,  378690.2,  378748.9,  378807.7,  378866.4,
378925.2,  378983.9,  379042.7,


                                            *** Y-COORDINATES OF GRID ***
                                                      (METERS)

      9201729.5, 9201779.6, 9201829.8, 9201880.0, 9201930.2, 9201980.4, 9202030.6,
9202080.8, 9202131.0, 9202181.2,
      9202231.4, 9202281.5, 9202331.7, 9202381.9, 9202432.1, 9202482.3, 9202532.5,
9202582.7, 9202632.9, 9202683.1,
      9202733.3, 9202783.4, 9202833.6, 9202883.8, 9202934.0, 9202984.2, 9203034.4,
9203084.6, 9203134.8, 9203185.0,
      9203235.2, 9203285.3, 9203335.5, 9203385.7, 9203435.9, 9203486.1, 9203536.3,
9203586.5, 9203636.7, 9203686.9,
      9203737.1, 9203787.2, 9203837.4, 9203887.6, 9203937.8, 9203988.0, 9204038.2,
9204088.4, 9204138.6, 9204188.8,
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 5
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 376163.91	376222.66	376281.41	376340.16	376398.91	376457.66	376516.41	376575.16	376633.91
9204188.76	1882.00	1889.40	1892.20	1894.90	1897.00	1897.00	1892.60	1889.40	1890.80
9204138.57	1880.10	1886.30	1891.50	1895.00	1899.50	1899.40	1894.90	1892.60	1890.40
9204088.38	1880.20	1880.30	1888.70	1893.60	1897.20	1898.40	1897.00	1895.00	1891.60
9204038.19	1887.70	1881.40	1885.30	1891.60	1895.90	1898.80	1897.90	1895.00	1894.20
9203988.00	1892.30	1886.70	1883.20	1890.00	1895.30	1897.40	1895.90	1892.70	1894.50
9203937.81	1892.30	1889.10	1890.40	1895.60	1899.90	1897.30	1892.50	1892.10	1894.00
9203887.62	1892.20	1892.10	1901.40	1906.10	1904.70	1898.40	1894.20	1893.70	1895.20
9203837.43	1895.50	1892.90	1899.10	1905.80	1904.50	1898.80	1895.30	1894.80	1894.90
9203787.24	1897.90	1892.60	1897.90	1902.60	1901.30	1896.80	1895.10	1894.60	1896.00
9203737.05	1903.80	1896.00	1900.30	1903.00	1900.40	1896.00	1896.30	1897.40	1898.70
9203686.86	1907.90	1903.30	1905.90	1907.60	1904.30	1899.60	1899.30	1900.40	1902.20
9203636.67	1912.80	1914.40	1914.20	1914.60	1911.00	1908.70	1908.00	1907.20	1909.50
9203586.48	1921.90	1923.70	1924.80	1922.90	1916.00	1916.40	1915.20	1916.00	1918.40
9203536.29	1931.70	1930.60	1926.90	1926.90	1922.50	1920.40	1921.90	1923.90	1927.60
9203486.10	1943.70	1938.20	1932.60	1930.50	1926.50	1925.60	1928.20	1937.50	1951.80
9203435.91	1958.90	1949.00	1941.80	1936.30	1931.10	1929.10	1933.80	1953.60	1973.90
9203385.72	1971.00	1960.60	1950.70	1942.90	1936.70	1933.10	1938.80	1965.50	1984.90
9203335.53	1986.20	1972.60	1960.50	1950.60	1943.80	1938.30	1942.40	1973.60	1989.00
9203285.34	1997.60	1983.70	1969.10	1958.40	1951.60	1945.90	1953.00	1979.00	1991.00
9203235.15	2001.10	1989.50	1980.30	1969.10	1960.00	1954.40	1963.20	1981.30	1993.40
9203184.96	2004.00	1993.90	1986.40	1977.70	1965.40	1958.10	1970.70	1985.70	1992.70
9203134.77	2012.20	1999.30	1987.40	1981.00	1970.90	1964.00	1972.00	1986.90	1992.70
9203084.58	2010.50	1995.30	1983.10	1975.20	1969.30	1969.40	1978.90	1988.80	1992.70
9203034.39	2010.60	1995.70	1980.40	1969.40	1968.00	1972.50	1981.20	1988.40	1994.50
9202984.20	2008.30	1991.50	1974.50	1964.70	1967.10	1973.20	1981.20	1988.90	1995.30
9202934.01	2001.70	1982.60	1968.30	1961.70	1963.30	1971.40	1980.90	1989.30	1994.90
9202883.82	1989.50	1974.20	1959.50	1955.80	1958.10	1967.40	1980.00	1987.40	1992.70
9202833.63	1980.90	1966.60	1952.20	1945.40	1949.30	1960.70	1975.30	1984.80	1989.60

```
  9202783.44 |       1969.40      1955.10      1943.50      1936.30      1939.20
1951.70      1968.70      1981.70      1988.60
  9202733.25 |       1958.40      1948.50      1934.50      1927.30      1929.80
1940.40      1960.60      1980.00      1987.40
  9202683.06 |       1947.50      1939.80      1927.30      1920.70      1922.70
1931.50      1954.10      1975.80      1983.20
  9202632.87 |       1937.50      1930.40      1920.90      1913.60      1915.40
1926.20      1948.10      1970.80      1978.90
  9202582.68 |       1928.30      1922.00      1911.30      1902.60      1909.70
1922.00      1942.10      1966.30      1971.20
  9202532.49 |       1915.20      1911.00      1901.50      1896.60      1906.90
1921.90      1945.40      1966.00      1967.20
  9202482.30 |       1899.40      1898.20      1890.10      1889.40      1902.40
1921.00      1946.90      1964.90      1966.80
  9202432.11 |       1885.00      1885.50      1878.10      1878.30      1896.40
1919.90      1945.60      1962.90      1965.30
  9202381.92 |       1872.50      1870.80      1866.30      1870.90      1892.90
1919.10      1943.20      1960.50      1963.60
  9202331.73 |       1860.00      1858.90      1857.20      1871.60      1899.00
1923.70      1946.20      1958.70      1957.50
  9202281.54 |       1852.20      1849.90      1851.60      1878.10      1905.10
1928.30      1945.90      1955.60      1955.90
  9202231.35 |       1844.40      1837.00      1848.60      1885.20      1906.90
1926.90      1943.50      1952.60      1955.00
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 6
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 376163.91	376222.66	376281.41	376340.16	376398.91	376457.66	376516.41	376575.16	376633.91
9202181.16	1830.40	1836.10	1859.80	1889.10	1908.00	1919.90	1936.40	1948.30	1952.20
9202130.97	1822.20	1842.30	1870.80	1892.50	1904.40	1914.30	1930.60	1942.20	1948.70
9202080.78	1823.70	1847.70	1871.50	1889.40	1899.80	1910.00	1921.50	1934.20	1943.90
9202030.59	1827.90	1846.10	1869.40	1887.30	1897.40	1908.10	1913.10	1923.80	1936.70
9201980.40	1837.70	1853.40	1872.20	1885.10	1892.60	1901.00	1907.80	1918.90	1930.50
9201930.21	1847.70	1861.30	1874.70	1885.00	1889.50	1894.80	1900.20	1911.10	1921.90
9201880.02	1846.20	1860.60	1874.40	1883.00	1886.60	1891.60	1895.70	1902.70	1913.30
9201829.83	1841.90	1856.30	1871.10	1877.80	1885.60	1891.50	1894.90	1899.00	1904.30
9201779.64	1839.20	1850.20	1865.40	1877.70	1886.20	1891.30	1896.20	1898.40	1898.30
9201729.45	1834.60	1840.90	1855.60	1871.20	1878.50	1883.90	1888.20	1887.20	1888.00

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 7
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 376692.66	376751.41	376810.16	376868.91	376927.66	376986.41	377045.16	377103.91	377162.66
9204188.76	1892.80	1895.30	1896.90	1907.60	1919.70	1933.90	1950.00	1961.70	1984.40
9204138.57	1889.30	1893.00	1894.20	1901.20	1910.90	1926.10	1942.00	1956.00	1972.60
9204088.38	1891.20	1893.10	1899.80	1903.50	1905.80	1915.70	1928.20	1948.50	1964.40
9204038.19	1896.50	1896.80	1899.70	1906.40	1909.80	1909.70	1913.30	1931.60	1952.70
9203988.00	1896.80	1897.30	1898.80	1903.40	1913.40	1914.60	1910.70	1920.70	1937.50
9203937.81	1896.90	1898.90	1898.90	1905.20	1912.60	1918.00	1920.40	1929.10	1941.20
9203887.62	1897.80	1900.80	1904.80	1912.40	1914.30	1920.60	1928.10	1939.90	1952.20
9203837.43	1896.80	1900.60	1908.70	1914.40	1917.30	1921.90	1930.50	1942.70	1955.50
9203787.24	1899.10	1904.80	1911.20	1915.70	1922.00	1928.40	1936.60	1949.40	1960.30
9203737.05	1904.00	1909.40	1914.50	1920.20	1929.80	1939.40	1947.30	1960.60	1974.30
9203686.86	1910.80	1917.60	1926.10	1938.50	1951.10	1957.80	1964.70	1975.40	1988.50
9203636.67	1919.90	1931.10	1950.00	1963.30	1972.70	1979.00	1981.50	1989.60	2002.20
9203586.48	1933.10	1955.20	1971.60	1981.60	1987.20	1991.10	1994.20	2001.20	2011.40
9203536.29	1950.90	1975.90	1984.90	1988.90	1992.40	1997.80	2000.40	2008.30	2015.00
9203486.10	1968.40	1984.00	1989.00	1993.20	1995.80	2001.70	2002.90	2011.60	2018.90
9203435.91	1980.50	1987.70	1993.40	1998.60	1999.70	2004.20	2007.10	2014.90	2022.20
9203385.72	1988.30	1992.60	1996.30	1998.40	2002.60	2004.00	2008.20	2016.50	2022.90
9203335.53	1990.00	1992.80	1996.10	1999.90	2003.00	2003.40	2008.00	2017.40	2022.80
9203285.34	1995.00	1994.60	1997.20	2002.70	2003.40	2006.70	2011.00	2017.60	2026.80
9203235.15	1996.80	1997.80	1999.30	2001.90	2003.40	2006.80	2012.50	2019.50	2027.40
9203184.96	1996.80	1998.50	1999.30	2001.30	2003.00	2004.20	2011.50	2017.40	2027.50
9203134.77	1997.80	1998.80	1999.10	2001.60	2003.20	2006.70	2010.50	2016.80	2030.20
9203084.58	1998.60	2000.30	1999.00	2000.80	2002.40	2007.50	2010.30	2017.30	2031.80
9203034.39	2000.40	2000.40	1997.80	1998.30	1998.10	2004.00	2008.80	2016.70	2029.60
9202984.20	1998.80	1997.80	1996.40	1996.70	1997.40	1999.50	2003.40	2015.40	2030.20
9202934.01	1995.40	1995.50	1994.80	1995.10	1996.30	1995.50	2001.00	2013.90	2028.40
9202883.82	1994.30	1993.10	1993.50	1992.00	1993.60	1993.70	2001.20	2013.60	2027.30
9202833.63	1991.90	1988.80	1990.90	1989.20	1990.70	1995.50	2002.80	2013.80	2025.40

```
  9202783.44 |       1989.40      1984.90      1986.30      1985.20      1986.90
1993.20      2000.40      2013.90      2026.40
  9202733.25 |       1985.60      1978.90      1979.70      1980.10      1980.90
1987.10      2000.50      2013.10      2025.10
  9202683.06 |       1980.60      1975.20      1976.40      1977.10      1978.80
1986.70      2002.90      2014.30      2022.60
  9202632.87 |       1976.00      1970.50      1972.20      1974.30      1976.60
1986.90      2002.40      2010.80      2019.80
  9202582.68 |       1968.30      1966.00      1965.90      1968.00      1971.50
1983.80      1997.20      2007.20      2018.20
  9202532.49 |       1964.10      1962.80      1962.10      1961.30      1964.40
1977.80      1991.60      2003.70      2012.80
  9202482.30 |       1963.00      1960.20      1958.80      1958.70      1959.40
1970.70      1983.10      1996.20      2003.80
  9202432.11 |       1961.00      1957.50      1955.70      1956.00      1958.10
1963.30      1971.60      1981.10      1992.30
  9202381.92 |       1960.20      1956.30      1954.10      1954.10      1953.90
1953.30      1956.50      1969.40      1978.80
  9202331.73 |       1956.80      1953.90      1953.50      1953.80      1952.60
1949.40      1949.00      1956.30      1966.00
  9202281.54 |       1953.90      1952.40      1952.40      1950.70      1950.50
1949.00      1949.20      1954.50      1960.90
  9202231.35 |       1953.20      1951.40      1951.70      1950.00      1949.00
1948.80      1948.20      1952.50      1959.20
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE   8
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * ELEVATION HEIGHTS IN METERS *

    Y-COORD  |                                               X-COORD (METERS)
    (METERS) |     376692.66    376751.41    376810.16    376868.91    376927.66
376986.41    377045.16    377103.91    377162.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       1952.40      1952.00      1951.90      1949.70      1948.70
1947.20      1945.50      1948.80      1955.70
  9202130.97 |       1950.40      1950.10      1950.40      1948.10      1947.40
1946.50      1944.70      1947.10      1952.80
  9202080.78 |       1948.00      1948.00      1947.70      1944.50      1944.50
1945.80      1943.00      1945.40      1951.30
  9202030.59 |       1943.40      1945.60      1944.70      1944.00      1944.40
1943.30      1942.00      1947.00      1953.70
  9201980.40 |       1938.70      1943.90      1943.00      1941.00      1941.30
1944.90      1946.20      1949.30      1954.60
  9201930.21 |       1932.60      1941.20      1939.70      1933.30      1938.00
1945.40      1948.20      1949.10      1953.20
  9201880.02 |       1926.70      1935.40      1935.10      1930.40      1935.40
1941.50      1944.20      1946.90      1951.80
  9201829.83 |       1917.50      1929.10      1930.50      1927.00      1932.40
1938.90      1941.80      1943.50      1946.60
  9201779.64 |       1906.40      1921.50      1926.20      1921.70      1929.50
1937.20      1938.10      1939.10      1942.10
  9201729.45 |       1892.20      1901.00      1911.30      1917.80      1928.40
1933.40      1931.70      1935.30      1935.50
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 9
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 377221.41	377280.16	377338.91	377397.66	377456.41	377515.16	377573.91	377632.66	377691.41
9204188.76	2004.50	2017.00	2029.80	2045.60	2053.70	2063.00	2072.70	2089.10	2112.20
9204138.57	1988.40	2004.00	2016.30	2024.40	2032.30	2043.50	2053.80	2066.60	2087.70
9204088.38	1978.80	1990.50	2002.20	2008.30	2016.10	2026.80	2040.10	2051.30	2066.70
9204038.19	1963.00	1974.00	1985.30	1992.70	2001.30	2014.50	2024.80	2037.50	2047.50
9203988.00	1952.10	1959.00	1971.00	1977.20	1984.90	1997.40	2010.70	2023.80	2035.00
9203937.81	1950.60	1956.70	1966.20	1968.30	1973.80	1981.30	1995.00	2007.60	2018.50
9203887.62	1960.90	1971.00	1976.90	1978.70	1984.30	1988.30	1995.00	2005.60	2014.20
9203837.43	1967.40	1976.90	1986.50	1994.30	1999.90	2005.50	2011.70	2018.10	2024.20
9203787.24	1972.80	1983.70	1996.50	2010.20	2014.40	2019.30	2024.00	2029.20	2032.30
9203737.05	1983.60	1995.40	2009.10	2021.20	2026.00	2034.10	2037.20	2044.60	2049.70
9203686.86	1999.10	2010.30	2019.80	2030.60	2039.90	2051.50	2057.30	2064.90	2069.50
9203636.67	2014.80	2025.50	2033.50	2043.40	2052.30	2063.70	2072.20	2083.10	2090.50
9203586.48	2022.30	2030.60	2041.10	2052.70	2063.00	2075.30	2087.50	2096.40	2105.70
9203536.29	2026.20	2036.40	2047.20	2058.90	2071.40	2086.60	2099.20	2109.00	2115.80
9203486.10	2030.40	2040.00	2049.00	2063.60	2078.40	2093.00	2107.30	2118.00	2121.20
9203435.91	2032.00	2041.60	2052.20	2066.20	2082.50	2097.10	2111.10	2113.90	2102.40
9203385.72	2033.30	2046.50	2058.20	2069.40	2086.00	2101.60	2108.10	2092.50	2075.60
9203335.53	2037.20	2047.90	2059.50	2069.70	2088.60	2100.00	2092.60	2067.60	2055.00
9203285.34	2034.60	2043.70	2058.50	2075.30	2087.70	2082.30	2053.80	2045.70	2045.00
9203235.15	2036.70	2049.00	2065.20	2080.10	2076.10	2062.70	2046.50	2045.00	2045.00
9203184.96	2039.80	2060.90	2073.80	2073.20	2060.70	2046.20	2045.00	2045.00	2045.00
9203134.77	2045.50	2060.90	2073.00	2064.40	2051.30	2045.00	2045.00	2045.00	2045.00
9203084.58	2050.50	2066.60	2071.00	2054.60	2045.40	2045.00	2045.00	2045.00	2045.00
9203034.39	2050.30	2067.80	2069.50	2050.90	2045.20	2045.00	2045.00	2045.00	2045.00
9202984.20	2049.40	2065.30	2063.80	2051.30	2045.10	2045.00	2045.00	2045.00	2045.00
9202934.01	2046.20	2060.90	2062.10	2048.90	2045.10	2045.00	2045.00	2045.00	2045.00
9202883.82	2041.50	2054.40	2060.80	2047.70	2045.00	2045.00	2045.00	2045.00	2045.70
9202833.63	2034.90	2050.30	2058.20	2051.30	2045.10	2045.00	2045.00	2045.00	2045.70

9202783.44	2033.70	2043.40	2053.20	2051.70	2046.90	2045.00	2045.00	2045.00	2046.10
9202733.25	2032.70	2039.80	2049.40	2055.50	2052.50	2046.30	2045.00	2045.20	2046.70
9202683.06	2030.30	2038.10	2046.10	2058.40	2060.00	2051.20	2047.20	2047.80	2048.50
9202632.87	2027.60	2035.90	2045.40	2059.00	2069.10	2065.20	2061.30	2057.40	2054.20
9202582.68	2025.50	2033.50	2043.30	2059.10	2075.30	2082.00	2077.90	2075.90	2073.30
9202532.49	2018.60	2029.30	2039.90	2057.30	2075.80	2094.80	2102.10	2105.60	2105.90
9202482.30	2011.30	2022.10	2033.90	2048.50	2069.40	2092.70	2115.20	2130.30	2137.60
9202432.11	2002.20	2014.20	2023.00	2033.70	2055.10	2082.20	2110.10	2139.00	2164.20
9202381.92	1985.10	1998.70	2008.50	2021.00	2041.20	2064.80	2095.70	2129.30	2162.90
9202331.73	1971.50	1980.80	1991.50	2010.70	2033.10	2056.20	2084.90	2122.90	2154.40
9202281.54	1965.90	1975.20	1984.70	2003.20	2020.30	2044.00	2074.80	2109.80	2141.20
9202231.35	1963.20	1969.20	1980.80	1996.50	2016.60	2041.70	2072.10	2101.10	2123.60

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  10
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * ELEVATION HEIGHTS IN METERS *

    Y-COORD  |                                              X-COORD (METERS)
    (METERS) |     377221.41    377280.16    377338.91    377397.66    377456.41
377515.16    377573.91    377632.66    377691.41
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       1960.80      1968.90      1982.40      2000.10      2019.00
2041.10      2069.10      2094.00      2110.10
  9202130.97 |       1961.30      1974.30      1987.10      2003.70      2017.90
2043.00      2067.20      2084.90      2096.90
  9202080.78 |       1961.30      1974.10      1984.90      1998.50      2016.80
2037.30      2055.50      2067.90      2077.20
  9202030.59 |       1962.80      1969.10      1978.20      1992.50      2008.70
2028.00      2042.70      2050.10      2056.60
  9201980.40 |       1960.50      1965.70      1973.60      1985.20      1999.20
2014.80      2028.90      2030.60      2029.10
  9201930.21 |       1957.20      1962.00      1967.00      1975.60      1990.10
2003.90      2015.40      2015.50      2014.20
  9201880.02 |       1955.70      1958.30      1963.50      1971.40      1978.60
1987.40      1997.10      1999.90      1999.50
  9201829.83 |       1952.10      1955.00      1958.50      1965.30      1969.40
1976.90      1982.00      1980.30      1981.00
  9201779.64 |       1945.00      1944.90      1947.80      1950.80      1957.60
1965.20      1964.10      1962.90      1966.80
  9201729.45 |       1934.10      1931.20      1935.10      1940.40      1944.10
1946.40      1945.40      1948.70      1960.10
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 11
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS): 377750.16	377808.91	377867.66	377926.41	377985.16	378043.91	378102.66	378161.41	378220.16
9204188.76	2121.80	2114.00	2104.60	2087.70	2072.30	2056.90	2040.40	2028.40	2022.50
9204138.57	2096.70	2092.80	2085.30	2071.20	2057.00	2042.90	2030.20	2021.90	2019.40
9204088.38	2075.10	2073.20	2065.40	2054.00	2037.80	2025.70	2021.00	2018.10	2020.40
9204038.19	2056.10	2055.80	2047.50	2036.00	2022.20	2017.80	2018.30	2024.80	2032.40
9203988.00	2040.30	2039.70	2033.30	2023.60	2019.20	2027.20	2029.30	2038.50	2043.30
9203937.81	2027.00	2023.70	2019.40	2015.20	2019.50	2031.00	2038.70	2039.80	2042.10
9203887.62	2022.80	2019.80	2013.00	2011.80	2017.00	2024.60	2031.00	2033.90	2036.40
9203837.43	2028.50	2027.60	2022.70	2018.50	2017.00	2019.20	2027.20	2037.10	2036.50
9203787.24	2035.20	2036.90	2037.90	2033.50	2029.20	2032.70	2043.40	2052.00	2045.30
9203737.05	2053.90	2057.30	2060.50	2056.70	2049.70	2052.90	2058.20	2063.60	2058.80
9203686.86	2073.00	2077.20	2078.80	2075.30	2071.10	2065.50	2067.00	2073.10	2073.00
9203636.67	2094.00	2097.80	2099.30	2096.00	2086.50	2078.70	2074.60	2077.30	2078.90
9203586.48	2112.70	2115.70	2115.50	2112.10	2101.90	2085.60	2077.30	2080.10	2088.30
9203536.29	2123.60	2128.70	2129.50	2127.00	2121.50	2101.40	2086.50	2082.60	2092.50
9203486.10	2123.00	2123.10	2123.70	2131.20	2131.70	2117.60	2099.80	2087.50	2093.30
9203435.91	2099.00	2101.20	2097.80	2101.50	2114.90	2121.20	2118.40	2103.80	2099.00
9203385.72	2070.20	2067.60	2068.80	2074.50	2087.10	2106.20	2118.50	2120.30	2115.90
9203335.53	2052.70	2050.60	2052.10	2056.30	2064.50	2080.80	2101.10	2125.40	2132.70
9203285.34	2045.70	2047.90	2047.70	2048.60	2050.60	2064.70	2086.20	2113.80	2136.20
9203235.15	2045.30	2048.20	2047.30	2047.20	2049.00	2059.10	2073.00	2103.80	2129.60
9203184.96	2045.00	2046.60	2047.20	2047.50	2049.00	2053.90	2068.50	2098.20	2131.30
9203134.77	2045.00	2046.60	2049.20	2046.50	2048.20	2053.30	2073.60	2099.50	2136.30
9203084.58	2045.00	2045.40	2047.60	2046.70	2049.00	2054.60	2072.70	2095.70	2125.80
9203034.39	2045.90	2047.00	2046.60	2047.80	2051.30	2054.40	2069.20	2087.80	2117.40
9202984.20	2046.40	2048.10	2047.40	2050.40	2053.80	2056.60	2063.70	2079.70	2122.60
9202934.01	2046.40	2046.30	2046.80	2049.40	2052.80	2059.30	2071.20	2092.30	2139.30
9202883.82	2047.40	2047.30	2048.80	2049.60	2053.10	2062.10	2075.40	2107.00	2167.20
9202833.63	2047.70	2048.90	2050.00	2050.00	2053.10	2072.30	2096.80	2136.60	2184.90

9202783.44	2047.20	2048.60	2050.90	2051.40	2058.90	2083.30	2119.80	2158.20	2203.60
9202733.25	2048.80	2050.90	2052.60	2055.30	2066.50	2103.90	2136.60	2194.30	2224.30
9202683.06	2050.50	2051.60	2053.50	2063.30	2085.50	2130.80	2163.80	2205.60	2241.90
9202632.87	2054.60	2056.30	2062.40	2079.60	2103.70	2145.00	2191.00	2222.30	2250.80
9202582.68	2067.20	2066.80	2080.40	2100.60	2122.00	2177.60	2212.60	2239.40	2249.70
9202532.49	2097.60	2093.30	2107.60	2132.60	2159.40	2215.50	2237.70	2243.20	2228.40
9202482.30	2134.90	2135.40	2148.10	2168.00	2218.40	2242.90	2253.90	2233.30	2202.90
9202432.11	2171.00	2171.90	2185.60	2206.10	2250.00	2257.30	2243.70	2217.50	2185.00
9202381.92	2192.00	2204.30	2216.60	2232.60	2241.70	2256.80	2238.40	2212.20	2176.30
9202331.73	2180.20	2193.50	2200.20	2208.30	2220.50	2248.70	2236.10	2205.70	2170.60
9202281.54	2159.90	2172.50	2179.50	2186.10	2198.80	2232.00	2232.70	2206.00	2172.00
9202231.35	2142.90	2154.30	2158.60	2163.80	2181.00	2210.00	2228.60	2212.80	2185.10

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 12
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
	377750.16	377808.91	377867.66	377926.41	377985.16	378043.91	378102.66	378161.41	378220.16
9202181.16	2125.20	2135.00	2132.90	2137.80	2150.20	2172.80	2206.60	2217.50	2198.50
9202130.97	2106.80	2108.30	2107.40	2114.90	2121.90	2133.50	2165.60	2208.60	2210.50
9202080.78	2082.80	2078.80	2080.20	2093.80	2103.80	2110.60	2126.40	2162.10	2196.50
9202030.59	2059.10	2056.40	2060.90	2073.30	2083.10	2090.20	2097.70	2113.10	2147.50
9201980.40	2035.70	2040.20	2044.40	2051.90	2059.40	2071.50	2076.80	2090.80	2109.50
9201930.21	2022.40	2028.90	2031.30	2032.70	2042.60	2052.50	2062.00	2075.60	2081.80
9201880.02	2012.10	2013.90	2013.50	2018.60	2032.40	2040.80	2046.80	2058.20	2067.80
9201829.83	1998.00	2002.70	2010.20	2020.00	2028.20	2035.80	2039.80	2041.60	2055.90
9201779.64	1983.30	1998.30	2010.40	2018.40	2022.40	2028.70	2035.50	2037.80	2049.00
9201729.45	1971.40	1987.00	1992.70	1994.50	2003.30	2015.30	2021.10	2028.00	2043.00

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 13
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 378278.91	378337.66	378396.41	378455.16	378513.91	378572.66	378631.41	378690.16	378748.91
9204188.76	2023.20	2027.60	2028.70	2025.50	2023.60	2023.40	2025.40	2028.00	2033.60
9204138.57	2024.70	2029.20	2031.90	2029.00	2027.50	2023.40	2026.50	2029.40	2036.00
9204088.38	2027.40	2031.40	2033.10	2032.70	2030.70	2026.10	2028.10	2032.10	2040.00
9204038.19	2036.80	2036.30	2035.50	2035.10	2032.20	2028.60	2028.80	2034.80	2045.00
9203988.00	2045.30	2041.20	2037.80	2037.50	2035.90	2031.70	2030.90	2035.40	2051.20
9203937.81	2044.30	2044.60	2041.90	2041.00	2040.20	2037.10	2033.30	2039.20	2054.80
9203887.62	2037.90	2042.00	2043.90	2043.70	2043.60	2044.10	2041.30	2041.00	2055.80
9203837.43	2035.50	2036.90	2042.80	2043.80	2046.60	2050.30	2048.60	2045.10	2057.10
9203787.24	2040.00	2037.00	2041.40	2043.30	2047.60	2053.20	2054.10	2053.50	2061.20
9203737.05	2054.70	2049.80	2046.80	2046.40	2052.50	2056.40	2057.60	2061.10	2066.40
9203686.86	2072.60	2068.80	2061.70	2060.30	2060.30	2063.40	2067.20	2071.10	2070.70
9203636.67	2080.00	2079.90	2075.10	2069.80	2067.60	2072.00	2077.60	2082.70	2081.90
9203586.48	2092.90	2091.10	2082.50	2077.50	2077.70	2081.70	2083.50	2092.70	2093.70
9203536.29	2102.50	2101.10	2092.70	2090.30	2093.40	2092.50	2089.00	2097.40	2100.40
9203486.10	2103.70	2110.30	2107.00	2108.30	2107.40	2100.30	2095.50	2101.20	2102.90
9203435.91	2105.80	2119.80	2121.70	2117.10	2113.50	2107.80	2101.20	2102.80	2101.30
9203385.72	2115.80	2126.00	2133.50	2123.50	2115.40	2109.80	2105.40	2101.50	2094.80
9203335.53	2124.90	2128.60	2140.40	2133.30	2118.80	2113.30	2107.90	2101.10	2090.50
9203285.34	2140.60	2137.70	2147.00	2141.60	2125.50	2117.30	2108.70	2102.80	2096.30
9203235.15	2150.80	2148.90	2153.00	2149.10	2132.40	2118.60	2111.90	2108.00	2102.60
9203184.96	2154.90	2153.40	2155.90	2152.50	2138.90	2127.80	2123.50	2114.00	2107.10
9203134.77	2156.70	2160.30	2158.80	2159.90	2155.50	2149.20	2138.40	2127.40	2119.70
9203084.58	2156.40	2175.70	2175.00	2176.60	2176.50	2163.80	2147.90	2140.60	2133.20
9203034.39	2157.40	2186.60	2195.00	2198.10	2194.30	2173.20	2159.70	2151.50	2143.30
9202984.20	2159.20	2202.50	2223.70	2224.60	2210.00	2189.00	2174.70	2167.40	2156.00
9202934.01	2176.90	2216.00	2251.00	2252.70	2230.60	2209.90	2196.20	2186.80	2177.20
9202883.82	2198.50	2219.10	2265.10	2281.70	2264.30	2238.80	2217.70	2205.80	2190.40
9202833.63	2222.10	2252.60	2286.10	2296.80	2280.80	2263.60	2240.50	2220.00	2196.10

```
  9202783.44 |       2248.80      2276.00      2291.40      2284.00      2271.00
2264.40      2256.60      2241.60      2211.10
  9202733.25 |       2261.00      2277.00      2278.60      2264.90      2248.90
2246.40      2249.60      2250.80      2233.80
  9202683.06 |       2262.00      2264.70      2252.10      2237.20      2226.70
2227.50      2235.80      2241.60      2242.90
  9202632.87 |       2260.30      2244.30      2223.00      2210.40      2205.60
2209.60      2220.80      2226.90      2230.30
  9202582.68 |       2234.00      2213.30      2195.10      2184.80      2181.90
2190.60      2202.60      2212.30      2215.70
  9202532.49 |       2202.10      2179.40      2172.30      2167.70      2161.50
2176.10      2185.10      2193.90      2201.60
  9202482.30 |       2180.10      2165.60      2160.40      2152.30      2149.20
2160.40      2172.30      2182.10      2193.40
  9202432.11 |       2168.70      2155.90      2150.40      2144.80      2146.90
2153.70      2163.70      2176.00      2190.00
  9202381.92 |       2163.40      2147.20      2146.00      2144.20      2147.50
2152.10      2153.70      2168.40      2191.50
  9202331.73 |       2154.70      2143.10      2141.50      2144.20      2149.30
2150.30      2150.50      2159.40      2185.70
  9202281.54 |       2149.70      2140.40      2141.40      2148.50      2152.60
2151.50      2150.30      2155.20      2173.50
  9202231.35 |       2156.90      2139.50      2143.60      2152.90      2154.10
2155.70      2153.00      2162.80      2172.80
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  14
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * ELEVATION HEIGHTS IN METERS *

    Y-COORD  |                                               X-COORD (METERS)
    (METERS) |     378278.91    378337.66    378396.41    378455.16    378513.91
378572.66    378631.41    378690.16    378748.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       2169.20      2150.00      2148.20      2153.30      2153.70
2157.00      2157.70      2167.90      2175.90
  9202130.97 |       2187.00      2166.80      2157.90      2157.80      2158.10
2160.50      2169.60      2179.00      2176.70
  9202080.78 |       2205.60      2192.30      2178.00      2175.50      2171.60
2173.40      2188.00      2195.70      2185.10
  9202030.59 |       2176.80      2183.20      2194.00      2202.10      2199.10
2200.80      2205.40      2209.50      2191.40
  9201980.40 |       2124.30      2141.40      2173.60      2203.30      2208.10
2208.60      2207.50      2205.50      2175.80
  9201930.21 |       2095.80      2112.40      2143.50      2174.20      2191.30
2192.50      2178.90      2167.10      2147.50
  9201880.02 |       2075.70      2087.10      2101.50      2119.00      2150.00
2161.60      2155.70      2139.30      2119.30
  9201829.83 |       2060.90      2070.50      2079.80      2096.60      2124.30
2139.40      2133.10      2120.20      2099.30
  9201779.64 |       2056.20      2060.00      2066.60      2080.10      2099.10
2103.00      2107.70      2100.80      2079.20
  9201729.45 |       2047.90      2050.60      2059.70      2066.50      2070.40
2075.00      2081.90      2081.70      2061.80
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  15
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * ELEVATION HEIGHTS IN METERS *
```

Y-COORD (METERS)	X-COORD (METERS) 378807.66	378866.41	378925.16	378983.91	379042.66
9204188.76	2039.80	2049.30	2060.50	2072.10	2082.30
9204138.57	2045.30	2054.10	2064.70	2073.10	2080.70
9204088.38	2053.40	2061.60	2067.70	2074.90	2091.40
9204038.19	2056.50	2068.90	2076.60	2085.10	2097.00
9203988.00	2066.00	2078.60	2087.70	2098.50	2105.80
9203937.81	2068.50	2079.10	2094.40	2111.40	2110.40
9203887.62	2067.60	2075.30	2088.90	2107.20	2100.50
9203837.43	2067.50	2072.60	2082.70	2098.20	2091.60
9203787.24	2072.00	2075.90	2080.10	2090.50	2087.10
9203737.05	2074.00	2075.60	2076.30	2084.70	2084.80
9203686.86	2072.30	2073.50	2075.40	2079.80	2081.00
9203636.67	2075.90	2072.10	2072.80	2071.90	2071.50
9203586.48	2083.70	2072.40	2070.20	2068.60	2065.70
9203536.29	2085.20	2072.60	2068.70	2067.70	2064.80
9203486.10	2087.00	2073.60	2067.40	2067.00	2065.00
9203435.91	2089.40	2074.50	2068.30	2067.20	2066.00
9203385.72	2086.00	2075.10	2069.80	2068.10	2066.20
9203335.53	2082.50	2078.50	2073.80	2069.70	2066.40
9203285.34	2085.90	2080.20	2078.00	2073.00	2070.00
9203235.15	2093.30	2087.70	2084.50	2079.30	2074.80
9203184.96	2102.20	2097.20	2092.30	2088.10	2081.60
9203134.77	2112.40	2106.40	2102.90	2098.00	2088.30
9203084.58	2123.00	2118.70	2117.80	2111.50	2098.30
9203034.39	2133.40	2130.80	2130.10	2121.90	2108.70
9202984.20	2146.90	2141.30	2136.20	2126.00	2118.20
9202934.01	2162.80	2155.10	2144.00	2133.20	2126.50
9202883.82	2173.60	2164.00	2160.70	2152.40	2140.30
9202833.63	2182.70	2178.40	2170.90	2166.20	2149.20
9202783.44	2196.90	2197.20	2187.70	2171.70	2154.20
9202733.25	2224.50	2221.00	2205.10	2180.40	2164.20
9202683.06	2242.30	2236.90	2213.00	2186.20	2171.50
9202632.87	2233.90	2234.60	2217.50	2193.40	2179.60
9202582.68	2225.40	2233.80	2227.00	2204.80	2189.10
9202532.49	2216.70	2232.30	2234.60	2213.40	2197.30
9202482.30	2210.00	2227.20	2227.40	2213.70	2202.70
9202432.11	2207.10	2214.20	2206.30	2197.70	2188.60
9202381.92	2204.70	2197.50	2179.90	2170.30	2157.40
9202331.73	2190.80	2175.30	2156.10	2146.30	2140.40
9202281.54	2173.10	2153.30	2137.30	2124.30	2124.90
9202231.35	2162.90	2137.80	2119.00	2103.20	2104.10

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  16
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * ELEVATION HEIGHTS IN METERS *
```

Y-COORD (METERS)	X-COORD (METERS) 378807.66	378866.41	378925.16	378983.91	379042.66
9202181.16	2160.00	2138.50	2124.80	2099.40	2085.50
9202130.97	2158.20	2138.50	2125.80	2100.40	2074.10
9202080.78	2162.80	2141.00	2120.90	2097.50	2073.20
9202030.59	2161.00	2137.60	2111.40	2087.50	2070.00
9201980.40	2148.60	2128.10	2099.20	2072.40	2062.80
9201930.21	2129.60	2113.30	2093.80	2066.50	2054.80
9201880.02	2109.10	2094.90	2082.70	2064.00	2050.40
9201829.83	2087.80	2074.10	2069.90	2059.70	2046.40
9201779.64	2070.30	2056.80	2059.60	2054.60	2049.50
9201729.45	2053.10	2050.10	2049.40	2049.50	2050.40

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 17
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 376163.91	376222.66	376281.41	376340.16	376398.91	376457.66	376516.41	376575.16	376633.91
9204188.76	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204138.57	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204088.38	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204038.19	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203988.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203937.81	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203887.62	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203837.43	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203787.24	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203737.05	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203686.86	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203636.67	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203586.48	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203536.29	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203486.10	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203435.91	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203385.72	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203335.53	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203285.34	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203235.15	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203184.96	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203134.77	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203084.58	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203034.39	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202984.20	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202934.01	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202883.82	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202833.63	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

```
  9202783.44 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202733.25 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202683.06 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202632.87 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202582.68 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202532.49 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202482.30 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202432.11 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202381.92 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202331.73 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202281.54 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202231.35 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  18
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * HILL HEIGHT SCALES IN METERS *

    Y-COORD  |                                               X-COORD (METERS)
    (METERS) |     376163.91    376222.66    376281.41    376340.16    376398.91
376457.66    376516.41    376575.16    376633.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202130.97 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202080.78 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202030.59 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201980.40 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201930.21 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201880.02 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201829.83 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201779.64 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201729.45 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 19
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 376692.66	376751.41	376810.16	376868.91	376927.66	376986.41	377045.16	377103.91	377162.66
9204188.76	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204138.57	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204088.38	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204038.19	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203988.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203937.81	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203887.62	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203837.43	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203787.24	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203737.05	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203686.86	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203636.67	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203586.48	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203536.29	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203486.10	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203435.91	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203385.72	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203335.53	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203285.34	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203235.15	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203184.96	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203134.77	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203084.58	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203034.39	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202984.20	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202934.01	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202883.82	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202833.63	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

```
  9202783.44 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202733.25 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202683.06 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202632.87 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202582.68 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202532.49 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202482.30 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202432.11 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202381.92 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202331.73 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202281.54 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202231.35 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 20
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 376692.66	376751.41	376810.16	376868.91	376927.66	376986.41	377045.16	377103.91	377162.66
9202181.16	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202130.97	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202080.78	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202030.59	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9201980.40	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9201930.21	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9201880.02	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9201829.83	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9201779.64	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9201729.45	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  21
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * HILL HEIGHT SCALES IN METERS *

    Y-COORD  |                                              X-COORD (METERS)
    (METERS) |     377221.41    377280.16    377338.91    377397.66    377456.41
377515.16    377573.91    377632.66    377691.41
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

  9204188.76 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9204138.57 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9204088.38 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9204038.19 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203988.00 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203937.81 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203887.62 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203837.43 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203787.24 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203737.05 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203686.86 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203636.67 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203586.48 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203536.29 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203486.10 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203435.91 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203385.72 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203335.53 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203285.34 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203235.15 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203184.96 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203134.77 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203084.58 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9203034.39 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202984.20 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202934.01 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202883.82 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202833.63 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

9202783.44	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202733.25	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202683.06	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202632.87	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202582.68	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202532.49	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202482.30	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202432.11	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202381.92	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202331.73	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202281.54	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202231.35	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  22
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * HILL HEIGHT SCALES IN METERS *

    Y-COORD  |                                               X-COORD (METERS)
    (METERS) |     377221.41    377280.16    377338.91    377397.66    377456.41
377515.16    377573.91    377632.66    377691.41
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202130.97 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202080.78 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202030.59 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201980.40 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201930.21 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201880.02 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201829.83 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201779.64 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201729.45 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 23
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	377750.16	377808.91	377867.66	377926.41	377985.16	378043.91	378102.66	378161.41	378220.16
9204188.76	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204138.57	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204088.38	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204038.19	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203988.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203937.81	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203887.62	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203837.43	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203787.24	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203737.05	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203686.86	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203636.67	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203586.48	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203536.29	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203486.10	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203435.91	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203385.72	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203335.53	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203285.34	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203235.15	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203184.96	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203134.77	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203084.58	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203034.39	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202984.20	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202934.01	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202883.82	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202833.63	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

9202783.44	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202733.25	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202683.06	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202632.87	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202582.68	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202532.49	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202482.30	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2267.00	2298.00	2298.00
9202432.11	2298.00	2298.00	2298.00	2298.00	2267.00	2267.00	2298.00	2298.00	2298.00
9202381.92	2298.00	2298.00	2298.00	2267.00	2267.00	2267.00	2298.00	2298.00	2298.00
9202331.73	2298.00	2298.00	2298.00	2298.00	2298.00	2267.00	2298.00	2298.00	2298.00
9202281.54	2298.00	2298.00	2298.00	2298.00	2298.00	2267.00	2298.00	2298.00	2298.00
9202231.35	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  24
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * HILL HEIGHT SCALES IN METERS *

    Y-COORD  |                                                X-COORD (METERS)
    (METERS) |     377750.16    377808.91    377867.66    377926.41    377985.16
378043.91    378102.66    378161.41    378220.16
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202130.97 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202080.78 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202030.59 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201980.40 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201930.21 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201880.02 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201829.83 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201779.64 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201729.45 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 25
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 378278.91	378337.66	378396.41	378455.16	378513.91	378572.66	378631.41	378690.16	378748.91
9204188.76	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204138.57	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204088.38	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9204038.19	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203988.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203937.81	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203887.62	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203837.43	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203787.24	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203737.05	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203686.86	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203636.67	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203586.48	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203536.29	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203486.10	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203435.91	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203385.72	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203335.53	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203285.34	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203235.15	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203184.96	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203134.77	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203084.58	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203034.39	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202984.20	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202934.01	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202883.82	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202833.63	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

9202783.44	2298.00	2298.00	2297.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202733.25	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202683.06	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202632.87	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202582.68	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202532.49	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202482.30	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202432.11	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202381.92	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202331.73	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202281.54	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00
9202231.35	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00	2298.00

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  26
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * HILL HEIGHT SCALES IN METERS *

    Y-COORD  |                                                X-COORD (METERS)
    (METERS) |     378278.91    378337.66    378396.41    378455.16    378513.91
378572.66    378631.41    378690.16    378748.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202130.97 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202080.78 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9202030.59 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201980.40 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201930.21 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201880.02 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201829.83 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201779.64 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
  9201729.45 |       2298.00      2298.00      2298.00      2298.00      2298.00
2298.00      2298.00      2298.00      2298.00
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 27
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 378807.66	378866.41	378925.16	378983.91	379042.66
9204188.76	2298.00	2298.00	2298.00	2298.00	2298.00
9204138.57	2298.00	2298.00	2298.00	2298.00	2298.00
9204088.38	2298.00	2298.00	2298.00	2298.00	2298.00
9204038.19	2298.00	2298.00	2298.00	2298.00	2298.00
9203988.00	2298.00	2298.00	2298.00	2298.00	2298.00
9203937.81	2298.00	2298.00	2298.00	2298.00	2298.00
9203887.62	2298.00	2298.00	2298.00	2298.00	2298.00
9203837.43	2298.00	2298.00	2298.00	2298.00	2298.00
9203787.24	2298.00	2298.00	2298.00	2298.00	2298.00
9203737.05	2298.00	2298.00	2298.00	2298.00	2298.00
9203686.86	2298.00	2298.00	2298.00	2298.00	2298.00
9203636.67	2298.00	2298.00	2298.00	2298.00	2298.00
9203586.48	2298.00	2298.00	2298.00	2298.00	2298.00
9203536.29	2298.00	2298.00	2298.00	2298.00	2298.00
9203486.10	2298.00	2298.00	2298.00	2298.00	2298.00
9203435.91	2298.00	2298.00	2298.00	2298.00	2298.00
9203385.72	2298.00	2298.00	2298.00	2298.00	2298.00
9203335.53	2298.00	2298.00	2298.00	2298.00	2298.00
9203285.34	2298.00	2298.00	2298.00	2298.00	2298.00
9203235.15	2298.00	2298.00	2298.00	2298.00	2298.00
9203184.96	2298.00	2298.00	2298.00	2298.00	2298.00
9203134.77	2298.00	2298.00	2298.00	2298.00	2298.00
9203084.58	2298.00	2298.00	2298.00	2298.00	2298.00
9203034.39	2298.00	2298.00	2298.00	2298.00	2298.00
9202984.20	2298.00	2298.00	2298.00	2298.00	2298.00
9202934.01	2298.00	2298.00	2298.00	2298.00	2298.00
9202883.82	2298.00	2298.00	2298.00	2298.00	2298.00
9202833.63	2298.00	2298.00	2298.00	2298.00	2298.00
9202783.44	2298.00	2298.00	2298.00	2298.00	2298.00
9202733.25	2298.00	2298.00	2298.00	2298.00	2298.00
9202683.06	2298.00	2298.00	2298.00	2298.00	2298.00
9202632.87	2298.00	2298.00	2298.00	2298.00	2298.00
9202582.68	2298.00	2298.00	2298.00	2298.00	2298.00
9202532.49	2298.00	2298.00	2298.00	2298.00	2298.00
9202482.30	2298.00	2298.00	2298.00	2298.00	2298.00
9202432.11	2298.00	2298.00	2298.00	2298.00	2298.00
9202381.92	2298.00	2298.00	2298.00	2298.00	2298.00
9202331.73	2298.00	2298.00	2298.00	2298.00	2298.00
9202281.54	2298.00	2298.00	2298.00	2298.00	2298.00
9202231.35	2298.00	2298.00	2298.00	2298.00	2298.00

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  28
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                                * HILL HEIGHT SCALES IN METERS *

    Y-COORD  |                                              X-COORD (METERS)
    (METERS) |     378807.66    378866.41    378925.16    378983.91    379042.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

  9202181.16 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9202130.97 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9202080.78 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9202030.59 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9201980.40 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9201930.21 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9201880.02 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9201829.83 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9201779.64 |       2298.00      2298.00      2298.00      2298.00      2298.00
  9201729.45 |       2298.00      2298.00      2298.00      2298.00      2298.00
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  29
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                          *** DISCRETE CARTESIAN RECEPTORS ***
                                        (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                                        (METERS)

     ( 378487.3, 9203829.1,    2045.4,    2298.0,       0.0);         ( 377842.3,
9203830.0,    2026.2,    2298.0,       0.0);
     ( 377118.9, 9203357.9,    2018.7,    2298.0,       0.0);         ( 376305.4,
9201982.0,    1878.4,    2298.0,       0.0);
     ( 377321.0, 9202026.1,    1974.6,    2298.0,       0.0);
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  30
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                            *** METEOROLOGICAL DAYS SELECTED FOR
PROCESSING ***
                                                               (1=YES; 0=NO)

            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0 0   0 0 0 0 0
0 0 0 0 0   0 0 0 0 0 0 0 0 0 0
            0 0 0 0 0 0 0 0 0 0   0 0 0 0 0

                NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT
IS INCLUDED IN THE DATA FILE.


                                  *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED
CATEGORIES ***
                                                            (METERS/SEC)

                                                 1.54,   3.09,   5.14,   8.23,  10.80,
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  31
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                    *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA
***

   Surface file:   D:\Amdal\Aecom\Geodipa\Met
File\MET2221112_MMIF_AERMET\MET2221112_AERMET_2021-20   Met Version:  21112
   Profile file:   D:\Amdal\Aecom\Geodipa\Met
File\MET2221112_MMIF_AERMET\MET2221112_AERMET_2021-20
   Surface format: FREE
   Profile format: FREE
   Surface station no.:        0                 Upper air station no.:    99999
                  Name: UNKNOWN                                    Name: UNKNOWN
                  Year:   2021                                     Year:   2021

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO
REF WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
 21 01 01   1 01   -0.9  0.563 -9.000 -9.000 -999.  224.   8888.0  0.50   0.66   1.00
3.82  234.   10.0  289.9    2.0
 21 01 01   1 02  -12.8  0.534 -9.000 -9.000 -999.  161.    900.8  0.50   0.66   1.00
3.69  214.   10.0  289.7    2.0
 21 01 01   1 03  -14.7  0.302 -9.000 -9.000 -999.   98.    141.6  0.50   0.66   1.00
2.31  204.   10.0  290.0    2.0
 21 01 01   1 04  -25.7  0.280 -9.000 -9.000 -999.   52.     64.8  0.50   0.66   1.00
2.44  231.   10.0  289.7    2.0
 21 01 01   1 05   -4.5  0.106 -9.000 -9.000 -999.   35.     20.2  0.50   0.66   1.00
1.38  222.   10.0  289.6    2.0
 21 01 01   1 06    0.0  0.133 -9.000 -9.000 -999.  134.   8888.0  0.50   0.66   1.00
0.99  276.   10.0  290.4    2.0
 21 01 01   1 07   21.7  0.168  0.552  0.006  234.  234.    -16.6  0.50   0.66   0.29
0.94   93.   10.0  290.5    2.0
 21 01 01   1 08  105.4  0.125  1.205  0.006  503.  503.     -1.4  0.50   0.66   0.17
0.42  184.   10.0  292.0    2.0
 21 01 01   1 09   31.2  0.199  0.571  0.006  181.  181.    -19.1  0.50   0.66   0.14
1.13  352.   10.0  291.8    2.0
 21 01 01   1 10   15.0  0.349  0.490  0.006  236.  236.   -214.7  0.50   0.66   0.13
2.49  332.   10.0  292.1    2.0
 21 01 01   1 11   23.7  0.427  0.659  0.006  363.  363.   -247.1  0.50   0.66   0.13
3.06  313.   10.0  292.2    2.0
 21 01 01   1 12  143.7  0.533  1.524  0.005  745.  745.    -79.5  0.50   0.66   0.13
3.58  293.   10.0  293.6    2.0
 21 01 01   1 13  204.3  0.572  1.737  0.005  776.  776.    -69.3  0.50   0.66   0.13
3.80  285.   10.0  294.0    2.0
 21 01 01   1 14   73.0  0.517  1.037  0.006  462.  462.   -143.1  0.50   0.66   0.13
3.61  299.   10.0  293.1    2.0
 21 01 01   1 15   33.2  0.443  0.723  0.006  343.  343.   -197.9  0.50   0.66   0.14
3.15  297.   10.0  292.6    2.0
 21 01 01   1 16   21.9  0.159  0.491  0.006  163.  163.    -13.9  0.50   0.66   0.15
0.86  324.   10.0  292.4    2.0
 21 01 01   1 17    4.6  0.206  0.310  0.006  194.  194.   -142.5  0.50   0.66   0.21
1.44  288.   10.0  292.3    2.0
 21 01 01   1 18    0.0  0.205 -9.000 -9.000 -999.  159.   8888.0  0.50   0.66   0.46
1.53  249.   10.0  292.0    2.0
 21 01 01   1 19    0.0  0.348 -9.000 -9.000 -999.  210.   8888.0  0.50   0.66   1.00
2.36  226.   10.0  291.6    2.0
 21 01 01   1 20    0.0  0.294 -9.000 -9.000 -999.  176.   8888.0  0.50   0.66   1.00
2.20  179.   10.0  291.4    2.0
 21 01 01   1 21   -3.5  0.333 -9.000 -9.000 -999.  125.    800.8  0.50   0.66   1.00
2.31  228.   10.0  290.8    2.0
 21 01 01   1 22   -7.9  0.504 -9.000 -9.000 -999.  210.   1219.7  0.50   0.66   1.00
3.47  240.   10.0  290.8    2.0
 21 01 01   1 23   -4.9  0.424 -9.000 -9.000 -999.  154.   1180.0  0.50   0.66   1.00
2.91  229.   10.0  290.7    2.0
 21 01 01   1 24   -9.4  0.221 -9.000 -9.000 -999.   62.     87.7  0.50   0.66   1.00
1.82  222.   10.0  290.9    2.0
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 32
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
21	01	01	01	2.0	0	-999.	-99.00	289.9	99.0	-99.00	-99.00
21	01	01	01	10.0	0	234.	3.82	-999.0	99.0	-99.00	-99.00
21	01	01	01	18.8	0	234.	4.47	289.8	99.0	-99.00	-99.00
21	01	01	01	50.0	0	235.	5.69	289.5	99.0	-99.00	-99.00
21	01	01	01	75.0	0	236.	6.25	289.4	99.0	-99.00	-99.00
21	01	01	01	100.0	0	235.	6.66	289.3	99.0	-99.00	-99.00
21	01	01	01	125.0	0	234.	7.02	289.2	99.0	-99.00	-99.00
21	01	01	01	150.0	0	232.	7.40	289.1	99.0	-99.00	-99.00
21	01	01	01	175.0	0	232.	7.53	289.1	99.0	-99.00	-99.00
21	01	01	01	206.2	0	230.	7.67	289.1	99.0	-99.00	-99.00
21	01	01	01	250.0	0	229.	7.51	289.1	99.0	-99.00	-99.00
21	01	01	01	300.0	0	229.	7.30	289.0	99.0	-99.00	-99.00
21	01	01	01	350.0	0	228.	7.12	288.8	99.0	-99.00	-99.00
21	01	01	01	400.0	0	228.	6.98	288.6	99.0	-99.00	-99.00
21	01	01	01	450.0	0	228.	6.86	288.4	99.0	-99.00	-99.00
21	01	01	01	512.5	0	228.	6.70	288.1	99.0	-99.00	-99.00
21	01	01	01	600.0	0	228.	6.49	287.7	99.0	-99.00	-99.00
21	01	01	01	700.0	0	230.	6.30	287.2	99.0	-99.00	-99.00
21	01	01	01	800.0	0	232.	6.15	286.7	99.0	-99.00	-99.00
21	01	01	01	900.0	0	234.	6.04	286.3	99.0	-99.00	-99.00
21	01	01	01	1100.0	0	241.	5.85	285.4	99.0	-99.00	-99.00
21	01	01	01	1500.0	0	255.	5.51	283.8	99.0	-99.00	-99.00
21	01	01	01	2000.0	0	259.	4.84	280.9	99.0	-99.00	-99.00
21	01	01	01	2500.0	0	250.	4.07	277.2	99.0	-99.00	-99.00
21	01	01	01	3000.0	0	255.	2.68	274.2	99.0	-99.00	-99.00
21	01	01	01	3500.0	0	302.	0.87	273.0	99.0	-99.00	-99.00
21	01	01	01	4000.0	0	42.	1.90	270.9	99.0	-99.00	-99.00
21	01	01	01	4500.0	0	48.	3.36	268.3	99.0	-99.00	-99.00
21	01	01	01	5000.0	1	47.	4.43	265.7	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 33
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 9C ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF H2S IN PPM **

Y-COORD (METERS)	X-COORD (METERS) 376163.91	376222.66	376281.41	376340.16	376398.91
9204188.8	0.04401 (21090906)	0.03993 (21090906)	0.04136 (21092804)	0.04432 (21092805)	0.04425 (21092805)
9204138.6	0.04722 (21090906)	0.04423 (21090906)	0.03924 (21090906)	0.04267 (21092805)	0.04456 (21092805)
9204088.4	0.05187 (21100119)	0.04804 (21090906)	0.04409 (21090906)	0.04025 (21092804)	0.04371 (21092805)
9204038.2	0.05781 (21100119)	0.05213 (21100119)	0.04856 (21090906)	0.04352 (21090906)	0.04156 (21092805)
9203988.0	0.06269 (21100119)	0.05889 (21100119)	0.05228 (21090906)	0.04868 (21090906)	0.04244 (21090906)
9203937.8	0.06595 (21100119)	0.06465 (21100119)	0.05969 (21100119)	0.05319 (21090906)	0.04830 (21090906)
9203887.6	0.06705 (21100119)	0.06873 (21100119)	0.06645 (21100119)	0.06011 (21100119)	0.05366 (21090906)
9203837.4	0.06565 (21100119)	0.07048 (21100119)	0.07150 (21100119)	0.06799 (21100119)	0.06005 (21100119)
9203787.2	0.06162 (21100119)	0.06942 (21100119)	0.07405 (21100119)	0.07419 (21100119)	0.06917 (21100119)
9203737.1	0.05517 (21100119)	0.06533 (21100119)	0.07344 (21100119)	0.07771 (21100119)	0.07670 (21100119)
9203686.9	0.04686 (21100119)	0.05843 (21100119)	0.06934 (21100119)	0.07770 (21100119)	0.08141 (21100119)
9203636.7	0.04777 (21091006)	0.04933 (21100119)	0.06194 (21100119)	0.07366 (21100119)	0.08218 (21100119)
9203586.5	0.04861 (21090805)	0.05050 (21090806)	0.05194 (21100119)	0.06571 (21100119)	0.07828 (21100119)
9203536.3	0.05013 (21090805)	0.05221 (21090805)	0.05442 (21090806)	0.05500 (21090806)	0.06976 (21100119)
9203486.1	0.05225 (21092906)	0.05351 (21090805)	0.05617 (21090805)	0.05881 (21090806)	0.05963 (21090806)
9203435.9	0.05031 (21092906)	0.05227 (21090805)	0.05711 (21090805)	0.06054 (21090805)	0.06372 (21090806)
9203385.7	0.04971 (21092101)	0.05019 (21092101)	0.05499 (21090805)	0.06092 (21090805)	0.06530 (21090805)
9203335.5	0.04748 (21092101)	0.05030 (21092101)	0.05158 (21092101)	0.05759 (21090805)	0.06485 (21090805)
9203285.3	0.04675 (21092205)	0.04775 (21091824)	0.05006 (21092101)	0.05229 (21092101)	0.05989 (21090805)
9203235.2	0.05116 (21092205)	0.05036 (21092205)	0.05038 (21091824)	0.05403 (21091824)	0.05724 (21091824)
9203185.0	0.05703 (21092920)	0.05356 (21092920)	0.05399 (21092205)	0.05401 (21091224)	0.05796 (21091824)
9203134.8	0.06268 (21092920)	0.06129 (21092920)	0.05920 (21092920)	0.05900 (21092302)	0.06084 (21092302)
9203084.6	0.06085 (21092920)	0.06227 (21092920)	0.06326 (21092920)	0.06275 (21092920)	0.06568 (21092302)
9203034.4	0.06337 (21092206)	0.06261 (21092206)	0.06383 (21092206)	0.06621 (21092206)	0.06845 (21092206)
9202984.2	0.06208 (21092405)	0.06201 (21092405)	0.06490 (21092206)	0.06940 (21092206)	0.07418 (21092206)

```
 9202934.0 |      0.06349 (21092406)      0.06381 (21092406)      0.06698 (21092406)
0.07111 (21092406)      0.07548 (21092406)
 9202883.8 |      0.06029 (21092406)      0.06317 (21092406)      0.06769 (21092406)
0.07314 (21092406)      0.07918 (21092406)
 9202833.6 |      0.05730 (21093001)      0.05778 (21092406)      0.06244 (21092406)
0.06790 (21092406)      0.07410 (21092406)
 9202783.4 |      0.05695 (21093001)      0.05627 (21093001)      0.05499 (21092403)
0.06029 (21092403)      0.06652 (21092403)
 9202733.3 |      0.04869 (21091402)      0.05124 (21091402)      0.05397 (21091402)
0.05680 (21091402)      0.06109 (21092403)
 9202683.1 |      0.05607 (21091501)      0.05758 (21091501)      0.05892 (21091501)
0.06000 (21091501)      0.06126 (21091405)
 9202632.9 |      0.06178 (21091501)      0.06259 (21091501)      0.06299 (21091501)
0.06285 (21091501)      0.06365 (21091405)
 9202582.7 |      0.06042 (21091501)      0.05974 (21091501)      0.05840 (21091501)
0.05686 (21091406)      0.06314 (21091406)
 9202532.5 |      0.05266 (21091501)      0.05030 (21091501)      0.05280 (21091406)
0.05741 (21091406)      0.06202 (21091406)
 9202482.3 |      0.04417 (21091406)      0.04733 (21091406)      0.05040 (21091406)
0.05320 (21091406)      0.05545 (21091406)
 9202432.1 |      0.04144 (21091406)      0.04328 (21091406)      0.04472 (21091406)
0.04768 (21091322)      0.05278 (21091322)
 9202381.9 |      0.03667 (21091406)      0.03993 (21091322)      0.04378 (21091322)
0.04759 (21091322)      0.05110 (21091322)
 9202331.7 |      0.03683 (21091322)      0.03978 (21091322)      0.04255 (21091322)
0.04493 (21091322)      0.04663 (21091322)
 9202281.5 |      0.03590 (21091322)      0.03787 (21091322)      0.03942 (21091322)
0.04034 (21091322)      0.04036 (21091322)
 9202231.4 |      0.03365 (21091322)      0.03460 (21091322)      0.03498 (21091322)
0.03462 (21091322)      0.03332 (21091322)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  34
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       376163.91              376222.66              376281.41
376340.16              376398.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.03042 (21091322)      0.03045 (21091322)      0.02986 (21091322)
0.02854 (21091322)      0.02817 (21091417)
 9202131.0 |      0.02662 (21091322)      0.02591 (21091322)      0.02594 (21100207)
0.02706 (21091417)      0.02840 (21091417)
 9202080.8 |      0.02511 (21100207)      0.02539 (21100207)      0.02587 (21091417)
0.02723 (21091417)      0.02847 (21091417)
 9202030.6 |      0.02491 (21100207)      0.02474 (21100207)      0.02601 (21091417)
0.02732 (21091417)      0.02848 (21091417)
 9201980.4 |      0.02439 (21100207)      0.02494 (21091417)      0.02616 (21091417)
0.02731 (21091417)      0.02834 (21091417)
 9201930.2 |      0.02406 (21091417)      0.02513 (21091417)      0.02622 (21091417)
0.02726 (21091417)      0.02815 (21091417)
 9201880.0 |      0.02407 (21091417)      0.02511 (21091417)      0.02615 (21091417)
0.02709 (21091417)      0.02789 (21091417)
 9201829.8 |      0.02399 (21091417)      0.02496 (21091417)      0.02596 (21091417)
0.02679 (21091417)      0.02761 (21091417)
 9201779.6 |      0.02387 (21091417)      0.02473 (21091417)      0.02567 (21091417)
0.02655 (21091417)      0.02733 (21091417)
 9201729.5 |      0.02368 (21091417)      0.02441 (21091417)      0.02526 (21091417)
0.02613 (21091417)      0.02680 (21091417)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  35
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       376457.66              376516.41              376575.16
376633.91              376692.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9204188.8 |      0.04514 (21100106)      0.04873 (21100106)      0.04872 (21100106)
0.04484 (21100106)      0.03771 (21100106)
 9204138.6 |      0.04381 (21100105)      0.04816 (21100106)      0.04988 (21100106)
0.04745 (21100106)      0.04114 (21100106)
 9204088.4 |      0.04388 (21092805)      0.04670 (21100106)      0.05026 (21100106)
0.04957 (21100106)      0.04445 (21100106)
 9204038.2 |      0.04393 (21092805)      0.04432 (21100106)      0.04972 (21100106)
0.05101 (21100106)      0.04746 (21100106)
 9203988.0 |      0.04260 (21092805)      0.04303 (21092805)      0.04815 (21100106)
0.05158 (21100106)      0.04998 (21100106)
 9203937.8 |      0.04074 (21090906)      0.04274 (21092805)      0.04549 (21100106)
0.05109 (21100106)      0.05176 (21100106)
 9203887.6 |      0.04730 (21090906)      0.04119 (21091101)      0.04473 (21091103)
0.04939 (21100106)      0.05257 (21100106)
 9203837.4 |      0.05356 (21090906)      0.04554 (21090906)      0.04547 (21091101)
0.04782 (21091102)      0.05214 (21100106)
 9203787.2 |      0.05935 (21100119)      0.05272 (21090906)      0.04589 (21091101)
0.04985 (21091101)      0.05157 (21091102)
 9203737.1 |      0.06982 (21100119)      0.05920 (21090906)      0.05093 (21090906)
0.05117 (21091101)      0.05403 (21091101)
 9203686.9 |      0.07888 (21100119)      0.06974 (21100119)      0.05860 (21090906)
0.05138 (21091101)      0.05657 (21091101)
 9203636.7 |      0.08504 (21100119)      0.08054 (21100119)      0.06868 (21100119)
0.05876 (21090905)      0.05793 (21091101)
 9203586.5 |      0.08683 (21100119)      0.08846 (21100119)      0.08141 (21100119)
0.06709 (21090905)      0.05788 (21090905)
 9203536.3 |      0.08321 (21100119)      0.09157 (21100119)      0.09142 (21100119)
0.08115 (21100119)      0.06804 (21090905)
 9203486.1 |      0.07406 (21100119)      0.08840 (21100119)      0.09624 (21100119)
0.09360 (21100119)      0.07928 (21100119)
 9203435.9 |      0.06486 (21090806)      0.07859 (21100119)      0.09377 (21100119)
0.10059 (21100119)      0.09451 (21100119)
 9203385.7 |      0.06921 (21090806)      0.07076 (21090806)      0.08328 (21100119)
0.09918 (21100119)      0.10423 (21100119)
 9203335.5 |      0.07046 (21090805)      0.07534 (21090806)      0.07749 (21090806)
0.08802 (21100119)      0.10434 (21100119)
 9203285.3 |      0.06875 (21090805)      0.07592 (21090805)      0.08222 (21090806)
0.08533 (21090806)      0.09255 (21100119)
 9203235.2 |      0.06160 (21090805)      0.07237 (21090805)      0.08160 (21090805)
0.08995 (21090806)      0.09368 (21090806)
 9203185.0 |      0.06298 (21091824)      0.06880 (21091804)      0.07832 (21091804)
0.08712 (21090805)      0.09753 (21090806)
 9203134.8 |      0.06379 (21091224)      0.06869 (21091224)      0.07760 (21091804)
0.08991 (21091804)      0.10039 (21091804)
 9203084.6 |      0.07024 (21092302)      0.07428 (21092302)      0.08047 (21091224)
0.08619 (21091224)      0.10271 (21091804)
 9203034.4 |      0.07303 (21092204)      0.08029 (21092302)      0.08742 (21092302)
0.09330 (21091903)      0.10569 (21091903)
 9202984.2 |      0.07874 (21092206)      0.08282 (21092405)      0.08958 (21092301)
0.10035 (21092303)      0.11156 (21092303)
```

```
 9202934.0 |      0.08204 (21092405)      0.09015 (21092405)      0.09870 (21092405)
0.10687 (21092405)      0.11508 (21092301)
 9202883.8 |      0.08581 (21092406)      0.09304 (21092406)      0.10061 (21092406)
0.10842 (21092405)      0.12100 (21092405)
 9202833.6 |      0.08110 (21092406)      0.08906 (21092406)      0.09801 (21092406)
0.10782 (21092406)      0.11835 (21092406)
 9202783.4 |      0.07375 (21092403)      0.08225 (21092403)      0.09218 (21092403)
0.10326 (21092403)      0.11515 (21092403)
 9202733.3 |      0.06709 (21092403)      0.07390 (21092403)      0.08176 (21092403)
0.09002 (21092403)      0.09806 (21092403)
 9202683.1 |      0.06624 (21091405)      0.07132 (21091405)      0.07685 (21091404)
0.08379 (21091406)      0.09611 (21091406)
 9202632.9 |      0.06741 (21091405)      0.07447 (21091406)      0.08428 (21091406)
0.09460 (21091406)      0.10442 (21091406)
 9202582.7 |      0.06988 (21091406)      0.07684 (21091406)      0.08364 (21091406)
0.08915 (21091406)      0.09203 (21091406)
 9202532.5 |      0.06634 (21091406)      0.06990 (21091406)      0.07207 (21091406)
0.07975 (21091322)      0.08794 (21091322)
 9202482.3 |      0.05764 (21091322)      0.06459 (21091322)      0.07137 (21091322)
0.07656 (21091322)      0.07896 (21091322)
 9202432.1 |      0.05779 (21091322)      0.06228 (21091322)      0.06558 (21091322)
0.06626 (21091322)      0.06337 (21091322)
 9202381.9 |      0.05394 (21091322)      0.05562 (21091322)      0.05549 (21091322)
0.05253 (21091322)      0.04634 (21091322)
 9202331.7 |      0.04728 (21091322)      0.04650 (21091322)      0.04377 (21091322)
0.03861 (21091322)      0.03374 (21091417)
 9202281.5 |      0.03922 (21091322)      0.03666 (21091322)      0.03248 (21091322)
0.03339 (21091417)      0.03424 (21091417)
 9202231.4 |      0.03096 (21091322)      0.03117 (21091417)      0.03268 (21091417)
0.03380 (21091417)      0.03457 (21091417)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  36
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       376457.66              376516.41              376575.16
376633.91              376692.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.02961 (21091417)      0.03127 (21091417)      0.03279 (21091417)
0.03390 (21091417)      0.03467 (21091417)
 9202131.0 |      0.02971 (21091417)      0.03125 (21091417)      0.03265 (21091417)
0.03377 (21091417)      0.03451 (21091417)
 9202080.8 |      0.02971 (21091417)      0.03098 (21091417)      0.03229 (21091417)
0.03342 (21091417)      0.03418 (21091417)
 9202030.6 |      0.02966 (21091417)      0.03064 (21091417)      0.03173 (21091417)
0.03285 (21091417)      0.03361 (21091417)
 9201980.4 |      0.02936 (21091417)      0.03030 (21091417)      0.03130 (21091417)
0.03225 (21091417)      0.03295 (21091417)
 9201930.2 |      0.02901 (21091417)      0.02981 (21091417)      0.03069 (21091417)
0.03149 (21091417)      0.03218 (21091417)
 9201880.0 |      0.02867 (21091417)      0.02935 (21091417)      0.03002 (21091417)
0.03070 (21091417)      0.03137 (21091417)
 9201829.8 |      0.02834 (21091417)      0.02893 (21091417)      0.02944 (21091417)
0.02987 (21091417)      0.03042 (21091417)
 9201779.6 |      0.02796 (21091417)      0.02852 (21091417)      0.02891 (21091417)
0.02912 (21091417)      0.02942 (21091417)
 9201729.5 |      0.02737 (21091417)      0.02784 (21091417)      0.02808 (21091417)
0.02825 (21091417)      0.02838 (21091417)
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 37
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 9C ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF H2S IN PPM **

Y-COORD (METERS)	X-COORD (METERS) 376751.41	376810.16	376868.91	376927.66	376986.41
9204188.8	0.04271 (21100118)	0.04382 (21100118)	0.03950 (21100118)	0.04083 (21100418)	0.03890 (21100418)
9204138.6	0.04084 (21100118)	0.04354 (21100118)	0.04052 (21100118)	0.04152 (21100418)	0.04018 (21100418)
9204088.4	0.03838 (21100118)	0.04272 (21100118)	0.04121 (21100118)	0.04202 (21100418)	0.04140 (21100418)
9204038.2	0.03966 (21100106)	0.04128 (21100118)	0.04148 (21100118)	0.04230 (21100418)	0.04250 (21100418)
9203988.0	0.04335 (21100106)	0.03918 (21100118)	0.04125 (21100118)	0.04230 (21100418)	0.04346 (21100418)
9203937.8	0.04678 (21100106)	0.03810 (21090918)	0.04042 (21100118)	0.04196 (21100418)	0.04422 (21100418)
9203887.6	0.04974 (21100106)	0.04129 (21100106)	0.04002 (21090918)	0.04398 (21091219)	0.04489 (21091219)
9203837.4	0.05192 (21100106)	0.04516 (21100106)	0.04214 (21090918)	0.04603 (21091219)	0.04806 (21091219)
9203787.2	0.05301 (21100106)	0.04858 (21100106)	0.04524 (21091021)	0.04785 (21091219)	0.05132 (21091219)
9203737.1	0.05458 (21091102)	0.05154 (21090920)	0.04953 (21091021)	0.04931 (21091219)	0.05458 (21091219)
9203686.9	0.05831 (21091102)	0.05623 (21091102)	0.05386 (21091021)	0.05172 (21092018)	0.05784 (21091219)
9203636.7	0.06171 (21091101)	0.06163 (21091102)	0.05895 (21090920)	0.05793 (21091021)	0.06131 (21091219)
9203586.5	0.06474 (21091101)	0.06652 (21091102)	0.06431 (21090920)	0.06518 (21091021)	0.06654 (21091020)
9203536.3	0.06630 (21091101)	0.07185 (21091101)	0.07051 (21091102)	0.07174 (21090919)	0.07161 (21091020)
9203486.1	0.06810 (21091220)	0.07540 (21091101)	0.07712 (21092019)	0.07762 (21090919)	0.07935 (21092018)
9203435.9	0.07865 (21090905)	0.07799 (21091220)	0.08518 (21091024)	0.08543 (21092019)	0.08878 (21090919)
9203385.7	0.09349 (21100119)	0.08085 (21092819)	0.09048 (21091024)	0.09533 (21092019)	0.09665 (21090919)
9203335.5	0.10654 (21100119)	0.09203 (21092819)	0.09462 (21091119)	0.10263 (21091024)	0.10307 (21092019)
9203285.3	0.10879 (21100119)	0.10648 (21100119)	0.10261 (21090901)	0.10950 (21091119)	0.11730 (21092019)
9203235.2	0.10009 (21090903)	0.11164 (21100119)	0.11553 (21090901)	0.11937 (21090823)	0.12671 (21092019)
9203185.0	0.10550 (21092006)	0.11162 (21090903)	0.12206 (21090824)	0.13412 (21090901)	0.14398 (21090823)
9203134.8	0.10720 (21091803)	0.12099 (21092006)	0.12699 (21092005)	0.14611 (21090901)	0.15808 (21090823)
9203084.6	0.11745 (21091804)	0.12724 (21091803)	0.13960 (21092006)	0.14834 (21091724)	0.17713 (21090901)
9203034.4	0.11461 (21091805)	0.13604 (21091805)	0.15315 (21091805)	0.16979 (21091723)	0.18510 (21091724)
9202984.2	0.12497 (21091903)	0.14162 (21091903)	0.16120 (21091805)	0.19232 (21091805)	0.21213 (21091802)

9202934.0 |	0.12653 (21092303)	0.14811 (21091905)	0.17710 (21091904)	0.20934 (21091904)	0.24473 (21091806)
9202883.8 |	0.13372 (21092405)	0.14535 (21092224)	0.17776 (21092304)	0.22109 (21091905)	0.27905 (21091905)
9202833.6 |	0.13271 (21092404)	0.15324 (21092305)	0.18641 (21092305)	0.22900 (21092305)	0.27852 (21092305)
9202783.4 |	0.12808 (21092403)	0.14414 (21092402)	0.17082 (21092306)	0.21798 (21092306)	0.28552 (21092306)
9202733.3 |	0.10597 (21092403)	0.11255 (21092402)	0.12838 (21092306)	0.15264 (21092306)	0.17802 (21092306)
9202683.1 |	0.10952 (21091406)	0.12251 (21091406)	0.13159 (21091406)	0.13029 (21091406)	0.10931 (21091406)
9202632.9 |	0.11247 (21091406)	0.11569 (21091406)	0.11353 (21091322)	0.11811 (21091322)	0.10356 (21091322)
9202582.7 |	0.09762 (21091322)	0.10682 (21091322)	0.10844 (21091322)	0.09590 (21091322)	0.06546 (21091322)
9202532.5 |	0.09325 (21091322)	0.09248 (21091322)	0.08191 (21091322)	0.05974 (21091322)	0.03621 (21100207)
9202482.3 |	0.07678 (21091322)	0.06796 (21091322)	0.05173 (21091322)	0.03167 (21091417)	0.03184 (21100207)
9202432.1 |	0.05602 (21091322)	0.04389 (21091322)	0.03332 (21091417)	0.03323 (21091417)	0.03269 (21091417)
9202381.9 |	0.03706 (21091322)	0.03418 (21091417)	0.03444 (21091417)	0.03423 (21091417)	0.03343 (21091417)
9202331.7 |	0.03443 (21091417)	0.03498 (21091417)	0.03520 (21091417)	0.03489 (21091417)	0.03396 (21091417)
9202281.5 |	0.03492 (21091417)	0.03541 (21091417)	0.03547 (21091417)	0.03514 (21091417)	0.03424 (21091417)
9202231.4 |	0.03514 (21091417)	0.03555 (21091417)	0.03552 (21091417)	0.03510 (21091417)	0.03422 (21091417)

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  38
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       376751.41               376810.16               376868.91
376927.66              376986.41
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.03521 (21091417)      0.03549 (21091417)      0.03535 (21091417)
0.03486 (21091417)      0.03391 (21091417)
 9202131.0 |      0.03495 (21091417)      0.03516 (21091417)      0.03492 (21091417)
0.03440 (21091417)      0.03344 (21091417)
 9202080.8 |      0.03453 (21091417)      0.03461 (21091417)      0.03427 (21091417)
0.03372 (21091417)      0.03285 (21091417)
 9202030.6 |      0.03397 (21091417)      0.03394 (21091417)      0.03364 (21091417)
0.03307 (21091417)      0.03209 (21091417)
 9201980.4 |      0.03336 (21091417)      0.03325 (21091417)      0.03284 (21091417)
0.03223 (21091417)      0.03144 (21091417)
 9201930.2 |      0.03263 (21091417)      0.03244 (21091417)      0.03180 (21091417)
0.03134 (21091417)      0.03071 (21091417)
 9201880.0 |      0.03173 (21091417)      0.03153 (21091417)      0.03093 (21091417)
0.03046 (21091417)      0.02977 (21091417)
 9201829.8 |      0.03080 (21091417)      0.03061 (21091417)      0.03004 (21091417)
0.02956 (21091417)      0.02888 (21091417)
 9201779.6 |      0.02982 (21091417)      0.02970 (21091417)      0.02908 (21091417)
0.02866 (21091417)      0.02804 (21091417)
 9201729.5 |      0.02847 (21091417)      0.02846 (21091417)      0.02817 (21091417)
0.02784 (21091417)      0.02712 (21091417)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  39
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       377045.16              377103.91              377162.66
377221.41              377280.16
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9204188.8 |      0.03383 (21100418)      0.03834 (21093021)      0.04007 (21093021)
0.04197 (21100518)      0.04610 (21100318)
 9204138.6 |      0.03532 (21100418)      0.03867 (21093021)      0.04065 (21093021)
0.04173 (21100518)      0.04577 (21100318)
 9204088.4 |      0.03683 (21100418)      0.03893 (21093021)      0.04131 (21093021)
0.04210 (21100518)      0.04557 (21100318)
 9204038.2 |      0.03834 (21100418)      0.03909 (21093021)      0.04191 (21093021)
0.04248 (21100518)      0.04571 (21100318)
 9203988.0 |      0.03983 (21100418)      0.03914 (21093021)      0.04246 (21093021)
0.04277 (21100518)      0.04704 (21100318)
 9203937.8 |      0.04127 (21100418)      0.03977 (21100619)      0.04430 (21100619)
0.04506 (21100619)      0.04950 (21100318)
 9203887.6 |      0.04261 (21100418)      0.04170 (21100619)      0.04713 (21100619)
0.04827 (21100619)      0.05300 (21100318)
 9203837.4 |      0.04539 (21091219)      0.04360 (21100619)      0.04998 (21100619)
0.05168 (21100619)      0.05641 (21100318)
 9203787.2 |      0.04941 (21091219)      0.04556 (21100619)      0.05308 (21100619)
0.05536 (21100619)      0.06106 (21093020)
 9203737.1 |      0.05378 (21091219)      0.04860 (21091019)      0.05691 (21100619)
0.06018 (21093020)      0.06762 (21093020)
 9203686.9 |      0.05864 (21091219)      0.05442 (21091019)      0.06160 (21100619)
0.06748 (21093020)      0.07731 (21093020)
 9203636.7 |      0.06417 (21091219)      0.06170 (21091019)      0.06758 (21100619)
0.07789 (21093020)      0.09060 (21093020)
 9203586.5 |      0.07026 (21091219)      0.07029 (21091019)      0.07400 (21091218)
0.08743 (21093020)      0.10101 (21093020)
 9203536.3 |      0.07715 (21091020)      0.07919 (21091019)      0.08048 (21091218)
0.09659 (21093020)      0.11377 (21093020)
 9203486.1 |      0.08460 (21091020)      0.08775 (21091019)      0.09045 (21091019)
0.10756 (21093020)      0.12735 (21093020)
 9203435.9 |      0.09272 (21091020)      0.09717 (21091019)      0.10334 (21091019)
0.11808 (21093020)      0.14161 (21093020)
 9203385.7 |      0.09882 (21091020)      0.10709 (21091020)      0.11654 (21091019)
0.12975 (21093020)      0.15897 (21093020)
 9203335.5 |      0.10589 (21090919)      0.11906 (21091020)      0.13077 (21091019)
0.14712 (21091218)      0.17508 (21093020)
 9203285.3 |      0.11994 (21090919)      0.12991 (21091020)      0.15170 (21091019)
0.15653 (21091218)      0.19021 (21093020)
 9203235.2 |      0.13077 (21090919)      0.13996 (21091020)      0.17028 (21091019)
0.17408 (21091218)      0.21038 (21093020)
 9203185.0 |      0.14463 (21092019)      0.14293 (21090919)      0.18733 (21091019)
0.19781 (21091019)      0.23642 (21093020)
 9203134.8 |      0.17183 (21090823)      0.15704 (21090919)      0.20634 (21091019)
0.22573 (21091019)      0.25867 (21093020)
 9203084.6 |      0.20140 (21090823)      0.18631 (21090823)      0.21197 (21091019)
0.25505 (21091019)      0.29830 (21093020)
 9203034.4 |      0.21321 (21091120)      0.24278 (21090823)      0.18084 (21091019)
0.27919 (21091019)      0.37893 (21100505)
 9202984.2 |      0.23025 (21091724)      0.27375 (21090823)      0.24043 (21090823)
0.27954 (21091019)      0.43014 (21093019)
```

```
 9202934.0 |      0.27212 (21091801)      0.26642 (21091801)      0.29788 (21090823)
0.21216 (21091019)      0.47934 (21093019)
 9202883.8 |      0.32429 (21091904)      0.31527 (21091806)      0.22862 (21091120)
0.10787 (21091615)      0.31487 (21093019)
 9202833.6 |      0.35441 (21091906)      0.44618 (21091906)      0.27031 (21091906)
0.15575 (21100612)      0.15350 (21100512)
 9202783.4 |      0.37890 (21092306)      0.47725 (21092306)      0.37405 (21092306)
0.24146 (21100612)      0.24794 (21091417)
 9202733.3 |      0.19093 (21092306)      0.15024 (21092306)      0.10480 (21100612)
0.16037 (21091615)      0.14832 (21091417)
 9202683.1 |      0.08398 (21091322)      0.06375 (21100612)      0.09306 (21100612)
0.12079 (21091615)      0.10265 (21091517)
 9202632.9 |      0.06190 (21091322)      0.05398 (21100612)      0.06455 (21091615)
0.08680 (21091615)      0.06823 (21092116)
 9202582.7 |      0.04270 (21100207)      0.04467 (21091615)      0.05145 (21091615)
0.05488 (21091615)      0.05258 (21092116)
 9202532.5 |      0.03715 (21100207)      0.03684 (21091615)      0.03904 (21091615)
0.04324 (21092613)      0.04470 (21092613)
 9202482.3 |      0.03120 (21100207)      0.02998 (21091417)      0.03485 (21092613)
0.04023 (21092613)      0.04139 (21092613)
 9202432.1 |      0.03167 (21091417)      0.03014 (21091417)      0.03242 (21092613)
0.03703 (21092613)      0.03806 (21092613)
 9202381.9 |      0.03211 (21091417)      0.03053 (21091417)      0.02998 (21092613)
0.03353 (21092613)      0.03449 (21092613)
 9202331.7 |      0.03251 (21091417)      0.03070 (21091417)      0.02849 (21091417)
0.03076 (21092613)      0.03127 (21092613)
 9202281.5 |      0.03282 (21091417)      0.03099 (21091417)      0.02872 (21091417)
0.02879 (21092613)      0.02922 (21092613)
 9202231.4 |      0.03279 (21091417)      0.03100 (21091417)      0.02884 (21091417)
0.02720 (21092613)      0.02740 (21092613)
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 40
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 9C ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF H2S IN PPM **

Y-COORD (METERS)	X-COORD (METERS) 377045.16	377103.91	377162.66	377221.41	377280.16
9202181.2	0.03246 (21091417)	0.03072 (21091417)	0.02868 (21091417)	0.02633 (21091417)	0.02606 (21092613)
9202131.0	0.03202 (21091417)	0.03032 (21091417)	0.02837 (21091417)	0.02627 (21091417)	0.02511 (21092613)
9202080.8	0.03142 (21091417)	0.02980 (21091417)	0.02797 (21091417)	0.02607 (21091417)	0.02423 (21091417)
9202030.6	0.03075 (21091417)	0.02930 (21091417)	0.02761 (21091417)	0.02582 (21091417)	0.02383 (21091417)
9201980.4	0.03023 (21091417)	0.02877 (21091417)	0.02714 (21091417)	0.02533 (21091417)	0.02342 (21091417)
9201930.2	0.02959 (21091417)	0.02811 (21091417)	0.02652 (21091417)	0.02476 (21091417)	0.02295 (21091417)
9201880.0	0.02868 (21091417)	0.02734 (21091417)	0.02588 (21091417)	0.02422 (21091417)	0.02243 (21091417)
9201829.8	0.02784 (21091417)	0.02652 (21091417)	0.02508 (21091417)	0.02357 (21091417)	0.02191 (21091417)
9201779.6	0.02695 (21091417)	0.02568 (21091417)	0.02430 (21091417)	0.02281 (21091417)	0.02116 (21091417)
9201729.5	0.02599 (21091417)	0.02486 (21091417)	0.02348 (21091417)	0.02195 (21091417)	0.02034 (21091417)

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  41
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**
```

Y-COORD (METERS)	377338.91	377397.66	377456.41	377515.16	377573.91
9204188.8	0.04974 (21100318)	0.05185 (21100605)	0.05300 (21100605)	0.06196 (21100504)	0.07892 (21100504)
9204138.6	0.04936 (21100318)	0.04854 (21100318)	0.04998 (21100605)	0.04866 (21100605)	0.04109 (21093018)
9204088.4	0.04864 (21100318)	0.04712 (21100318)	0.04420 (21100602)	0.04257 (21100602)	0.03935 (21093018)
9204038.2	0.04793 (21100318)	0.04598 (21100318)	0.04226 (21100602)	0.04080 (21093019)	0.03968 (21093018)
9203988.0	0.04859 (21100318)	0.04568 (21100318)	0.04118 (21100602)	0.04064 (21093019)	0.03997 (21093018)
9203937.8	0.05064 (21100318)	0.04671 (21100318)	0.04144 (21093019)	0.04043 (21093019)	0.03959 (21093018)
9203887.6	0.05402 (21100318)	0.04932 (21100318)	0.04552 (21093019)	0.04364 (21093018)	0.04122 (21093018)
9203837.4	0.05784 (21100318)	0.05314 (21100318)	0.05127 (21093019)	0.04920 (21093018)	0.04555 (21093018)
9203787.2	0.06241 (21100318)	0.05857 (21100318)	0.05796 (21093019)	0.05504 (21093018)	0.04944 (21093018)
9203737.1	0.06899 (21093020)	0.06495 (21093019)	0.06489 (21093019)	0.06159 (21093018)	0.05333 (21093018)
9203686.9	0.07761 (21093020)	0.07355 (21093019)	0.07347 (21093019)	0.07123 (21093018)	0.05686 (21093018)
9203636.7	0.08947 (21093020)	0.08774 (21093019)	0.08568 (21093019)	0.07512 (21093018)	0.05454 (21093018)
9203586.5	0.10042 (21093020)	0.10154 (21093019)	0.09335 (21093018)	0.07571 (21093018)	0.12439 (21100424)
9203536.3	0.11057 (21093020)	0.11314 (21093019)	0.09926 (21093018)	0.09932 (21100424)	0.23869 (21100424)
9203486.1	0.11851 (21093020)	0.12412 (21093019)	0.11751 (21100506)	0.16946 (21100424)	0.31254 (21100424)
9203435.9	0.13253 (21093019)	0.13422 (21093019)	0.12976 (21100506)	0.23638 (21100424)	0.33935 (21100424)
9203385.7	0.15131 (21093019)	0.14288 (21093019)	0.12191 (21100506)	0.31050 (21100424)	0.33069 (21100424)
9203335.5	0.17131 (21093019)	0.15039 (21093018)	0.16170 (21100424)	0.32286 (21100424)	0.19259 (21100424)
9203285.3	0.19319 (21093019)	0.15830 (21093018)	0.18575 (21100424)	0.13157 (21100424)	0.02742 (21092616)
9203235.2	0.21763 (21093019)	0.16074 (21093018)	0.09052 (21100424)	0.03115 (21093018)	0.02740 (21092616)
9203185.0	0.33878 (21100504)	0.15838 (21093018)	0.06819 (21093018)	0.03160 (21092616)	0.02640 (21092616)
9203134.8	0.27607 (21100504)	0.14151 (21093018)	0.04924 (21093018)	0.03127 (21092616)	0.02439 (21092616)
9203084.6	0.27134 (21093019)	0.10807 (21093018)	0.03608 (21092616)	0.02960 (21092616)	0.02345 (21100412)
9203034.4	0.26540 (21093018)	0.06267 (21093018)	0.03493 (21092616)	0.02646 (21092616)	0.02388 (21100412)
9202984.2	0.20189 (21093018)	0.04622 (21100512)	0.03228 (21100607)	0.02979 (21100607)	0.02696 (21100607)

```
 9202934.0 |      0.10040 (21093018)      0.05565 (21100512)      0.04443 (21100607)
0.03860 (21100607)      0.03380 (21100607)
 9202883.8 |      0.09394 (21100512)      0.06640 (21100607)      0.05582 (21100607)
0.04672 (21100607)      0.04015 (21100607)
 9202833.6 |      0.09076 (21100607)      0.08030 (21100607)      0.06439 (21100607)
0.05301 (21100607)      0.04529 (21100607)
 9202783.4 |      0.10588 (21100607)      0.08659 (21100607)      0.06866 (21100607)
0.05664 (21100607)      0.04863 (21100607)
 9202733.3 |      0.10292 (21100607)      0.08433 (21100607)      0.06821 (21100607)
0.05724 (21100607)      0.04988 (21100607)
 9202683.1 |      0.08793 (21100607)      0.07569 (21100607)      0.06379 (21100607)
0.05507 (21100607)      0.04903 (21100607)
 9202632.9 |      0.06970 (21100607)      0.06401 (21100607)      0.06180 (21100402)
0.05082 (21100607)      0.04646 (21100607)
 9202582.7 |      0.05375 (21092116)      0.05180 (21100607)      0.07889 (21100402)
0.16748 (21100402)      0.11598 (21100402)
 9202532.5 |      0.04509 (21092116)      0.04481 (21092116)      0.08594 (21100403)
0.30104 (21100402)      0.50643 (21100402)
 9202482.3 |      0.03767 (21092613)      0.03930 (21092116)      0.05168 (21100403)
0.22031 (21100403)      0.55908 (21100402)
 9202432.1 |      0.03476 (21092613)      0.03425 (21092116)      0.03531 (21092116)
0.12745 (21100403)      0.35311 (21100403)
 9202381.9 |      0.03183 (21092613)      0.02895 (21092116)      0.03185 (21092116)
0.03234 (21092116)      0.24929 (21100403)
 9202331.7 |      0.02910 (21092613)      0.02512 (21092613)      0.02803 (21092116)
0.02953 (21092116)      0.13723 (21100403)
 9202281.5 |      0.02727 (21092613)      0.02378 (21092613)      0.02411 (21092116)
0.02691 (21092116)      0.06044 (21100403)
 9202231.4 |      0.02578 (21092613)      0.02259 (21092613)      0.02122 (21100508)
0.02425 (21092116)      0.04549 (21100403)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  42
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                              X-COORD (METERS)
  (METERS) |       377338.91               377397.66               377456.41
377515.16               377573.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.02469 (21092613)      0.02188 (21092613)      0.02107 (21091417)
0.02170 (21092116)      0.03165 (21100403)
 9202131.0 |      0.02383 (21092613)      0.02151 (21091417)      0.02084 (21091417)
0.02103 (21091417)      0.02605 (21100324)
 9202080.8 |      0.02282 (21092613)      0.02116 (21091417)      0.02061 (21091417)
0.02071 (21091417)      0.01964 (21091417)
 9202030.6 |      0.02205 (21091417)      0.02076 (21091417)      0.01996 (21091417)
0.01977 (21091417)      0.01929 (21091417)
 9201980.4 |      0.02167 (21091417)      0.02027 (21091417)      0.01929 (21091417)
0.01874 (21091417)      0.01844 (21091417)
 9201930.2 |      0.02118 (21091417)      0.01969 (21091417)      0.01869 (21091417)
0.01797 (21091417)      0.01743 (21091417)
 9201880.0 |      0.02077 (21091417)      0.01931 (21091417)      0.01803 (21091417)
0.01706 (21091417)      0.01638 (21091417)
 9201829.8 |      0.02028 (21091417)      0.01885 (21091417)      0.01750 (21091417)
0.01648 (21091417)      0.01561 (21091417)
 9201779.6 |      0.01961 (21091417)      0.01814 (21091417)      0.01692 (21091417)
0.01591 (21091417)      0.01487 (21091417)
 9201729.5 |      0.01891 (21091417)      0.01758 (21091417)      0.01633 (21091417)
0.01522 (21091417)      0.01422 (21091417)
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 43
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 9C ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF H2S IN PPM **

Y-COORD (METERS)	X-COORD (METERS) 377632.66	377691.41	377750.16	377808.91	377867.66
9204188.8	0.12644 (21100506)	0.11522 (21100501)	0.14173 (21100322)	0.16158 (21100424)	0.16762 (21100424)
9204138.6	0.03921 (21093018)	0.05497 (21100506)	0.10723 (21100424)	0.11157 (21100424)	0.08159 (21100424)
9204088.4	0.03903 (21093018)	0.03383 (21093018)	0.03176 (21100424)	0.03228 (21100424)	0.01739 (21100412)
9204038.2	0.03714 (21093018)	0.03335 (21093018)	0.02609 (21093018)	0.01892 (21093018)	0.01885 (21100412)
9203988.0	0.03725 (21093018)	0.03228 (21093018)	0.02592 (21093018)	0.01953 (21093018)	0.01990 (21100412)
9203937.8	0.03637 (21093018)	0.03111 (21093018)	0.02480 (21093018)	0.01839 (21100412)	0.01975 (21100412)
9203887.6	0.03683 (21093018)	0.03055 (21093018)	0.02374 (21093018)	0.01894 (21100412)	0.02006 (21100412)
9203837.4	0.03910 (21093018)	0.03117 (21093018)	0.02308 (21093018)	0.02010 (21100412)	0.02119 (21100412)
9203787.2	0.04095 (21093018)	0.03120 (21093018)	0.02213 (21093018)	0.02130 (21100412)	0.02287 (21100412)
9203737.1	0.04222 (21093018)	0.02854 (21093018)	0.01926 (21100412)	0.02068 (21100412)	0.02194 (21100412)
9203686.9	0.03863 (21093018)	0.03058 (21100424)	0.03610 (21100424)	0.03731 (21100424)	0.02629 (21100424)
9203636.7	0.09812 (21100424)	0.14789 (21100424)	0.13854 (21100424)	0.10812 (21100424)	0.08214 (21100322)
9203586.5	0.21227 (21100424)	0.24132 (21100424)	0.18797 (21100424)	0.15909 (21100322)	0.14534 (21100322)
9203536.3	0.29299 (21100424)	0.23743 (21100424)	0.21050 (21100322)	0.20665 (21100322)	0.18799 (21100322)
9203486.1	0.28576 (21100424)	0.22129 (21100322)	0.21096 (21100322)	0.19155 (21100322)	0.17367 (21100322)
9203435.9	0.27305 (21100424)	0.14703 (21100424)	0.09883 (21100322)	0.11082 (21100405)	0.10347 (21100405)
9203385.7	0.14096 (21100424)	0.02572 (21100322)	0.01973 (21100412)	0.01947 (21100412)	0.01884 (21100412)
9203335.5	0.02374 (21092616)	0.02010 (21100412)	0.01990 (21100412)	0.01940 (21100412)	0.01851 (21100412)
9203285.3	0.02340 (21092616)	0.02048 (21100412)	0.01984 (21100412)	0.01888 (21100412)	0.01786 (21100412)
9203235.2	0.02196 (21092616)	0.02032 (21100412)	0.01939 (21100412)	0.01816 (21100412)	0.01697 (21100412)
9203185.0	0.02132 (21100412)	0.02013 (21100412)	0.01885 (21100412)	0.01743 (21100412)	0.01638 (21091417)
9203134.8	0.02150 (21100412)	0.01993 (21100412)	0.01825 (21100412)	0.01678 (21091417)	0.01653 (21091417)
9203084.6	0.02155 (21100412)	0.01956 (21100412)	0.01758 (21100412)	0.01689 (21091417)	0.01666 (21091417)
9203034.4	0.02141 (21100412)	0.01901 (21100412)	0.01705 (21091417)	0.01696 (21091417)	0.01676 (21091417)
9202984.2	0.02455 (21100607)	0.02265 (21100607)	0.02119 (21100607)	0.02025 (21100607)	0.01955 (21100607)

```
 9202934.0 |      0.03019 (21100607)      0.02754 (21100607)      0.02555 (21100607)
0.02425 (21100607)      0.02318 (21100607)
 9202883.8 |      0.03553 (21100607)      0.03222 (21100607)      0.02980 (21100607)
0.02814 (21100607)      0.02669 (21100607)
 9202833.6 |      0.04002 (21100607)      0.03631 (21100607)      0.03359 (21100607)
0.03167 (21100607)      0.02986 (21100607)
 9202783.4 |      0.04322 (21100607)      0.03942 (21100607)      0.03662 (21100607)
0.03461 (21100607)      0.03249 (21100607)
 9202733.3 |      0.04486 (21100607)      0.04129 (21100607)      0.03864 (21100607)
0.03659 (21100607)      0.03441 (21100607)
 9202683.1 |      0.04483 (21100607)      0.04181 (21100607)      0.03951 (21100607)
0.03753 (21100607)      0.03552 (21100607)
 9202632.9 |      0.04332 (21100607)      0.04100 (21100607)      0.03922 (21100607)
0.03751 (21100607)      0.03579 (21100607)
 9202582.7 |      0.09576 (21100423)      0.07825 (21100423)      0.03978 (21100423)
0.03663 (21100607)      0.12245 (21100423)
 9202532.5 |      0.60341 (21100402)      0.66675 (21100423)      0.47059 (21100423)
0.36568 (21100423)      0.76444 (21100423)
 9202482.3 |      0.69189 (21100402)      0.77016 (21100423)      0.94756 (21100423)
1.04571 (21100423)      0.86570 (21100423)
 9202432.1 |      0.41815 (21100402)      0.19974 (21100423)      0.19487 (21100423)
0.22697 (21100423)      0.07950 (21100423)
 9202381.9 |      0.34618 (21100402)      0.11880 (21100402)      0.06501 (21091518)
0.06996 (21091518)      0.07287 (21091518)
 9202331.7 |      0.47726 (21100403)      0.12937 (21100403)      0.05241 (21091518)
0.06045 (21091518)      0.05960 (21091518)
 9202281.5 |      0.44066 (21100403)      0.32398 (21100403)      0.08518 (21100402)
0.05430 (21100423)      0.06167 (21100423)
 9202231.4 |      0.33653 (21100403)      0.47768 (21100403)      0.23582 (21100403)
0.10961 (21100402)      0.11060 (21100402)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  44
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                 X-COORD (METERS)
  (METERS) |       377632.66              377691.41              377750.16
377808.91              377867.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.23122 (21100403)      0.41249 (21100403)      0.38487 (21100403)
0.21331 (21100403)      0.23922 (21100402)
 9202131.0 |      0.11987 (21100403)      0.24217 (21100403)      0.30537 (21100403)
0.22234 (21100403)      0.15843 (21100402)
 9202080.8 |      0.02515 (21100403)      0.05879 (21100403)      0.08171 (21100403)
0.04673 (21100403)      0.03822 (21100403)
 9202030.6 |      0.01995 (21092116)      0.02213 (21092116)      0.02401 (21092116)
0.02548 (21092116)      0.02645 (21092116)
 9201980.4 |      0.01808 (21092116)      0.02033 (21092116)      0.02280 (21092116)
0.02471 (21092116)      0.02587 (21092116)
 9201930.2 |      0.01657 (21091417)      0.01809 (21092116)      0.02059 (21092116)
0.02288 (21092116)      0.02464 (21092116)
 9201880.0 |      0.01564 (21091417)      0.01610 (21092116)      0.01869 (21092116)
0.02078 (21092116)      0.02251 (21092116)
 9201829.8 |      0.01474 (21091417)      0.01487 (21100508)      0.01679 (21092116)
0.01900 (21092116)      0.02119 (21092116)
 9201779.6 |      0.01403 (21091417)      0.01383 (21100508)      0.01504 (21092116)
0.01753 (21092116)      0.01997 (21092116)
 9201729.5 |      0.01349 (21091417)      0.01308 (21091417)      0.01389 (21100508)
0.01591 (21092116)      0.01803 (21092116)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  45
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       377926.41              377985.16              378043.91
378102.66              378161.41
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9204188.8 |      0.09157 (21100424)      0.02768 (21100424)      0.02153 (21100412)
0.02403 (21100412)      0.02452 (21100412)
 9204138.6 |      0.02730 (21100424)      0.02053 (21100412)      0.02292 (21100412)
0.02396 (21100412)      0.02437 (21100412)
 9204088.4 |      0.01959 (21100412)      0.02224 (21100412)      0.02278 (21100412)
0.02366 (21100412)      0.02433 (21100412)
 9204038.2 |      0.02109 (21100412)      0.02167 (21100412)      0.02271 (21100412)
0.02378 (21100412)      0.02501 (21100412)
 9203988.0 |      0.02088 (21100412)      0.02203 (21100412)      0.02383 (21100412)
0.02490 (21100412)      0.02637 (21100412)
 9203937.8 |      0.02097 (21100412)      0.02250 (21100412)      0.02444 (21100412)
0.02593 (21100412)      0.02607 (21100412)
 9203887.6 |      0.02130 (21100412)      0.02267 (21100412)      0.02398 (21100412)
0.02493 (21100412)      0.02517 (21100412)
 9203837.4 |      0.02209 (21100412)      0.02285 (21100412)      0.02350 (21100412)
0.02423 (21100412)      0.02488 (21100412)
 9203787.2 |      0.02352 (21100412)      0.02380 (21100412)      0.02438 (21100412)
0.02439 (21100412)      0.02334 (21100412)
 9203737.1 |      0.02301 (21100412)      0.02372 (21100412)      0.02356 (21100412)
0.02295 (21100412)      0.02202 (21100412)
 9203686.9 |      0.02261 (21100412)      0.02285 (21100412)      0.02258 (21100412)
0.02186 (21100412)      0.02078 (21100412)
 9203636.7 |      0.06443 (21100322)      0.03677 (21100405)      0.02170 (21100412)
0.02075 (21100412)      0.02151 (21100405)
 9203586.5 |      0.12019 (21100322)      0.09309 (21100405)      0.04173 (21100405)
0.02287 (21100405)      0.03074 (21100405)
 9203536.3 |      0.16466 (21100322)      0.13938 (21100405)      0.10903 (21100405)
0.05284 (21100405)      0.04182 (21100405)
 9203486.1 |      0.16647 (21100322)      0.14718 (21100322)      0.16720 (21100405)
0.11977 (21100405)      0.06525 (21100405)
 9203435.9 |      0.12704 (21100405)      0.17846 (21100405)      0.18774 (21100405)
0.19322 (21100405)      0.15514 (21100405)
 9203385.7 |      0.02521 (21100405)      0.07211 (21100405)      0.17703 (21100405)
0.21340 (21100405)      0.21568 (21100405)
 9203335.5 |      0.01735 (21100412)      0.01597 (21100412)      0.05282 (21100405)
0.16799 (21100405)      0.22899 (21100405)
 9203285.3 |      0.01666 (21100412)      0.01535 (21100412)      0.01500 (21091417)
0.08473 (21100405)      0.24181 (21100405)
 9203235.2 |      0.01587 (21091417)      0.01551 (21091417)      0.01517 (21091417)
0.03263 (21100405)      0.20622 (21100405)
 9203185.0 |      0.01605 (21091417)      0.01570 (21091417)      0.01533 (21091417)
0.02189 (21100405)      0.17602 (21100405)
 9203134.8 |      0.01622 (21091417)      0.01586 (21091417)      0.01549 (21091417)
0.03775 (21100405)      0.18981 (21100405)
 9203084.6 |      0.01636 (21091417)      0.01600 (21091417)      0.01563 (21091417)
0.03528 (21100405)      0.16262 (21100405)
 9203034.4 |      0.01647 (21091417)      0.01613 (21091417)      0.01575 (21091417)
0.02458 (21100405)      0.10373 (21100405)
 9202984.2 |      0.01813 (21100607)      0.01681 (21100607)      0.01612 (21100607)
0.01571 (21100607)      0.05699 (21100405)
```

```
 9202934.0 |      0.02150 (21100607)      0.01989 (21100607)      0.01914 (21100607)
0.02740 (21100405)      0.12407 (21100405)
 9202883.8 |      0.02483 (21100607)      0.02302 (21100607)      0.02218 (21100607)
0.03705 (21100405)      0.21500 (21100401)
 9202833.6 |      0.02787 (21100607)      0.02607 (21100607)      0.03062 (21100401)
0.20494 (21100401)      0.17639 (21100401)
 9202783.4 |      0.03044 (21100607)      0.02877 (21100607)      0.11020 (21100401)
0.38829 (21100401)      0.06457 (21100423)
 9202733.3 |      0.03242 (21100607)      0.03095 (21100607)      0.41395 (21100401)
0.27077 (21100401)      0.02887 (21100411)
 9202683.1 |      0.03367 (21100607)      0.17852 (21100401)      0.42509 (21100423)
0.16635 (21100423)      0.03089 (21100411)
 9202632.9 |      0.11529 (21100401)      0.48151 (21100401)      0.54917 (21100423)
0.03229 (21100607)      0.03225 (21100411)
 9202582.7 |      0.46895 (21100423)      0.87047 (21100423)      0.19123 (21100423)
0.03267 (21100607)      0.03241 (21100411)
 9202532.5 |      1.15224 (21100423)      0.55105 (21100423)      0.03329 (21100607)
0.03241 (21100607)      0.03151 (21100607)
 9202482.3 |      0.38005 (21100423)      0.03935 (21091518)      0.04616 (21091518)
0.03863 (21091518)      0.03093 (21100607)
 9202432.1 |      0.04581 (21091518)      0.06168 (21091518)      0.05574 (21091518)
0.04725 (21091518)      0.02991 (21100607)
 9202381.9 |      0.06817 (21091518)      0.06457 (21091518)      0.06357 (21091518)
0.05179 (21091518)      0.03028 (21091518)
 9202331.7 |      0.05937 (21091518)      0.06207 (21091518)      0.06613 (21091518)
0.05706 (21091518)      0.03117 (21091518)
 9202281.5 |      0.04172 (21091518)      0.04689 (21091518)      0.06036 (21091518)
0.06049 (21091518)      0.03534 (21091518)
 9202231.4 |      0.10265 (21100423)      0.06813 (21100423)      0.05353 (21091518)
0.06212 (21091518)      0.04365 (21091518)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  46
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       377926.41              377985.16              378043.91
378102.66              378161.41
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.25990 (21100402)      0.18865 (21100402)      0.07711 (21100423)
0.04762 (21091518)      0.05056 (21091518)
 9202131.0 |      0.23132 (21100402)      0.29129 (21100402)      0.30473 (21100402)
0.09434 (21100423)      0.04651 (21091518)
 9202080.8 |      0.08212 (21100402)      0.15927 (21100402)      0.22911 (21100402)
0.30520 (21100402)      0.09735 (21100423)
 9202030.6 |      0.02698 (21092116)      0.03719 (21100402)      0.07357 (21100402)
0.12978 (21100402)      0.25320 (21100402)
 9201980.4 |      0.02657 (21092116)      0.02687 (21092116)      0.02676 (21092116)
0.02624 (21092116)      0.08168 (21100402)
 9201930.2 |      0.02592 (21092116)      0.02690 (21092116)      0.02689 (21092116)
0.02661 (21092116)      0.02603 (21092116)
 9201880.0 |      0.02418 (21092116)      0.02613 (21092116)      0.02706 (21092116)
0.02693 (21092116)      0.02646 (21092116)
 9201829.8 |      0.02331 (21092116)      0.02508 (21092116)      0.02649 (21092116)
0.02711 (21092116)      0.02700 (21092116)
 9201779.6 |      0.02211 (21092116)      0.02379 (21092116)      0.02530 (21092116)
0.02651 (21092116)      0.02701 (21092116)
 9201729.5 |      0.01987 (21092116)      0.02177 (21092116)      0.02364 (21092116)
0.02492 (21092116)      0.02595 (21092116)
```

*** AERMOD - VERSION 21112 *** *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well Testing Geodipa\Wel *** 09/04/22
*** AERMET - VERSION 21112 *** ***
*** 10:33:49

PAGE 47
*** MODELOPTs: RegDFAULT CONC ELEV RURAL ADJ_U* MMIF_Data

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 9C ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF H2S IN PPM **

Y-COORD (METERS)	X-COORD (METERS) 378220.16	378278.91	378337.66	378396.41	378455.16
9204188.8	0.02497 (21100412)	0.02562 (21100412)	0.02624 (21100412)	0.02619 (21100412)	0.02540 (21100412)
9204138.6	0.02491 (21100412)	0.02574 (21100412)	0.02616 (21100412)	0.02604 (21100412)	0.02505 (21100412)
9204088.4	0.02505 (21100412)	0.02581 (21100412)	0.02596 (21100412)	0.02552 (21100412)	0.02457 (21100412)
9204038.2	0.02605 (21100412)	0.02642 (21100412)	0.02586 (21100412)	0.02494 (21100412)	0.02381 (21100412)
9203988.0	0.02604 (21100412)	0.02554 (21100412)	0.02510 (21100412)	0.02419 (21100412)	0.02291 (21100412)
9203937.8	0.02561 (21100412)	0.02484 (21100412)	0.02388 (21100412)	0.02288 (21100412)	0.02159 (21100412)
9203887.6	0.02497 (21100412)	0.02430 (21100412)	0.02296 (21100412)	0.02151 (21100412)	0.02008 (21100412)
9203837.4	0.02411 (21100412)	0.02299 (21100412)	0.02188 (21100412)	0.02028 (21100412)	0.01874 (21100412)
9203787.2	0.02276 (21100412)	0.02202 (21100412)	0.02061 (21100412)	0.01906 (21100412)	0.01743 (21100412)
9203737.1	0.02104 (21100412)	0.01989 (21100412)	0.01870 (21100412)	0.01739 (21100412)	0.01595 (21100412)
9203686.9	0.01953 (21100412)	0.01815 (21100412)	0.01679 (21100412)	0.01554 (21100412)	0.01419 (21100412)
9203636.7	0.02615 (21100405)	0.03001 (21100405)	0.03098 (21100405)	0.02143 (21100405)	0.01339 (21100405)
9203586.5	0.05788 (21100405)	0.07818 (21100405)	0.07263 (21100405)	0.04247 (21100405)	0.02949 (21100405)
9203536.3	0.08189 (21100405)	0.12870 (21100405)	0.12463 (21100405)	0.08725 (21100405)	0.07695 (21100405)
9203486.1	0.09383 (21100405)	0.14531 (21100405)	0.17186 (21100405)	0.16022 (21100405)	0.16473 (21100405)
9203435.9	0.13271 (21100405)	0.16642 (21100405)	0.20046 (21100405)	0.19977 (21100405)	0.19630 (21100405)
9203385.7	0.21321 (21100405)	0.21209 (21100405)	0.20863 (21100405)	0.18067 (21100405)	0.20669 (21100405)
9203335.5	0.20129 (21100405)	0.22570 (21100405)	0.21297 (21100405)	0.15102 (21100405)	0.18625 (21100405)
9203285.3	0.19420 (21100405)	0.16255 (21100405)	0.17740 (21100405)	0.11641 (21100405)	0.14497 (21100405)
9203235.2	0.23950 (21100405)	0.10444 (21100405)	0.11173 (21100405)	0.08797 (21100405)	0.10359 (21100405)
9203185.0	0.23932 (21100405)	0.08731 (21100405)	0.09029 (21100405)	0.07717 (21100405)	0.08710 (21100405)
9203134.8	0.21302 (21100405)	0.08104 (21100405)	0.06853 (21100405)	0.06814 (21100405)	0.06280 (21100405)
9203084.6	0.26338 (21100405)	0.08074 (21100405)	0.01290 (21091417)	0.01248 (21091417)	0.01201 (21091417)
9203034.4	0.26169 (21100405)	0.07458 (21100405)	0.01326 (21100607)	0.01317 (21092117)	0.01429 (21092117)
9202984.2	0.25299 (21100405)	0.06574 (21100405)	0.01767 (21092117)	0.02965 (21092117)	0.02883 (21092117)

```
 9202934.0 |      0.16581 (21100405)      0.01805 (21100607)      0.02464 (21092117)
0.04504 (21092117)      0.04253 (21092117)
 9202883.8 |      0.02103 (21100607)      0.02058 (21100607)      0.02205 (21092117)
0.04187 (21092117)      0.03911 (21092117)
 9202833.6 |      0.02359 (21100607)      0.02299 (21100411)      0.03001 (21092117)
0.03019 (21092117)      0.02554 (21092117)
 9202783.4 |      0.02609 (21100411)      0.02692 (21100411)      0.02400 (21100607)
0.02309 (21100607)      0.02224 (21100607)
 9202733.3 |      0.02941 (21100411)      0.03012 (21100411)      0.02560 (21100607)
0.02465 (21100607)      0.02713 (21100411)
 9202683.1 |      0.03200 (21100411)      0.03197 (21100411)      0.03092 (21100411)
0.02934 (21100411)      0.02797 (21100411)
 9202632.9 |      0.03309 (21100411)      0.03257 (21100411)      0.03075 (21100411)
0.02913 (21100411)      0.02806 (21100411)
 9202582.7 |      0.03231 (21100411)      0.03075 (21100411)      0.02929 (21100411)
0.02818 (21100411)      0.03671 (21100423)
 9202532.5 |      0.03068 (21100607)      0.02992 (21100607)      0.12623 (21100423)
0.14847 (21100423)      0.16671 (21100423)
 9202482.3 |      0.03031 (21100607)      0.15951 (21100423)      0.26769 (21100423)
0.31124 (21100423)      0.38913 (21100423)
 9202432.1 |      0.08281 (21100423)      0.27271 (21100423)      0.45549 (21100423)
0.51306 (21100423)      0.55174 (21100423)
 9202381.9 |      0.20430 (21100423)      0.35917 (21100423)      0.63324 (21100423)
0.61924 (21100423)      0.60837 (21100423)
 9202331.7 |      0.24444 (21100423)      0.50030 (21100423)      0.68865 (21100423)
0.68976 (21100423)      0.62878 (21100423)
 9202281.5 |      0.20185 (21100423)      0.53898 (21100423)      0.67744 (21100423)
0.66450 (21100423)      0.55568 (21100423)
 9202231.4 |      0.05660 (21100423)      0.36203 (21100423)      0.61166 (21100423)
0.58412 (21100423)      0.45569 (21100423)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  48
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       378220.16               378278.91               378337.66
378396.41              378455.16
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.03254 (21091518)      0.17100 (21100423)      0.41186 (21100423)
0.45887 (21100423)      0.40607 (21100423)
 9202131.0 |      0.04312 (21091518)      0.03413 (21100423)      0.17043 (21100423)
0.27769 (21100423)      0.29770 (21100423)
 9202080.8 |      0.03554 (21091518)      0.03787 (21091518)      0.02659 (21091518)
0.09331 (21100423)      0.11198 (21100423)
 9202030.6 |      0.18831 (21100402)      0.05539 (21100423)      0.05750 (21100423)
0.02647 (21091518)      0.02797 (21091518)
 9201980.4 |      0.21618 (21100402)      0.29154 (21100402)      0.23962 (21100402)
0.06688 (21100423)      0.03037 (21091518)
 9201930.2 |      0.03949 (21100402)      0.11427 (21100402)      0.23724 (21100402)
0.20893 (21100402)      0.05827 (21100423)
 9201880.0 |      0.02578 (21092116)      0.02483 (21092116)      0.06202 (21100402)
0.15432 (21100402)      0.26672 (21100402)
 9201829.8 |      0.02629 (21092116)      0.02556 (21092116)      0.02452 (21092116)
0.03277 (21100402)      0.11475 (21100402)
 9201779.6 |      0.02659 (21092116)      0.02606 (21092116)      0.02529 (21092116)
0.02421 (21092116)      0.03197 (21100402)
 9201729.5 |      0.02671 (21092116)      0.02641 (21092116)      0.02587 (21092116)
0.02496 (21092116)      0.02384 (21092116)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  49
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       378513.91               378572.66               378631.41
378690.16               378748.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9204188.8 |      0.02446 (21100412)      0.02344 (21100412)      0.02241 (21100412)
0.02129 (21100412)      0.02028 (21100412)
 9204138.6 |      0.02396 (21100412)      0.02248 (21100412)      0.02142 (21100412)
0.02023 (21100412)      0.01923 (21100412)
 9204088.4 |      0.02325 (21100412)      0.02161 (21100412)      0.02037 (21100412)
0.01920 (21100412)      0.01806 (21100412)
 9204038.2 |      0.02227 (21100412)      0.02062 (21100412)      0.01919 (21100412)
0.01811 (21100412)      0.01647 (21100412)
 9203988.0 |      0.02137 (21100412)      0.01959 (21100412)      0.01806 (21100412)
0.01685 (21100412)      0.01495 (21100412)
 9203937.8 |      0.02019 (21100412)      0.01866 (21100412)      0.01692 (21100412)
0.01576 (21100412)      0.01361 (21100412)
 9203887.6 |      0.01859 (21100412)      0.01706 (21100412)      0.01575 (21100412)
0.01435 (21100412)      0.01241 (21100412)
 9203837.4 |      0.01709 (21100412)      0.01547 (21100412)      0.01413 (21100412)
0.01293 (21100412)      0.01127 (21100412)
 9203787.2 |      0.01574 (21100412)      0.01411 (21100412)      0.01274 (21100412)
0.01150 (21100412)      0.01013 (21100412)
 9203737.1 |      0.01428 (21100412)      0.01281 (21100412)      0.01152 (21100412)
0.01026 (21100412)      0.00957 (21091417)
 9203686.9 |      0.01285 (21100412)      0.01151 (21100412)      0.01025 (21100412)
0.01543 (21100405)      0.01508 (21100405)
 9203636.7 |      0.01156 (21100412)      0.01744 (21100405)      0.02892 (21100405)
0.04267 (21100405)      0.04048 (21100405)
 9203586.5 |      0.03046 (21100405)      0.04172 (21100405)      0.04753 (21100405)
0.08307 (21100405)      0.08696 (21100405)
 9203536.3 |      0.09130 (21100405)      0.08704 (21100405)      0.07117 (21100405)
0.10816 (21100405)      0.12008 (21100405)
 9203486.1 |      0.16032 (21100405)      0.12890 (21100405)      0.10481 (21100405)
0.12964 (21100405)      0.13474 (21100405)
 9203435.9 |      0.18811 (21100405)      0.16702 (21100405)      0.13622 (21100405)
0.14071 (21100405)      0.13126 (21100405)
 9203385.7 |      0.19943 (21100405)      0.18031 (21100405)      0.15885 (21100405)
0.13795 (21100405)      0.10287 (21100405)
 9203335.5 |      0.20871 (21100405)      0.19553 (21100405)      0.17208 (21100405)
0.13793 (21100405)      0.08309 (21100405)
 9203285.3 |      0.21083 (21100405)      0.20512 (21100405)      0.17681 (21100405)
0.14640 (21100405)      0.11105 (21100405)
 9203235.2 |      0.19113 (21100405)      0.20660 (21100405)      0.18773 (21100405)
0.16730 (21100405)      0.13932 (21100405)
 9203185.0 |      0.15684 (21100405)      0.19803 (21100405)      0.19684 (21100405)
0.18297 (21100405)      0.15478 (21100405)
 9203134.8 |      0.07059 (21100405)      0.09217 (21100405)      0.14266 (21100405)
0.17766 (21100405)      0.17587 (21100405)
 9203084.6 |      0.01162 (21091417)      0.05115 (21100405)      0.08980 (21100405)
0.11974 (21100405)      0.14568 (21100405)
 9203034.4 |      0.01268 (21092117)      0.01183 (21100607)      0.04857 (21100405)
0.06661 (21100405)      0.09561 (21100405)
 9202984.2 |      0.01933 (21092117)      0.01368 (21100607)      0.01318 (21100607)
0.01506 (21100405)      0.04650 (21100405)
```

```
 9202934.0 |      0.02812 (21092117)      0.01653 (21092117)      0.01503 (21100607)
0.01452 (21100607)      0.01404 (21100607)
 9202883.8 |      0.03520 (21092117)      0.02476 (21092117)      0.01715 (21100411)
0.01670 (21100411)      0.01625 (21100411)
 9202833.6 |      0.02619 (21092117)      0.02372 (21092117)      0.01988 (21100411)
0.01919 (21100411)      0.01854 (21100411)
 9202783.4 |      0.02146 (21100607)      0.02327 (21100411)      0.02248 (21100411)
0.02168 (21100411)      0.02082 (21100411)
 9202733.3 |      0.02585 (21100411)      0.02507 (21100411)      0.02445 (21100411)
0.02382 (21100411)      0.02300 (21100411)
 9202683.1 |      0.02695 (21100411)      0.02630 (21100411)      0.02581 (21100411)
0.02528 (21100411)      0.02469 (21100411)
 9202632.9 |      0.02735 (21100411)      0.02689 (21100411)      0.02657 (21100411)
0.02612 (21100411)      0.02563 (21100411)
 9202582.7 |      0.06861 (21100423)      0.02681 (21100411)      0.02664 (21100411)
0.02638 (21100411)      0.02599 (21100411)
 9202532.5 |      0.20131 (21100423)      0.09349 (21100423)      0.03440 (21100423)
0.02600 (21100411)      0.02581 (21100411)
 9202482.3 |      0.39024 (21100423)      0.23593 (21100423)      0.12346 (21100423)
0.08179 (21100423)      0.02522 (21100411)
 9202432.1 |      0.48355 (21100423)      0.36160 (21100423)      0.21998 (21100423)
0.11523 (21100423)      0.02817 (21100423)
 9202381.9 |      0.52620 (21100423)      0.42807 (21100423)      0.37752 (21100423)
0.18556 (21100423)      0.02836 (21100423)
 9202331.7 |      0.52667 (21100423)      0.48539 (21100423)      0.45602 (21100423)
0.30916 (21100423)      0.05273 (21100423)
 9202281.5 |      0.47689 (21100423)      0.47880 (21100423)      0.47807 (21100423)
0.38666 (21100423)      0.16185 (21100423)
 9202231.4 |      0.43595 (21100423)      0.40576 (21100423)      0.43835 (21100423)
0.28624 (21100423)      0.17250 (21100423)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  50
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       378513.91               378572.66               378631.41
378690.16               378748.91
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.40940 (21100423)      0.36497 (21100423)      0.35441 (21100423)
0.22090 (21100423)      0.15104 (21100423)
 9202131.0 |      0.30842 (21100423)      0.28779 (21100423)      0.19167 (21100423)
0.13140 (21100423)      0.14168 (21100423)
 9202080.8 |      0.14275 (21100423)      0.13919 (21100423)      0.04131 (21100423)
0.02077 (21100423)      0.05578 (21100423)
 9202030.6 |      0.02394 (21091518)      0.02237 (21091518)      0.02205 (21091518)
0.02150 (21091518)      0.02929 (21100423)
 9201980.4 |      0.03010 (21091518)      0.02766 (21091518)      0.02471 (21091518)
0.02171 (21091518)      0.11103 (21100423)
 9201930.2 |      0.02328 (21091518)      0.02180 (21091518)      0.07296 (21100423)
0.13168 (21100423)      0.30245 (21100423)
 9201880.0 |      0.16042 (21100402)      0.10886 (21100423)      0.15824 (21100423)
0.26791 (21100423)      0.30310 (21100402)
 9201829.8 |      0.25931 (21100402)      0.22424 (21100402)      0.26876 (21100402)
0.28649 (21100402)      0.15686 (21100402)
 9201779.6 |      0.12354 (21100402)      0.15650 (21100402)      0.19561 (21100402)
0.15459 (21100402)      0.03752 (21100402)
 9201729.5 |      0.02261 (21092116)      0.02125 (21092116)      0.04043 (21100402)
0.04168 (21100402)      0.01703 (21092116)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  51
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                 X-COORD (METERS)
  (METERS) |       378807.66              378866.41              378925.16
378983.91              379042.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9204188.8 |      0.01910 (21100412)      0.01712 (21100412)      0.01537 (21100412)
0.01377 (21100412)      0.02234 (21100405)
 9204138.6 |      0.01751 (21100412)      0.01574 (21100412)      0.01408 (21100412)
0.01262 (21100412)      0.02132 (21100405)
 9204088.4 |      0.01595 (21100412)      0.01432 (21100412)      0.01286 (21100412)
0.01379 (21100405)      0.04577 (21100405)
 9204038.2 |      0.01462 (21100412)      0.01299 (21100412)      0.01672 (21100405)
0.03260 (21100405)      0.06389 (21100405)
 9203988.0 |      0.01319 (21100412)      0.02063 (21100405)      0.04028 (21100405)
0.07105 (21100405)      0.09107 (21100405)
 9203937.8 |      0.01198 (21100412)      0.02313 (21100405)      0.06230 (21100405)
0.10735 (21100405)      0.10670 (21100405)
 9203887.6 |      0.01091 (21100412)      0.01818 (21100405)      0.04931 (21100405)
0.10453 (21100405)      0.08683 (21100405)
 9203837.4 |      0.00989 (21100412)      0.01530 (21100405)      0.03508 (21100405)
0.08347 (21100405)      0.06179 (21100405)
 9203787.2 |      0.01519 (21100405)      0.02188 (21100405)      0.03080 (21100405)
0.06084 (21100405)      0.04983 (21100405)
 9203737.1 |      0.01949 (21100405)      0.02264 (21100405)      0.02418 (21100405)
0.04470 (21100405)      0.04494 (21100405)
 9203686.9 |      0.01774 (21100405)      0.01992 (21100405)      0.02355 (21100405)
0.03320 (21100405)      0.03607 (21100405)
 9203636.7 |      0.02565 (21100405)      0.01842 (21100405)      0.01960 (21100405)
0.01800 (21100405)      0.01726 (21100405)
 9203586.5 |      0.04783 (21100405)      0.01972 (21100405)      0.01605 (21100405)
0.01363 (21100405)      0.00983 (21100405)
 9203536.3 |      0.05470 (21100405)      0.02077 (21100405)      0.01426 (21100405)
0.01266 (21100405)      0.00904 (21100405)
 9203486.1 |      0.06304 (21100405)      0.02327 (21100405)      0.01263 (21100405)
0.01191 (21100405)      0.00936 (21100405)
 9203435.9 |      0.07444 (21100405)      0.02558 (21100405)      0.01410 (21100405)
0.01226 (21100405)      0.01051 (21100405)
 9203385.7 |      0.06121 (21100405)      0.02712 (21100405)      0.01657 (21100405)
0.01351 (21100405)      0.01069 (21100405)
 9203335.5 |      0.04880 (21100405)      0.03552 (21100405)      0.02354 (21100405)
0.01586 (21100405)      0.01078 (21100405)
 9203285.3 |      0.06077 (21100405)      0.03991 (21100405)      0.03276 (21100405)
0.02092 (21100405)      0.01543 (21100405)
 9203235.2 |      0.09202 (21100405)      0.06467 (21100405)      0.05090 (21100405)
0.03411 (21100405)      0.02299 (21100405)
 9203185.0 |      0.12962 (21100405)      0.10349 (21100405)      0.07897 (21100405)
0.05978 (21100405)      0.03758 (21100405)
 9203134.8 |      0.15989 (21100405)      0.13566 (21100405)      0.11804 (21100405)
0.09521 (21100405)      0.05595 (21100405)
 9203084.6 |      0.16118 (21100405)      0.15398 (21100405)      0.14704 (21100405)
0.13270 (21100405)      0.08835 (21100405)
 9203034.4 |      0.13054 (21100405)      0.13234 (21100405)      0.12815 (21100405)
0.13381 (21100405)      0.11442 (21100405)
 9202984.2 |      0.07088 (21100405)      0.08805 (21100405)      0.10197 (21100405)
0.12204 (21100405)      0.12021 (21100405)
```

```
 9202934.0 |      0.03197 (21100405)      0.03988 (21100405)      0.06815 (21100405)
0.09841 (21100405)      0.10780 (21100405)
 9202883.8 |      0.01584 (21100411)      0.02669 (21100405)      0.02695 (21100405)
0.03770 (21100405)      0.06897 (21100401)
 9202833.6 |      0.01805 (21100411)      0.01766 (21100411)      0.01727 (21100411)
0.01691 (21100411)      0.04875 (21100401)
 9202783.4 |      0.02021 (21100411)      0.01978 (21100411)      0.01930 (21100411)
0.01880 (21100411)      0.04532 (21100401)
 9202733.3 |      0.02235 (21100411)      0.02181 (21100411)      0.02119 (21100411)
0.02056 (21100411)      0.02059 (21100423)
 9202683.1 |      0.02410 (21100411)      0.02350 (21100411)      0.02276 (21100411)
0.02205 (21100411)      0.02152 (21100411)
 9202632.9 |      0.02514 (21100411)      0.02463 (21100411)      0.02395 (21100411)
0.02325 (21100411)      0.02272 (21100411)
 9202582.7 |      0.02567 (21100411)      0.02532 (21100411)      0.02479 (21100411)
0.02413 (21100411)      0.02358 (21100411)
 9202532.5 |      0.02569 (21100411)      0.02552 (21100411)      0.02516 (21100411)
0.02457 (21100411)      0.02407 (21100411)
 9202482.3 |      0.02524 (21100411)      0.02520 (21100411)      0.02492 (21100411)
0.02450 (21100411)      0.02412 (21100411)
 9202432.1 |      0.02442 (21100607)      0.02433 (21100411)      0.02409 (21100411)
0.02385 (21100411)      0.02360 (21100411)
 9202381.9 |      0.02447 (21100607)      0.02407 (21100607)      0.08661 (21100423)
0.11694 (21100423)      0.19341 (21100423)
 9202331.7 |      0.03173 (21100423)      0.12329 (21100423)      0.27176 (21100423)
0.34420 (21100423)      0.35957 (21100423)
 9202281.5 |      0.15653 (21100423)      0.35330 (21100423)      0.47850 (21100423)
0.44055 (21100423)      0.41493 (21100423)
 9202231.4 |      0.26503 (21100423)      0.53769 (21100423)      0.46555 (21100423)
0.25787 (21100423)      0.25346 (21100423)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  52
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                   *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART
***

                                        ** CONC OF H2S      IN PPM
**

  Y-COORD  |                                                X-COORD (METERS)
  (METERS) |       378807.66              378866.41              378925.16
378983.91              379042.66
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

 9202181.2 |      0.30540 (21100423)      0.54834 (21100423)      0.53265 (21100423)
0.22648 (21100423)      0.08469 (21100423)
 9202131.0 |      0.32327 (21100423)      0.54587 (21100423)      0.54335 (21100423)
0.24569 (21100423)      0.03204 (21100423)
 9202080.8 |      0.25227 (21100423)      0.50885 (21100423)      0.49905 (21100423)
0.20854 (21100423)      0.02971 (21100423)
 9202030.6 |      0.25313 (21100423)      0.49946 (21100423)      0.37330 (21100423)
0.10261 (21100423)      0.02096 (21100423)
 9201980.4 |      0.35700 (21100423)      0.46419 (21100423)      0.20053 (21100423)
0.02451 (21100423)      0.01854 (21100607)
 9201930.2 |      0.39216 (21100423)      0.31158 (21100423)      0.12804 (21100423)
0.01713 (21100607)      0.01739 (21100607)
 9201880.0 |      0.24183 (21100402)      0.12739 (21100402)      0.05377 (21100402)
0.01587 (21100607)      0.01619 (21100607)
 9201829.8 |      0.07908 (21100402)      0.02502 (21100402)      0.01637 (21100402)
0.01459 (21100607)      0.01497 (21100607)
 9201779.6 |      0.01641 (21100402)      0.01296 (21092116)      0.01294 (21100607)
0.01334 (21100607)      0.01373 (21100607)
 9201729.5 |      0.01570 (21092116)      0.01433 (21092116)      0.01299 (21092116)
0.01212 (21100607)      0.01251 (21100607)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  53
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                              *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES
FOR SOURCE GROUP:  ALL      ***
                                  INCLUDING SOURCE(S):     9C          ,

                                             *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                        ** CONC OF H2S      IN PPM
**

      X-COORD (M)  Y-COORD (M)        CONC     (YYMMDDHH)             X-COORD (M)  Y-
COORD (M)        CONC     (YYMMDDHH)
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -
        378487.26   9203829.10        0.01761  (21100412)               377842.31
9203830.03        0.02092  (21100412)
        377118.92   9203357.87        0.11662  (21091019)               376305.42
9201982.02        0.02664  (21091417)
        377321.00   9202026.11        0.02252  (21091417)
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  54
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

                                                *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                    ** CONC OF H2S      IN PPM
**

                                                      DATE
NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       1.15224  ON 21100423: AT (  377926.41,
9202532.49,  2132.60,  2298.00,    0.00)  GC  UCART1


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

```
 *** AERMOD - VERSION 21112  ***   *** D:\Amdal\Lainnya\Well Testing Geodipa\Model\Well
Testing Geodipa\Wel ***        09/04/22
 *** AERMET - VERSION  21112 ***   ***
***        10:33:49

PAGE  55
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  RURAL  ADJ_U*  MMIF_Data

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            5 Warning Message(s)
 A Total of            0 Informational Message(s)

 A Total of          720 Hours Were Processed

 A Total of            0 Calm Hours Identified

 A Total of            0 Missing Hours Identified (  0.00 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
 CO W116      20       MODOPT: Vector Wind Speeds specified on MODELOPT Keyword
VECTORWS
 SO W320      37        PPARM: Input Parameter May Be Out-of-Range for Parameter
VS
 ME W187      64       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET
 ME W182      64       MEOPEN: MMIF-generated meteorological inputs were used
 ME W181      64       MEOPEN: BULKRN Delta-T & SolarRad option for SBL was used
with MMIF

    ************************************
    *** AERMOD Finishes Successfully ***
    ************************************
```

NOISE STUDY OF SLR-T- 9C WELL TESTING ACTIVITIES

Final Report

December, 2022
Jakarta

Content

Daftar Tabel

List of Tables

List of Figures

1 INTRODUCTION

1.1 Background

In order to define potential and capacity of the well which has been drilled and to develop plan for geothermal production, PT Geo Dipa plans to carry out well testing work for the SLR-T-9C Well. In the well testing activity, fluid from the reservoir layer will be carried out and the release to NCG (Non Condensable Gas). Considering that the released fluid has a fairly high velocity, it is necessary to evaluate the potential for noise disturbance from this well testing activity. Evaluation is done by making a noise model.

1.2 Purpose

The purpose of this study are as follows:

- To identify the contours of the noise, with and without a sound barrier around the SLR-T-9C Well.
- To identify the contribution of noise due to activities at each potential receptor point.

1.3 Scope of Work

The scope of work is as follows.

- Conduct noise modeling during the well testing work of the SLR-T-9C Well. This emission distribution modeling study was conducted by using software of SoundPLAN Essential 5.1.
- Modeling is done for 2 conditions: with and without sound barrier.

2 METHODOLOGY

2.1 Noise Model

Noise propagation modelling was carried out using ISO 9613-2 and CNOSSOS-EU methods which were implemented in SoundPLAN Essential 5.1. Modelling is done for 2 scenarios: without and with sound barrier. The sound barrier construction is extending from North-East to South-West, 8 m high. With an open section on the Southwest side.

2.2 Noise Source

There are 3 noise sources modeled: diffuser, control valve and LECM with the characteristics presented in Table 1.

Table 1. Noise Sources Characteristics

No	Source Name	Height (m)	Noise Level (dBA, in 2 m the distance)
1	Diffuser	3	132
2	Control Valve	3	120
3	LECM	6	108

2.3 Sensitive Receptor

Noise levels at sensitive receptors are of primary concern. For this reason, an assessment of the contribution of noise to sensitive receptors around the SLR-Q-31A well was carried out. The receptor is modeled as a 2-level building. The distribution of these receptors is presented in **Error! Reference source not found.**. The receptor coordinates are presented in **Error! Reference source not found.**.

Tabel 1. Coordinate Receptor

No.	Receptor Code	X	Y
1	R1	376948	9202992
2	R2	377159	9203304
3	R3	377664	9203812
4	R4	378494	9203812
5	R5	377206	9202076
6	R6	376245	9201935

2.4 Topography

Topography affects noise propagation. In this study, the topography factor is calculated with the digital ground model (DGM), which is taken from Google Map which is integrated in SoundPLAN Essential 5.1.

2.5 Threshold Value

The predicted ambient noise level is compared with the standard noise level, both national and international. The National Noise Level Standard refers to the Decree of the Minister of the Environment No. 48 of 1996, namely 55 dBA for settlements, while the International standard refers to the IFC with 55 dBA for the day and 45 dBA for the night.

Figure 1. Well SLR-T-9C and Discrete Receptors Locations

3 RESULTS AND DISCUSSION

3.1 Results Without Sound Barrier

Noise contribution without a sound barrier due to well testing activities at 6 receptors is presented in Table 3. At night, there was an exceedance of the noise level standard at all receptor points except at Point R3. During the day the exceedance occurs at 4 (four) points, namely R1, R2, R5, and R6. The exceedance ranged from 0.7-32.9 dBA on the ground floor during the day; and ranges from 1.4-42.9 dBA at night.

Table 2. Modeling Results Without Sound Barrier

No.	Receiver name	Floor	Limit		Level		Conflict	
			Day	Night	Day	Night	Day	Night
			dB(A)		dB(A)		dB	
1	R1	GF	55	45	87.9	87.9	32.9	42.9
1	R1	1.Fl	55	45	87.9	87.9	32.9	42.9
1	R1	2.Fl	55	45	87.9	87.9	32.9	42.9
2	R2	GF	55	45	57.7	57.7	2.7	12.7
2	R2	1.Fl	55	45	64.4	64.4	9.4	19.4
2	R2	2.Fl	55	45	68.4	68.4	13.4	23.4
3	R3	GF	55	45	43	43	-	-
3	R3	1.Fl	55	45	42	42	-	-
3	R3	2.Fl	55	45	43.5	43.5	-	-
4	R4	GF	55	45	46.4	46.4	-	1.4
4	R4	1.Fl	55	45	46.4	46.4	-	1.4
4	R4	2.Fl	55	45	46.4	46.4	-	1.4
5	R5	GF	55	45	61	61	6	16
5	R5	1.Fl	55	45	62	62	7	17
5	R5	2.Fl	55	45	66.9	66.9	11.9	21.9
6	R6	GF	55	45	55.7	55.7	0.7	10.7
6	R6	1.Fl	55	45	56.4	56.4	1.4	11.4
6	R6	2.Fl	55	45	57.1	57.1	2.1	12.1

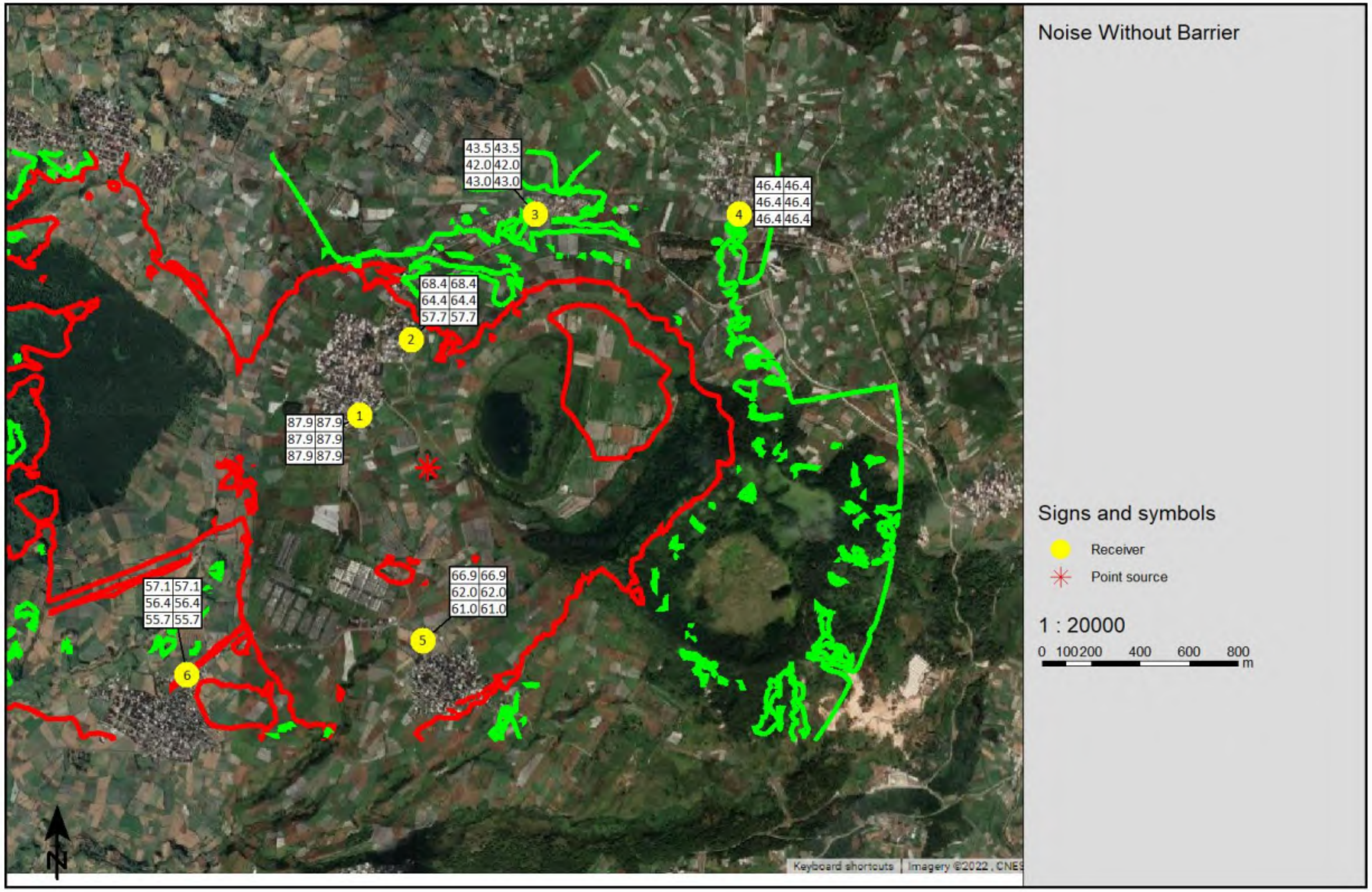


Figure 2. Noise Contribution At Night Without Sound Barrier

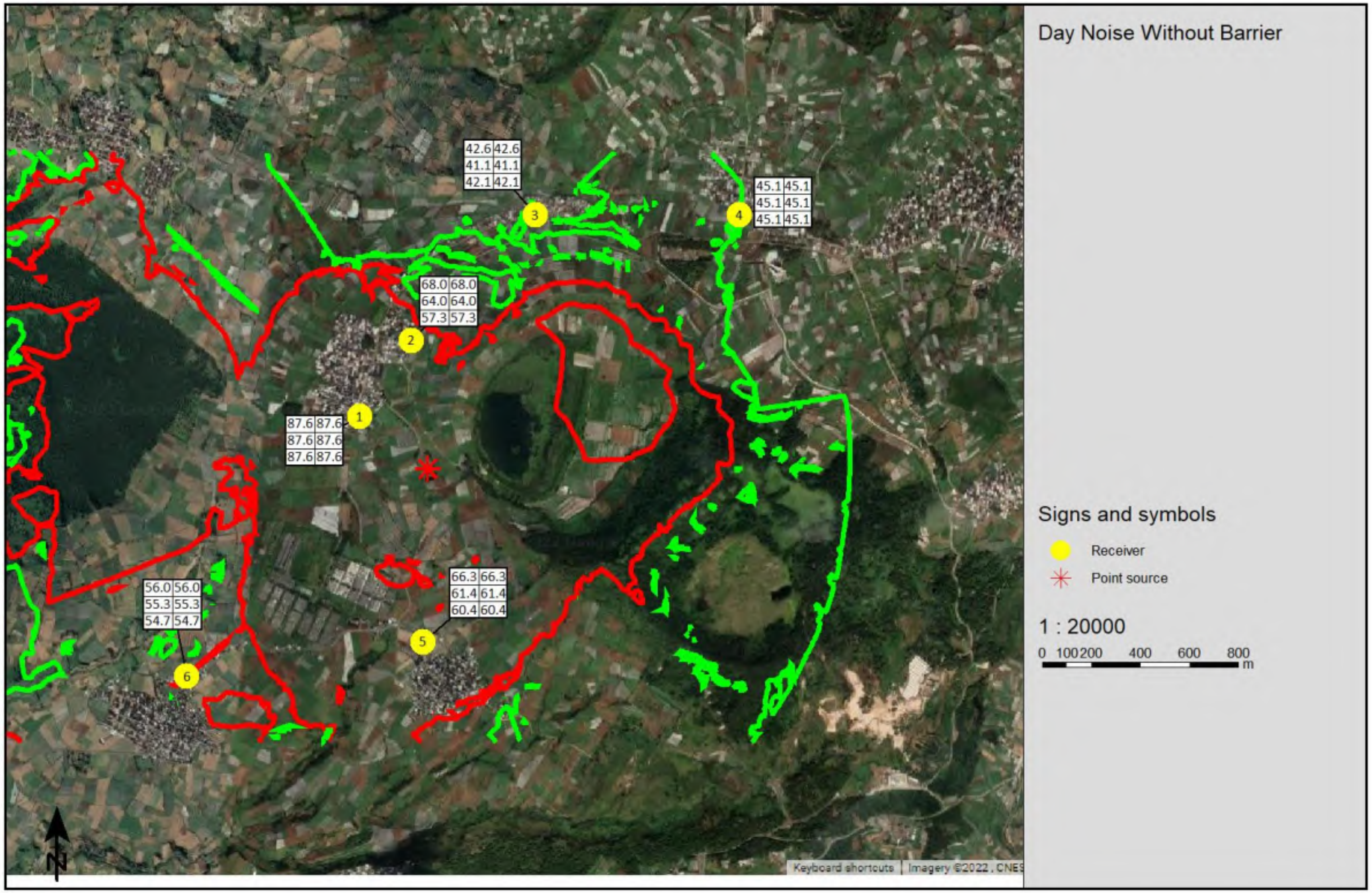


Figure 3. Noise Contribution At Day Without Sound Barrier

3.2 Modelling Result with Sound Barrier

Noise contribution with sound barrier due to well testing activities at 9 receptors is presented in Table 4. It can be seen that at all receptor points there was an exceedance of the standard noise level at night; while during the day exceedance R1, R2, and R5. At point R2 the exceedance only occurred for floors 2 and 3. The exceedance was around 4.8-28 dBA on the ground floor during the day; and ranges from 2.2-38.1 dBA at night. Installing a sound barrier can reduce noise contribution on the ground floor by 1.2-7.5 dBA.

Tabele 3. Modeling Results with Sound Barrier

No.	Receiver name	Floor	Limit		Level		Conflict	
			Day	Night	Day	Night	Day	Night
			dB(A)		dB(A)		dB	
1	R1	GF	55	45	83	83	28	38
1	R1	1.Fl	55	45	83.1	83.1	28.1	38.1
1	R1	2.Fl	55	45	83.1	83.1	28.1	38.1
2	R2	GF	55	45	51.1	51.1	-	6.1
2	R2	1.Fl	55	45	57.5	57.5	2.5	12.5
2	R2	2.Fl	55	45	60.9	60.9	5.9	15.9
3	R3	GF	55	45	48.9	48.9	-	3.9
3	R3	1.Fl	55	45	47.9	47.9	-	2.9
3	R3	2.Fl	55	45	49.4	49.4	-	4.4
4	R4	GF	55	45	47.2	47.2	-	2.2
4	R4	1.Fl	55	45	47.2	47.2	-	2.2
4	R4	2.Fl	55	45	47.2	47.2	-	2.2
5	R5	GF	55	45	59.8	59.8	4.8	14.8
5	R5	1.Fl	55	45	60.1	60.1	5.1	15.1
5	R5	2.Fl	55	45	60.3	60.3	5.3	15.3
6	R6	GF	55	45	52	52	-	7
6	R6	1.Fl	55	45	52.3	52.3	-	7.3
6	R6	2.Fl	55	45	52.7	52.7	-	7.7

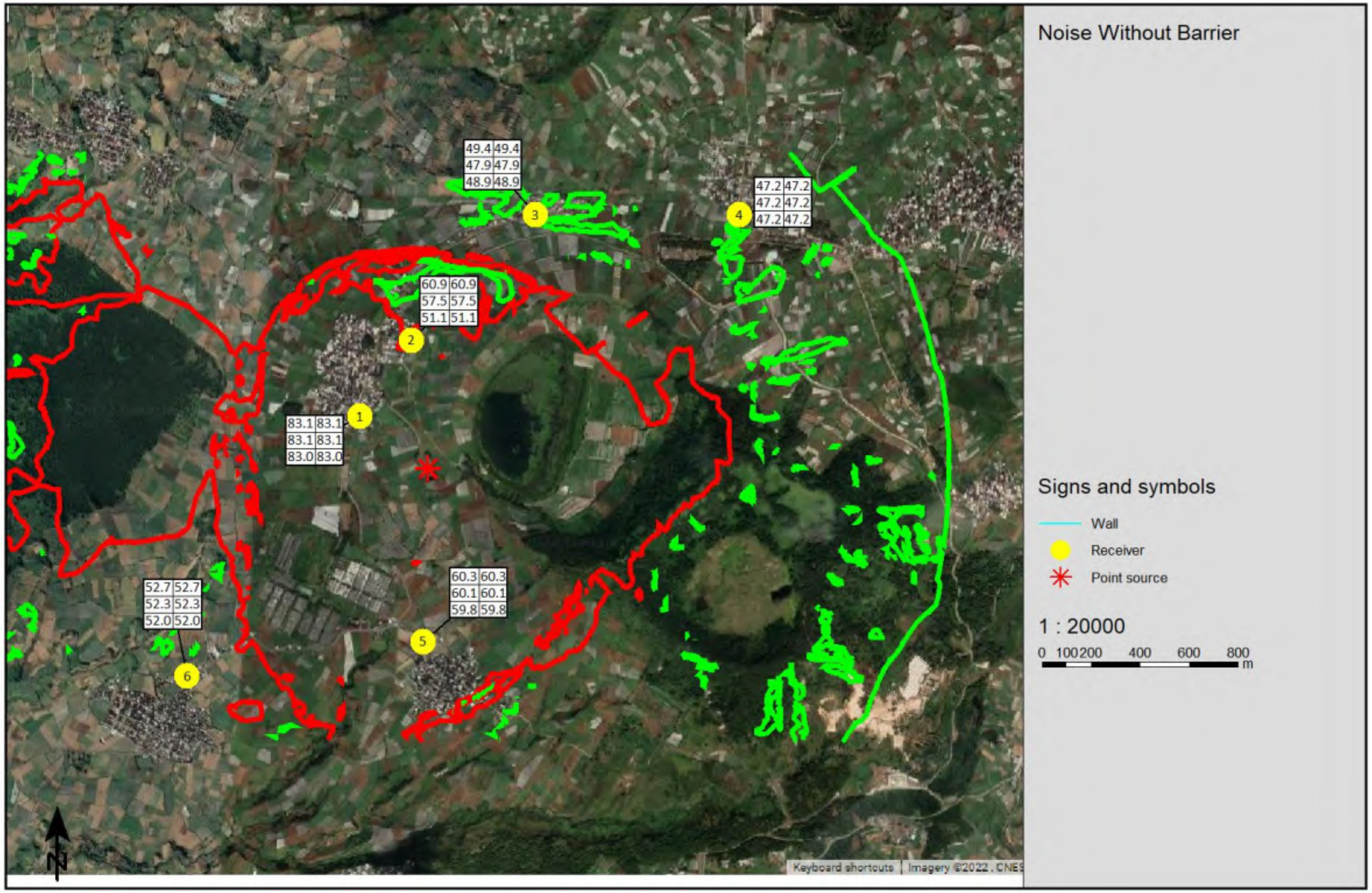


Figure 4. Noise Contribution At Night With Sound Barrier

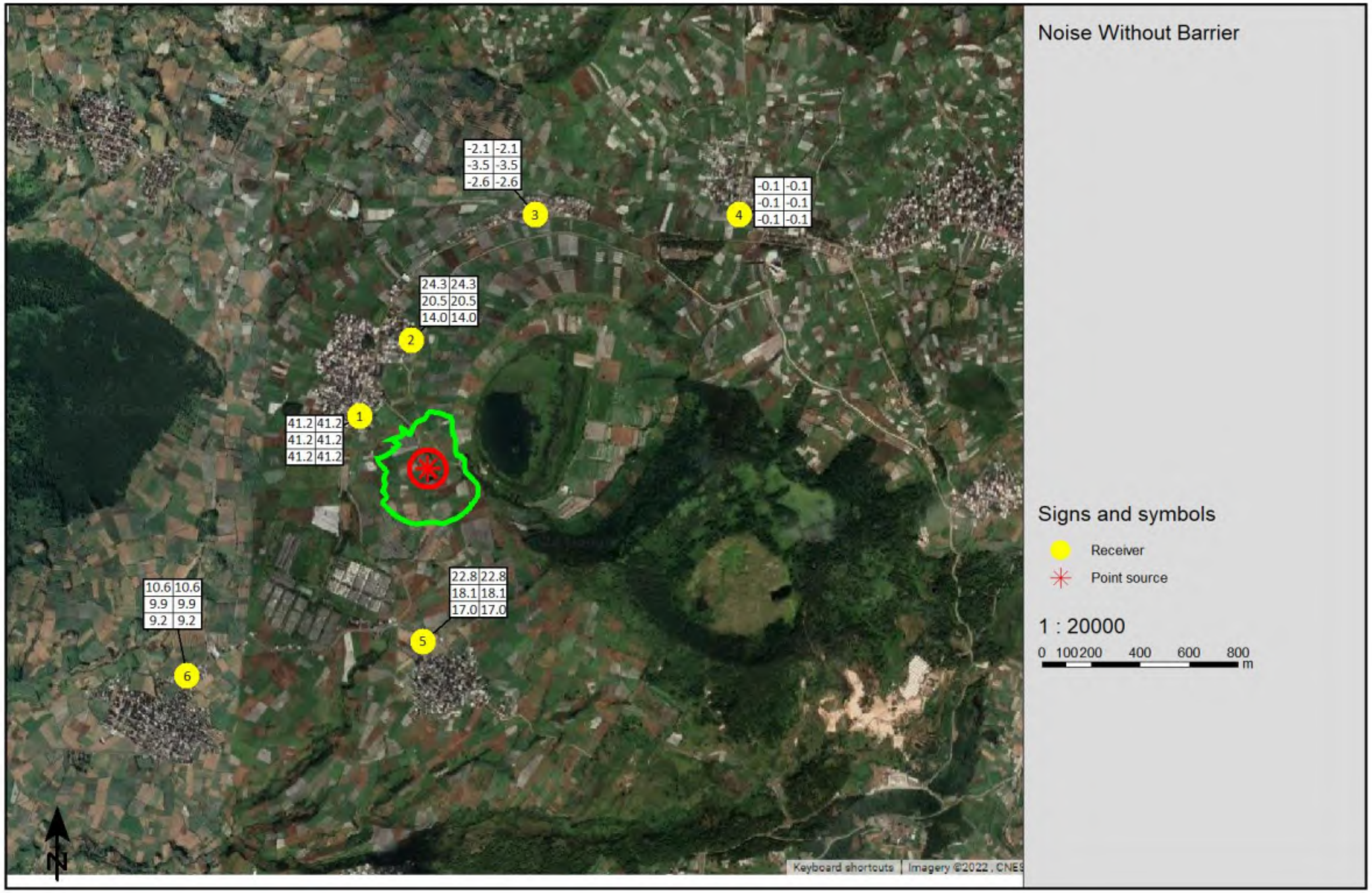


Figure 5. Noise Contribution At Day With Sound Barrier

4 Conclusion

The modelling result show that, without the sound barrier the modeled receptors provide an exceedance of noise levels with noise contributions ranging from 0.7-32.9 dBA during the day and 1.1-42.9 dBA during the night.

The sound barrier receptors that are modeled also provide exceedance of noise levels, but with a generally low noise contribution, which ranges from 4.8-28 dBA during the day and 2.2-38 dBA at night.

Installing a sound barrier reduces noise contribution by around 1.2-7.5 dBA.

Appendix 5 H_2S Modelling of Proposed Dieng 2 Power Plant

PT Geo Dipa Energi (Persero)

DIENG 2 & PATUHA 2 PROJECT

AECOM

(PAD 12) DIENG UNIT 2 POWER PLANT H_2S DISPERSION MODELLING REPORT

ISSUED FOR APPROVAL

A	21-Dec-22	Issued for Approval	Yeremiah	Novianto HS	Grant Morris	GDE
Rev.	**Date**	**Purpose**	**Issued**	**Checked**	**Approved**	**COMPANY**

RECORD OF REVISION

The revision listed below have been incorporated in this document

REV NO.	SECTION	PAGE NO.	DESCRIPTION OF CHANGES	DATE

TABLE OF CONTENTS

1. INTRODUCTION

1.1. Background

PT Geodipa Dieng plans to develop the Dieng Unit 2 geothermal power plant project with a capacity of 55 MW. The development of the Geothermal Field and the Construction of the Geothermal Power Plant (PLTP) are located in Wonosobo Regency, Central Java Province. This geothermal power plant activity is a source of H_2S emissions.

1.2. Objective

The purpose of this report is to model the emission distribution of the normal operation of the Unit 2 generator. This modeling needs to be done to see the contribution of H_2S emissions to sensitive receptors around the activity. This report was prepared in accordance with the British Columbia Air Quality Dispersion Modeling Guidance (BC Ministry of Environment, 2015).

2. SCOPE

This emission distribution modeling study covers Dieng Unit 2. The modeling is carried out using the AERMOD View air distribution model. The concentration distribution obtained is presented in the form of concentration contours. For discrete receptor points, an impact assessment is carried out on sensitive receptors in the vicinity of the location, namely settlements and surrounding fields. In summary, this report provides information on:

- Identification of sensitive receptors in the vicinity that are likely to be affected by emissions from Dieng Unit 2 operations;
- Description of the modeling methodology including meteorological input parameters, topography, and emission rates;
- Study of the contribution of increased H_2S concentrations due to the operation of Dieng Unit 2 based on the standard criteria for odor levels.

3. METHOD

This chapter describes the method was used to run H_2S dispersion simulation or modelling for proposed D2 Power Plant.

3.1. Dispersion Model

This study uses the AERMET meteorological processor and the AERMOD dispersion model. Summary of data and parameters used are presented in Table 3-1.

AERMET is a meteorological model that calculates hourly wind and temperature parameters on a three-dimensional grid. Related two-dimensional parameters such as mixing height, surface characteristics, and dispersion properties are also displayed by AERMET. AERMET product is a meteorological file used by AERMOD to predict the movement of air pollutants.

AERMOD is a three-dimensional non-steady-state Gaussian puff model developed by the US Environmental Protection Agency (USEPA) for use in conditions where the basic Gaussian model is ineffective. This condition includes stagnant conditions, which are characterized by conditions with no wind or very low wind speeds with changing directions. The AERMOD modeling system is able to model wind changes and spatial turbulence. This is important for modeling in the sites with complex topography, long-distance transport, and near windless or calm conditions. Thus, AERMOD used for modeling in this study has accuracy about 40%.

Table 3-1 Modelling Input Parameters

Parameter	Input
AERMET	
Meteorological grid	12 km x 12 km
Coordinate of grid centre reference	378255; 9203648 (Zona: 49S)
Vertical grid cell height	0, 20, 40, 80, 160, 300, 600, 1000, 1500, 2200 dan 3000
Simulation time	1 year (2021)
Surface meteorological station	The output of the AERMET numerical prediction model
Upper air meteorological station	Using 3-dimensional grid prognostic data as the initial prediction of AERMET wind fields
Topographical data	Altitude taken from SRTM1
AERMOD	
Modelling domain	Computation grid: 5 km x 5 km
Coordinate of grid centre reference	Grid resolution: 50 m
Modelling grid resolution for mapping	Total 5 discrete receptors were added around Unit 2
Number of discrete receptors	Turbulence based coefficient
Dispersion algorithm	8,760 hours
Number of modelling hours	1 year (1 January 2021-31 December 2021)

3.2. Determination of Model Input

3.2.1. Source of Emission

In this study, five cooling towers are determined as point sources, with total emission rate is 155.75 g/s. The emission source parameters used as modeling input are presented in Table 3-2.

Table 3-2 Source Emission Parameters

Parameter	Unit	Value
Number of sources	-	5
Height	m	20.33
Diameter	m	10
Total Volumetric flow rate	m^3/s	3,738

Parameter	Unit	Value
Total H_2S emission rate	g/s	115.75

3.2.2. Meteorological Baseline

Meteorological conditions determine the direction of movement and distribution of wind-borne emissions. Key meteorological parameters include air temperature, wind direction and speed, and mixing height. For modeling purposes, hourly data is required in the modeling period for each key parameter. For this reason, the NCAR (National Center for Atmospheric Research) MM5 (Mesoscale Model) prognostic data was used, obtained from Lakes Environmental, for the period January 2021 to December 31 of 2021 (1 year). This data is then processed by AERMET, which is a meteorological data processor for AERMOD.

Based on Lakes data, the dominant wind directions in the study area are East, Southeast, Southwest and Northwest. East winds dominate with a frequency of 14.9%, Southeast winds 14.0%, Southwest winds 9.3%, and Northwest winds 4.6%. The percentage of calm conditions is 1.28%. The average wind speed is 2.93 m/s. The wind rose around the Unit 2 location is presented in Figure 3-1.

3.2.3. Modelling Domain and Representative Receptor Network

For this study, emission distributions were modeled in an area of 10.0 km x 10.0 km. The scope of this area includes all nearby settlements in the study area.

For the purposes of AERMOD input, receptor points are modeled in the form of a representative receptor network (grid). The distribution of pollutant concentrations is calculated based on this receptor network. In this model, the receptor network is modeled as a Cartesian network, and the receptor points are placed in a 100 m x 100 m grid. Thus, there are 10,000 representative receptor points.

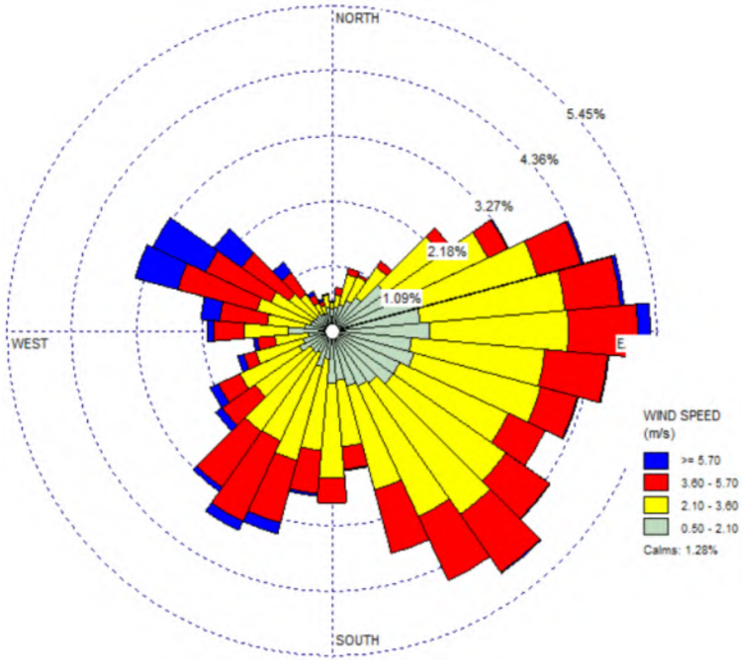


Figure 3-1 Wind Rose Based on Lakes Data (Period of 1 January 2021-31 December 2021)

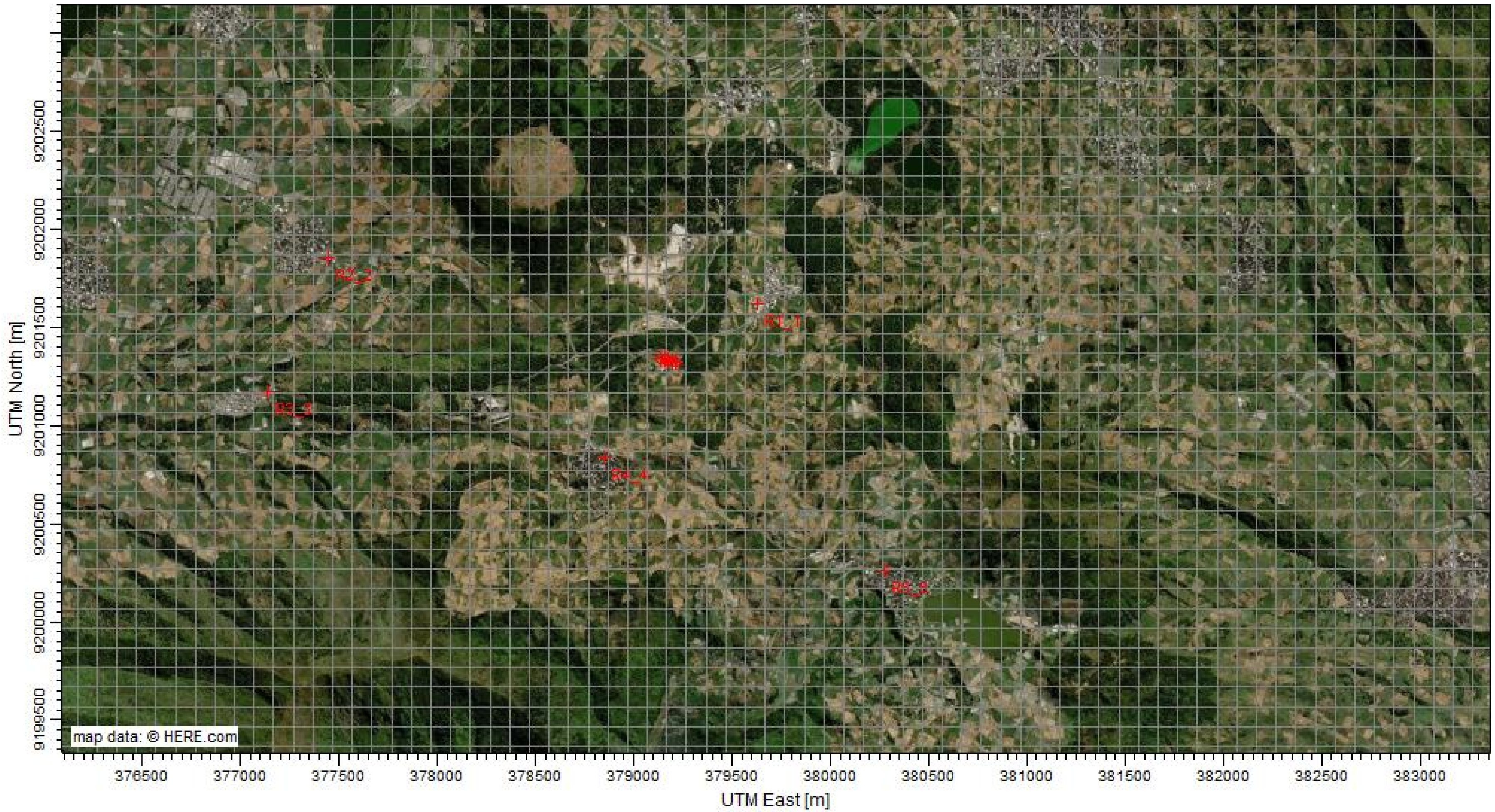


Figure 3-2 Modelling Domain, Source Location and Discrete Receptors

3.2.4. Sensitive Receptor

The impact of emissions on sensitive receptors has received major attention. These receptors are settlements around the activity site. In addition to the 10,000 receptor points in the grid, 5 discrete receptor points were added to the model (Figure 3-2). These discrete receptors represent sensitive receptors (settlements) or potential exposures to communities working in the fields surrounding Unit 2.

Table 3-3 Discrete Receptor Coordinate

No.	Receptor	X	Y
1	R1, Siterus	379629	9201616
2	R2, Karang Tengah	377447	9201857
3	R3, Jamur	377135	9201175
4	R4, Bakal	378847	9200840
5	R5, Sikunang	380271	9200263

3.2.5. Topography

Topography affects the distribution of pollutant concentrations at certain points. For that topographic data is needed to input the AERMOD model. For this study, topographical data with a resolution of 30 m from SRTM1 was used.

3.3. Ambient Threshold

The ambient air H_2S concentration as predicted by AERMOD View was compared with the national and international odor level standards. The national level standard refers to the Decree of the Minister of Environment No. 50 of 1996 concerning Odor Level Standards, where the limit value for H_2S is 0.02 ppm (0.03 mg/m^3) (Menteri Negara Lingkungan Hidup, 1996).

4. MODELLING RESULTS

The results of H_2S distribution modeling are presented in Figure 3. The maximum concentrations in the grid and at each discrete receptor point are presented in Table 4-1 (1 hour average), Table 4-2 (24 hours average), and Table 4-3 (annual average).

Table 4-1 1-Hour Maximum Concentration of Receptors in grid and Discrete Receptors

No.	Receptor	X	Y	H_2S		Date and Time	Wind Speed (m/s)
				ppm	mg/m^3		
1	In grid	378568	9201967	2,343	3,515	11/14; 23	1,65
2	R1, Siterus	379629	9201616	0,353	0,530	1/27; 01	6,51
3	R2, Karang Tengah	377447	9201857	0,106	0,159	7/25; 05	4,94
4	R3, Jamur	377135	9201175	0,070	0,105	7/26; 07	4,16
5	R4, Bakal	378847	9200840	0,147	0,221	12/16; 10	0,54
6	R5, Sikunang	380271	9200263	0,125	0,188	2/27; 05	4,83

For a 1-hour average time, the maximum concentration of H_2S in the grid is 2.343 ppm (3.515 mg/m^3) at the point with coordinates 378568; 9201967; at a distance of ± 850 m to the Northwest of Unit 2 (Figure 4-1). It can be seen that for 1 hour the maximum concentration at all discrete receptor locations is above 0.02 ppm. The entire modeling domain covering an area of 5 km x 5 km is within the range of concentrations > 0.02 ppm, so it has the potential to smell H_2S.

For 24-hour averaging time, the maximum concentration of H_2S in the grid is 0.567 ppm (0.851 mg/m^3) at the point with coordinates 379368; 9201267; at a distance of ± 240 m southeast of Unit 2 (Figure 4-1). The 24-hour average data distribution for all receptors, both in grid and discrete is presented in Figure 3. It was seen that the median value is 0.0213 ppm and 25.3% of modeling domain area has H_2S maximum concentration concentrations above 0.02 ppm.

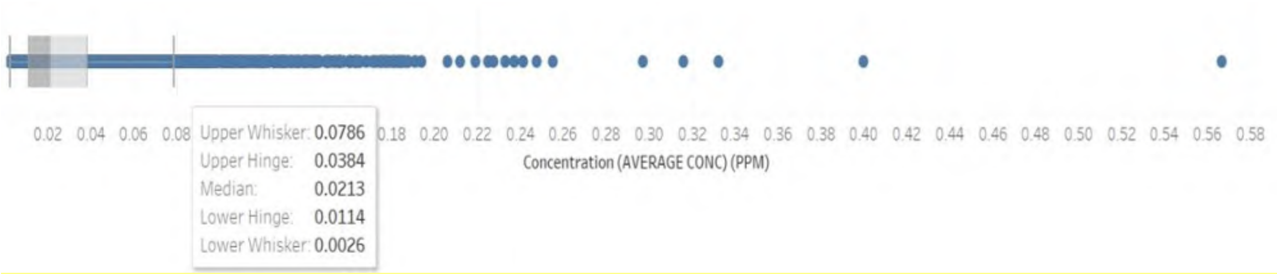


Figure 4-1 Boxplot of 24 Hours Averaging Time

In Table 4-2, it was seen that all discrete receptor points have a maximum concentration for an average of 24 hours which is relatively low compared to the maximum concentration of receptors in the grid. At five discrete receptors, all of them have a maximum concentration above 0.02 ppm. The lowest concentrations were found in R2 (Central Coral) and R3 (Mushrooms) for a 24-hour average of 0.026 ppm, which is practically same as the standard odour level of 0.02 ppm. There is only one exceeded point with a H_2S maximum concentration significantly above 0.02 ppm, namely R1 (Siterus). The H_2S maximum concentration at this point is 0.146 ppm or the highest compared to the other points with a maximum concentration above 0.02 ppm.

Table 4-2 24-Hours Maximum Concentration of Receptors in grid and Discrete Receptors

No.	Receptor	X	Y	H_2S		Date	Wind Speed (m/s)
				ppm	mg/m^3		
1	In grid	379368	9201267	0.567	0.851	1/29	0.4 - 3.58
2	R1, Siterus	379629	9201616	0.146	0.219	1/27	3.3 - 6.89
3	R2, Karang Tengah	377447	9201857	0.026	0.039	9/23	2.17 - 6.19
4	R3, Jamur	377135	9201175	0.026	0.039	7/11	3.5 - 7.16
5	R4, Bakal	378847	9200840	0.037	0.056	9/14	0.28 - 5.33
6	R5, Sikunang	380271	9200263	0.043	0.065	2/25	4.35 - 7.07

For the annual average, the maximum concentration of H_2S in the grid is 0.020 ppm (0.030 mg/m^3) at the point with coordinates 378668 and 9201967; at approximately 800 m to the Northwest of Unit 2 (Figure 4-4). Table 4-3 shows that the annual average maximum concentration at each discrete receptor point is very low. It advised that there is no potential impact to the human health due to annual exposure, except inconvenient condition due to fugitive odor when all these maximum concentrations in the grid and at some points of receptor are below the threshold for health problems (10-20 ppm for eye irritation endpoints). Long-term exposure at a concentration of 1 ppm has no impact on health (WHO, 2003).

Table 4-3 Annual H_2S Maximum Concentration of Receptors in grid and Discrete Receptors

No.	Receptor	X	Y	H_2S	
				ppm	mg/m^3
1	In grid	378668	9201967	0,020	0,030
2	R1, Siterus	376125	9203937	0,006	0,009
3	R2, Karang Tengah	374801	9201576	0,003	0,005
4	R3, Jamur	376824	9202096	0,003	0,005
5	R4, Bakal	377231	9202022	0,004	0,005
6	R5, Sikunang	376143	9201935	0,003	0,005

To see the intensity of disturbances, an analysis was carried out on the number of days exceeding the threshold value based on KepMenLH No. 50 of 1996 (H_2S concentration > 0.02) for each discrete receptor point. Of note, the regulation does not specifically advise the acceptable average number of days in a year when the H_2S maximum concentration at receptors in grid and discrete receptors more than 0.02 ppm. Details on the average number of days > 0.02 ppm (0.03 mg/m^3) per year are presented in Table 4-4. At the five discrete receptors the number of days > 0.02 ppm ranged from 3-27 days. As part analysis at Siterus, the number of days > 0.02 ppm reached 27 days (7%), while other discrete receptors only 3-8 days (1-2%). The average daily occurrence where the H_2S concentration is more than 0.02 ppm is more of an odour nuisance rather than health issue. It does not occur continuously and relatively low concentrations, far below the toxic concentration level of 10 ppm according to the WHO Standards.

Table 4-4 Number of Days Where H_2S Exceeding Odour Level Standard

No.	Receptor	Number of Days H_2S > 0,02 ppm	% in 1 Year
1	In Grid	113	31
2	R1, Siterus	27	7
3	R2, Karang Tengah	3	1
4	R3, Jamur	6	2
5	R4, Bakal	3	1
6	R5, Sikunang	8	2

Table 4-4 shows that the number of days exceeding the odour level standard at Siterus is 27 days or 7% in a year. Several European countries applies the percentage of number of days less than 5% exceedance in a year as acceptable annual H_2S maximum concentration of receptors. To achieve this acceptable number of days exceeding the odour level standard, the emission rate needs to be reduced from 115.75 g/s to 77.15 g/s. Therefore, the number of days exceeding the quality standard at Siterus is 16 days or 4% with an emission rate of

77.15 g/s. For other discrete receptor sites, the number of days exceeding the odour level standard ranged between 0 and 6 days (0-2%) in a year (Table 4-5).

Table 4-5 Number of Days during H_2S Concentration Exceedance (Emission Rate 77,15 g/s)

No.	**Receptor**	**Number of Days H_2S > 0,02 ppm**	**% in 1 Year**
1	In Grid	90	25
2	R1, Siterus	16	4
3	R2, Karang Tengah	0	0
4	R3, Jamur	0	0
5	R4, Bakal	2	1
6	R5, Sikunang	6	2

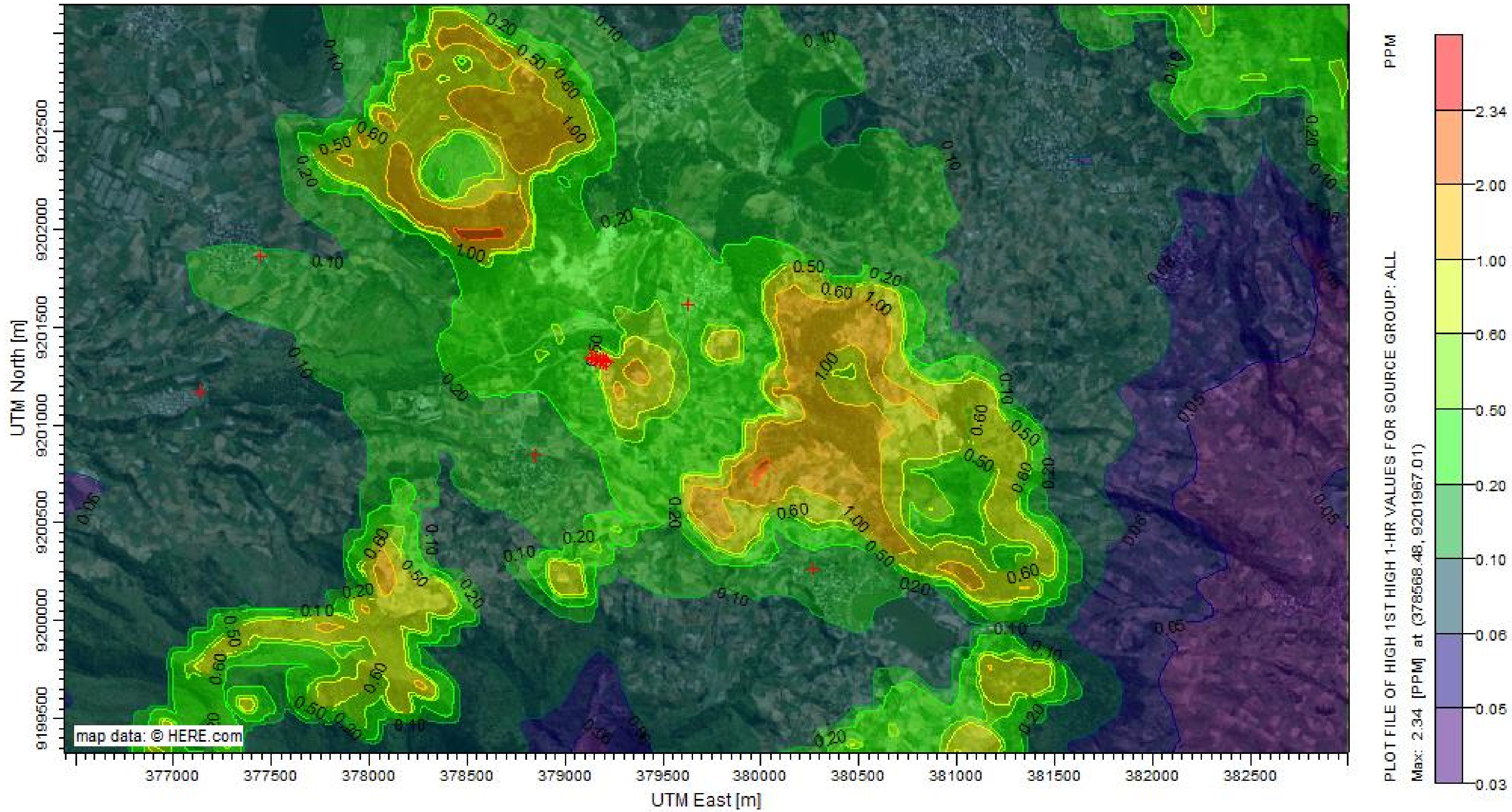


Figure 4-2 Isopleth H_2S (ppm) 1-Hour Average Time

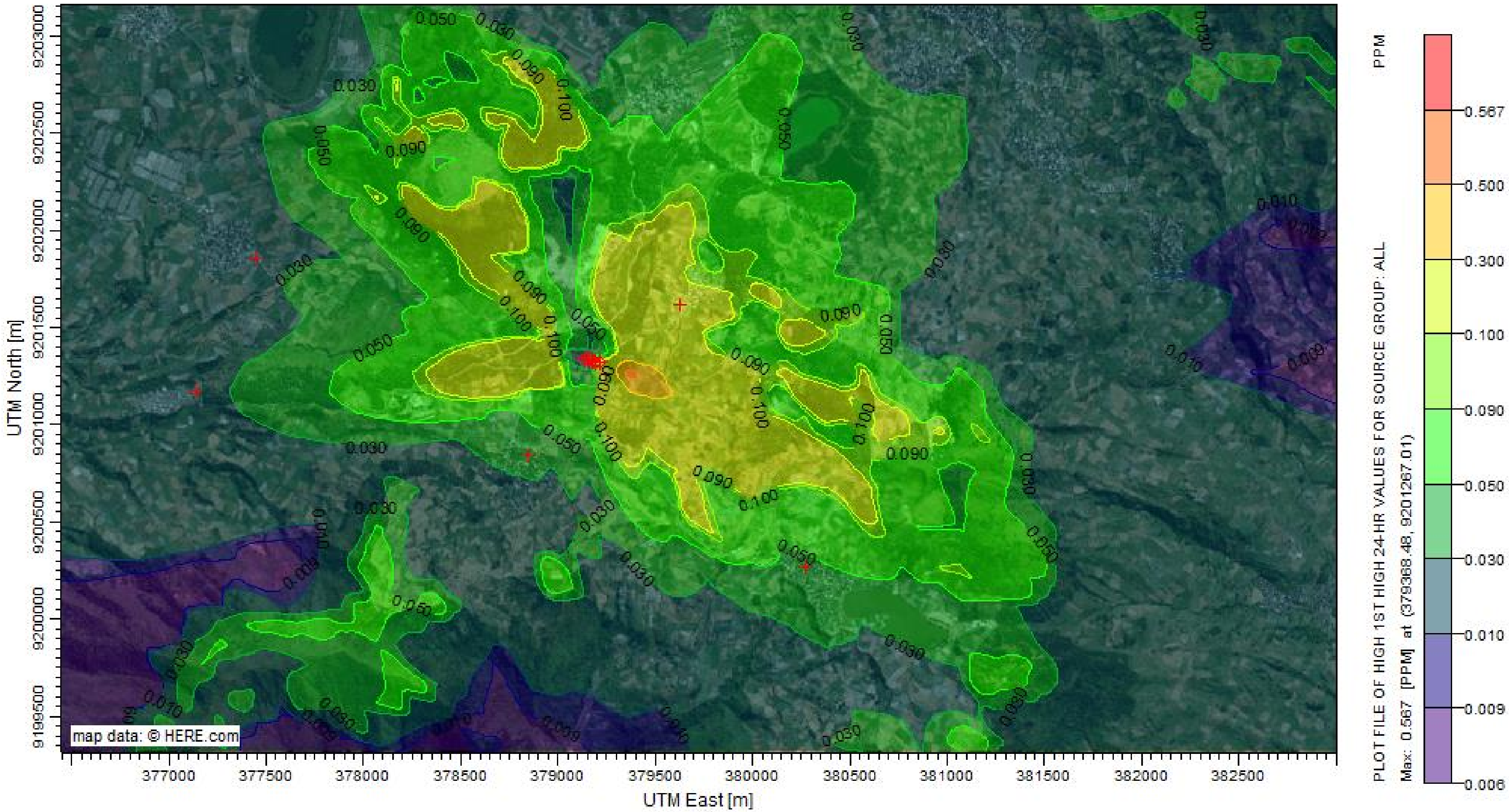


Figure 4-3 Isopleth of H_2S (ppm) 24-Hours Average

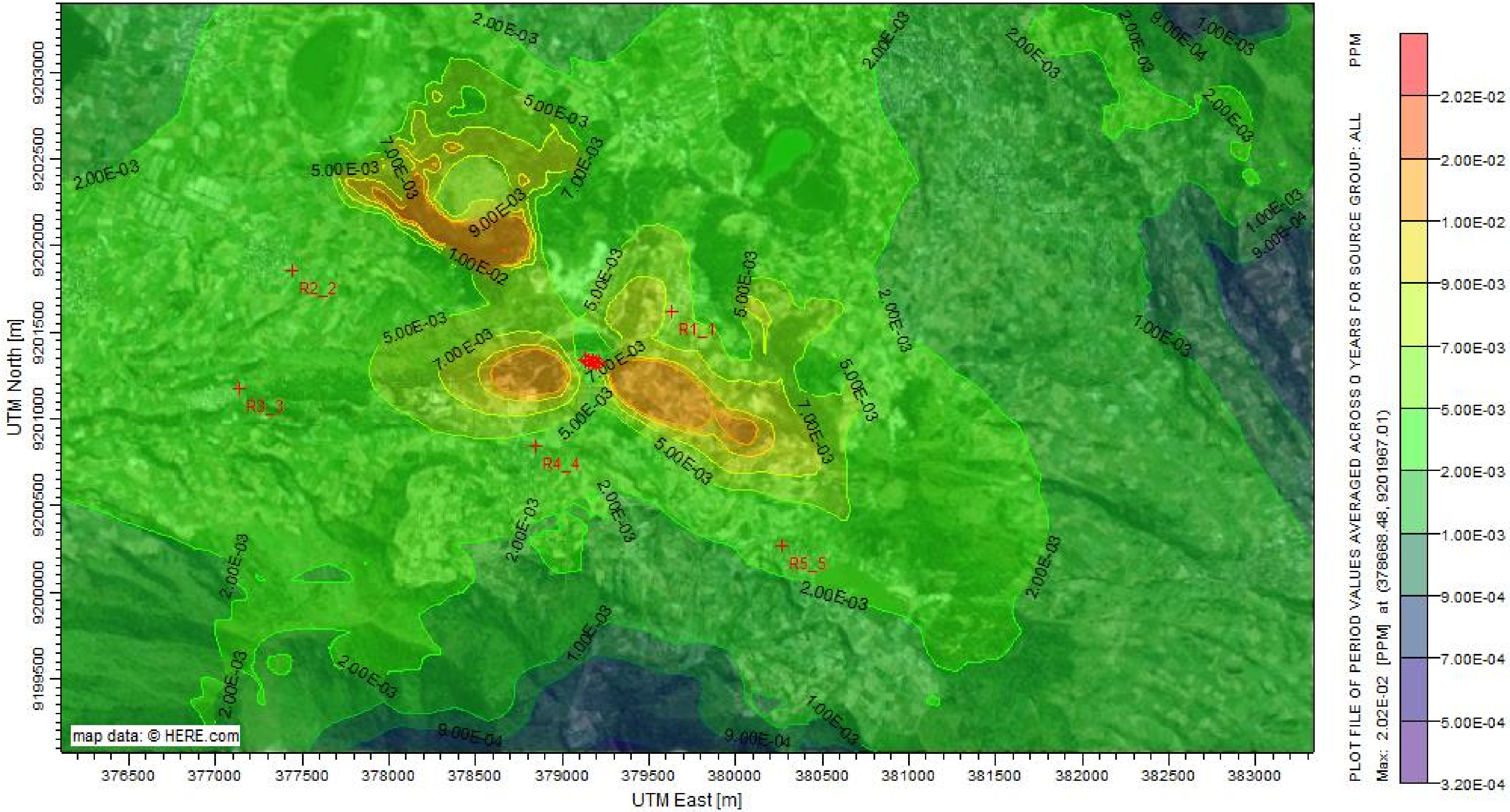


Figure 4-4 Isopleth of Annual Average H_2S (ppm)

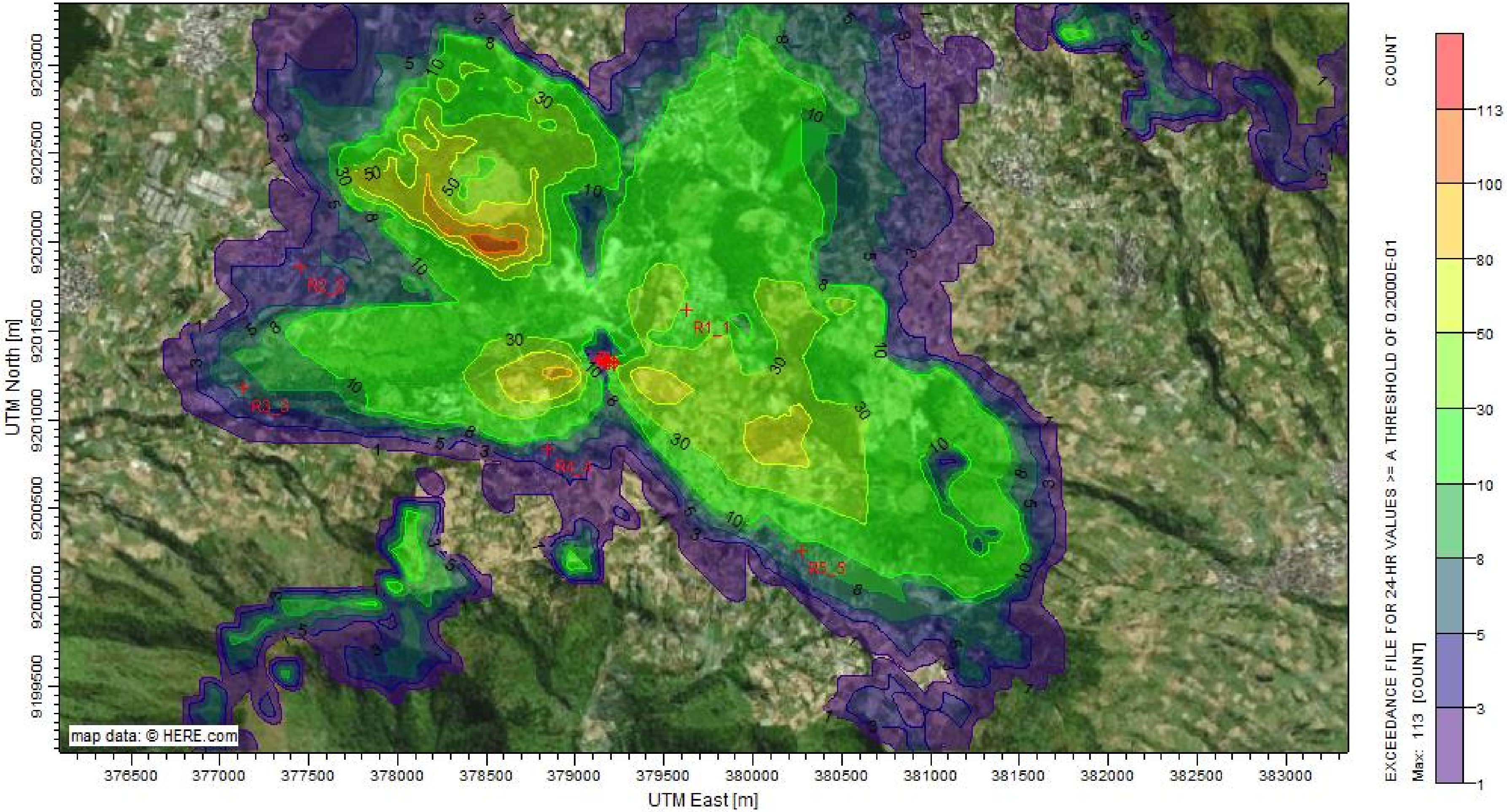


Figure 4-5 Number of Days Where H_2S > 0,02 ppm in 1 Year

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This report presents the results of modeling the distribution of H_2S Dieng Unit 2 at Pad 12 using the AERMOD View dispersion model and assessing the potential for odor disturbances at sensitive receptor points based on information and assumptions GDE has so far.

- For a 1-hour average, the maximum concentration is 2.343 ppm (3.515 mg/m^3) at a location located ± 850 m Northwest of Unit 2 Pad 12. In the entire modeling domain of 5 km x 5 km there is a potential for odour.
- For a 24-hour average, the median value is 0.0213 ppm and 25.3% of modeling domain area has H_2S maximum concentration concentrations above 0.02 ppm. The maximum concentration was 0.567 ppm (0.851 mg/m^3) at a location located ± 240 m in the Southeast of Unit 2. The R2 (Central Coral) and R3 (Mushroom) receptor points gave a daily maximum concentration of 0.026 ppm. Other receptor points give a maximum concentration of 0.037- 0.146 ppm.
- For the annual average, the maximum concentration of H_2S in the grid is 0.020 ppm (0.030 mg/m^3) at a distance of ± 800 m in the Northwest of Unit 2.
- The number of days H_2S concentration > 0.02 ppm is 3-27 days or 1-7% in a year.
- Maximum exposure of 2.343 ppm (3.515 mg/m^3) is odour nuisance, has no impact on health.

5.2. Recommendation

An abatement plant is not necessary to be included in the plant design. A provision might be made for an abatement plant and only install an abatement plant if subsequent AMDAL monitoring shows non-compliance during plant operation.

6. REFERENCES

Menteri Negara Lingkungan Hidup. (1996). *Keputusan Menteri Negara Lingkungan Hidup Nomor: Kep-50/MENLH/11/1996 Tentang Baku Tingkat Kebauan. .* Jakarta: Menteri Negara Lingkungan Hidup.

WHO. (2003). *Hydrogen Suphide: Human Health Aspects.* WHO.

Appendix 6 Land Slide Incident at Wellpad-9

Project Management Unit Dieng 2

Land Slide Incident at Wellpad-9

27 December 2022

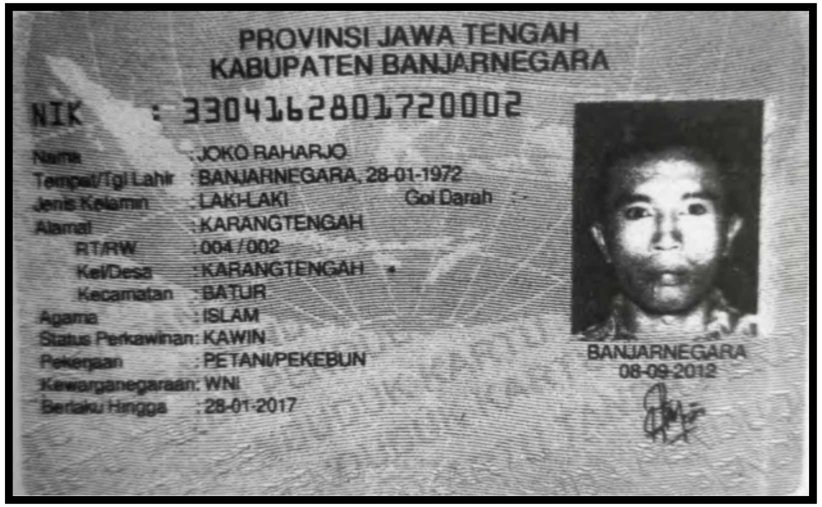
PT Geo Dipa Energi (Persero) PMU Dieng 2
Jl Raya Wonosobo – Batur PO BOX 01
Banjarnegara, Central Java

Event Summary

On Tuesday 27/12/22 at 05.30 AM, Injured Person (IP) was on his break and going to perform morning prayer (non-work-related activity), located behind the office porta camp. The porta-camp was in front of the cliff.
While taking the ablution, suddenly the landslide occurred and hit IP. Some soil covered him from thigh to toe. The loud noise caused by the land slide was heard by his colleagues and they come to check the location. They found the IP was conscious, they responded quickly to rescue IP and the IP Team Leader brought him to GDE medical facility for first aid treatment and observation and then after the observation IP was refer to hospital for further medical treatment. The location was secured and barricaded by the team. At 08.10 AM another land slide occurred at the adjacent location. At 09.00 AM GDE's KTPB notified the event to authorized person (KAIP) in EBTKE

Immediate action taken

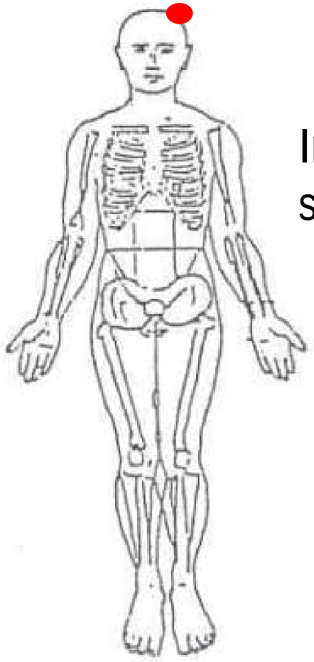
- Stop work authority
- Give first aid and medical observation to IP
- Secure and barricade the location
- Move office porta camp office to a safe location
- Notify authorized person (KAIP) in EBTKE
- Safety Stand Down
- Investigation initiated



Accident Detail

- Location, Date & Time
  - Location wellpad 9
  - Tuesday, 27 December 2022
  - 05.30 AM
- Witness
  - Musa (Leader), Eko Agustiawan (Operator WT), Amrul (Operator WT), Ebar (Operator)
- Contractor
  - PT Depriwangga
- Supervision
  - PT Jacobs (PMC Subsurface)
  - Subsurface Dept (PMU GDE)
- Impact
  - IP’s head hit by a falling rock
  - No property damage
  - No environmental impact
  - No social impact

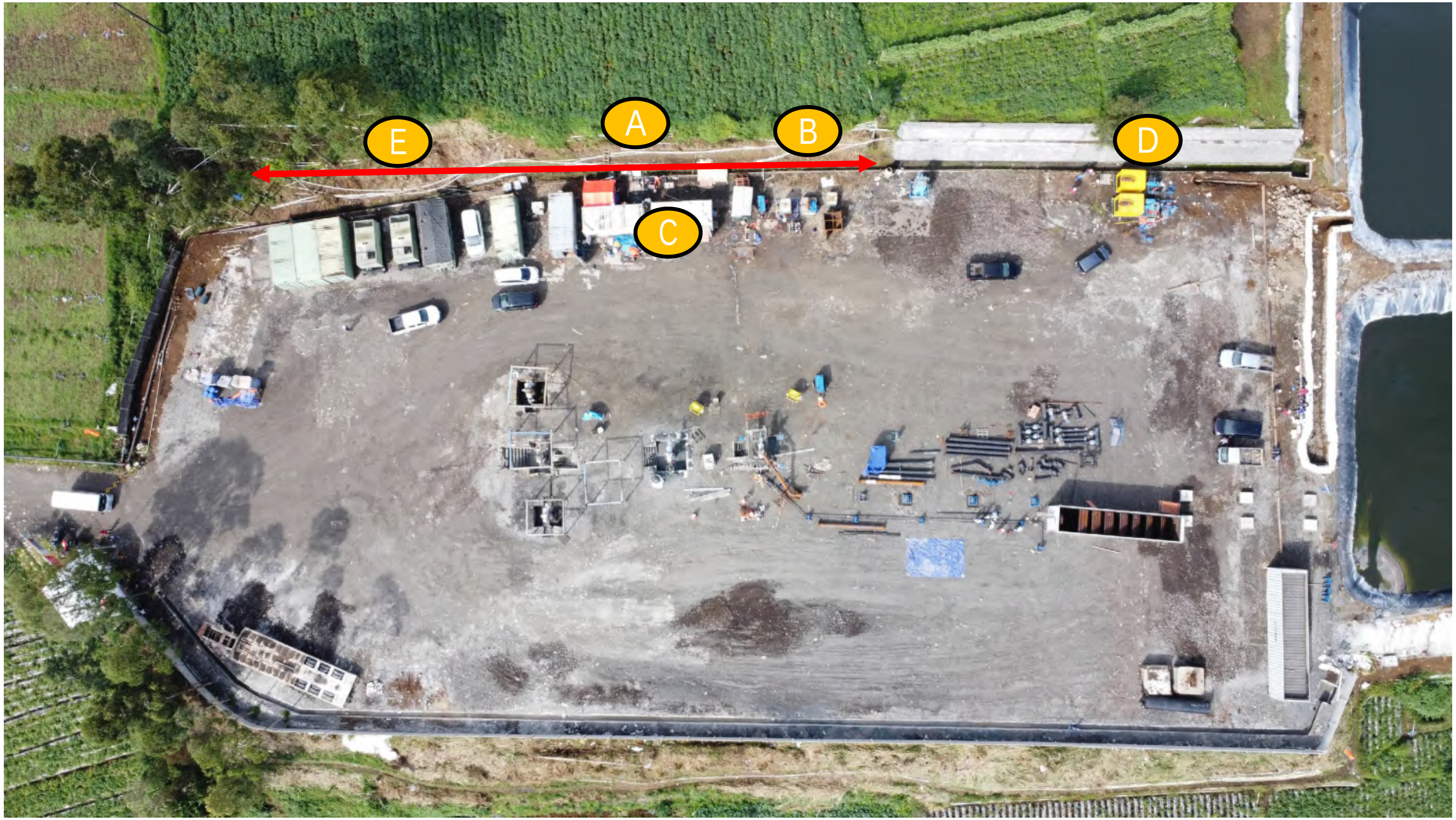
IP Name : Joko Raharjo
Gender : Male
Age : 57 Y.O
Company : PT Depriwangga
Dept : Well Test Operation
Position : Operator
Working Status : Local Hire
Working Experience : 10 Month



Injury Part : Top Left side head

Latest update of IP condition (28/12/22)
Operation and medical treatment successfully conducted. IP is in good condition, able to speak and move normally

Well pad – 9



Legend :
A : 1st Land Slide
B : 2nd Land Slide
C : Initial porta camp position
D : Additional retaining wall
E : Existing retaining wall

Pictures

1st land slide

2nd land slide

Length : ± 10 m
Height : ± 4 m

Fact Finding

GEO DIPA ENERGI

MEMO

Nomor : 119.MM/DNG1.00-GDE/XII/2022

Kepada : Seluruh Pegawai dan Mitra Kerja di Lingkungan GDE Unit Dieng
Dari : General Manager
Tanggal : 07 Desember 2022
Perihal : **Imbauan Waspada Longsor**

Dengan hormat,

Sehubungan dengan curah hujan di kawasan Dieng pada beberapa waktu terakhir cukup tinggi serta mengingat degradasi lingkungan berupa erosi, dengan ini kami mengimbau kepada seluruh pegawai dan mitra kerja untuk selalu waspada bahaya longsor. Maka dari itu, dimohon kepada masing-masing divisi selalu memonitoring wilayah kerja lapangan untuk mengantisipasi bencana longsor terjadi.

Demikian disampaikan, agar menjadi perhatian. Atas kerjasamanya disampaikan terima kasih.

Herdian Ardi Febrianto

Memo from GM: reminder of potential landslide (07/12/22)

EWS inspection by 22/12/2022

Existing retaining wall constructed during HCE era (> 30 years ago)

PERINGATAN DINI (TANGGAL 27 – 29 DESEMBER 2022)

Waspada hujan lebat (>50mm/hari) di wilayah: Aceh, Sumatera Utara, Sumatera Barat, Sumatera Selatan, Lampung, Banten, Jawa Barat, DKI Jakarta, Jawa Tengah, Jawa Timur, Bali, Nusa Tenggara Barat dan Nusa Tenggara Timur, Yogyakarta, Kalimantan Tengah, Kalimantan Timur, Sulawesi Utara, Gorontalo, Sulawesi Tengah, Sulawesi Selatan, Sulawesi Tenggara, Maluku dan Papua.

Sedangkan potensi hujan dengan intensitas signifikan selama periode tanggal 27 Desember 2022 - 02 Januari 2023 perlu diwaspadai di beberapa wilayah sebagai berikut:

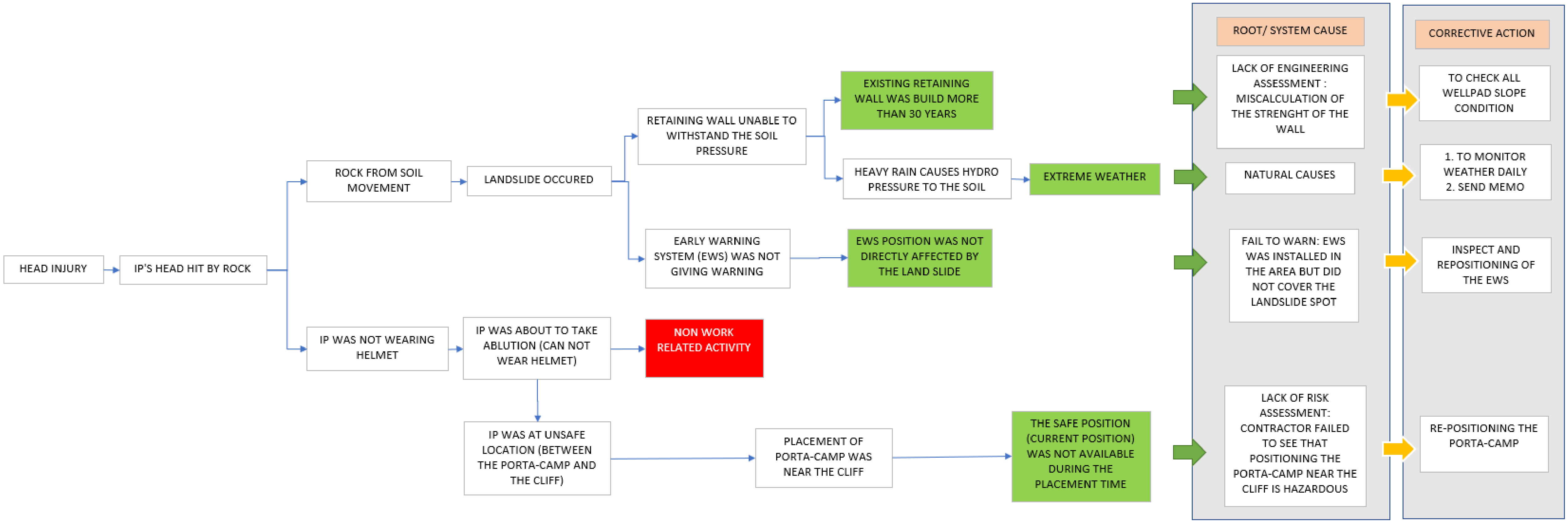
Potensi **HUJAN LEBAT** hingga **SANGAT LEBAT** dapat terjadi di sebagian wilayah :

1. Banten
2. Jawa Barat
3. DKI Jakarta
4. Jawa Tengah
5. DI Yogyakarta

Heavy rainfall during the week

https://www.bmkg.go.id/press-release/?p=update-perkembangan-potensi-cuaca-ekstrem-20221227&tag=press-release&lang=ID

Root Cause Analysis (using Logic tree)



Corrective Action

Action	Target	Status
Conduct Safety Stand Down meeting for all GDE Employee and contractor	27 Dec 2022	DONE
To reposition the office porta-camp	27 Dec 2022	DONE
Rechecking & inspection Early Warning System (EWS) devices condition & position	27 Dec 2022	DONE
Existing retaining wall inspection and repair	20 Jan 2023	On-going
To send out memo of hydrometeorology calamity from General Manager	27 Dec 2022	DONE
Roll out awareness training related to: - Extreme weather condition - Landslide : potential & how to identify - Emergency response communication	07 Jan 2023	On-going
To assess other well pad area for landslide potential	07 Jan 2023	On-going
To conduct daily safety patrol prior of start working	Daily	On-going

Corrective Action Pictures

Safety Stand Down

PRA | Meeting Attendance List & Minutes of Meeting Form | FOR-CP-QHSE-04.01Rev.00

Tanggal / Date : 28 Desember 2022 Time : 05:30 WIB

Topic / Topik : Tailgate Safety Meeting Day Shift / SSD Land Slide at Pad-9

Venue / Tempat : RIG PRA #09 / SLR – G-29B

- [x] Pre-Tours Meeting
- [ ] Pre-Job Meeting
- [ ] Stand Down Meeting
- [ ] Rig Weekly Meeting
- [ ] QHSE Monthly Meeting
- [ ] Weekly Manager Meeting
- [ ] Orientation / Induction
- [ ] Coffee Morning Meeting
- [ ] QHSE Committee Meeting
- [ ] Management Review Meeting
- [ ] KPI Review Meeting
- [ ] Management Visit
- [ ] Pre-spud Meeting
- [ ] Others

No	Name / Nama	Nama Perusahaan /Company Name	Jabatan / Position	Signature / Tanda Tangan
1	[illegible]	PT. NOV	[illegible]	
2	Tutut S	PRA	Driller	
3	Parnco	PRA	[illegible]	

Porta-camp reposition

After porta-camp reposition

Porta-camp reposition

Current Porta-camp position

Corrective Action Pictures

EWS inspection and relocation

GEO DIPA ENERGI

MEMO

Nomor : 121.MM/DNG1.00-GDE/XII/2022

Kepada : Seluruh Pegawai dan Mitra Kerja di Lingkungan GDE Unit Dieng
Dari : General Manager
Tanggal : 27 Desember 2022
Perihal : **Himbauan Waspada Bencana Hidrometrologi**

Dengan hormat,

Mengingat curah hujan di kawasan Dieng pada beberapa waktu terakhir cukup tinggi serta degradasi lingkungan berupa erosi, dengan ini kami mengimbau kepada seluruh pegawai dan mitra kerja untuk selalu waspada bahaya bencana hidrometrologi (curah hujan tinggi, tanah longsor, angin kencang dan pohon tumbang). Maka dari itu, dimohon kepada masing-masing divisi untuk melakukan mitigasi di wilayah kerja untuk mengantisipasi bencana hidrometrologi dimaksud terjadi.

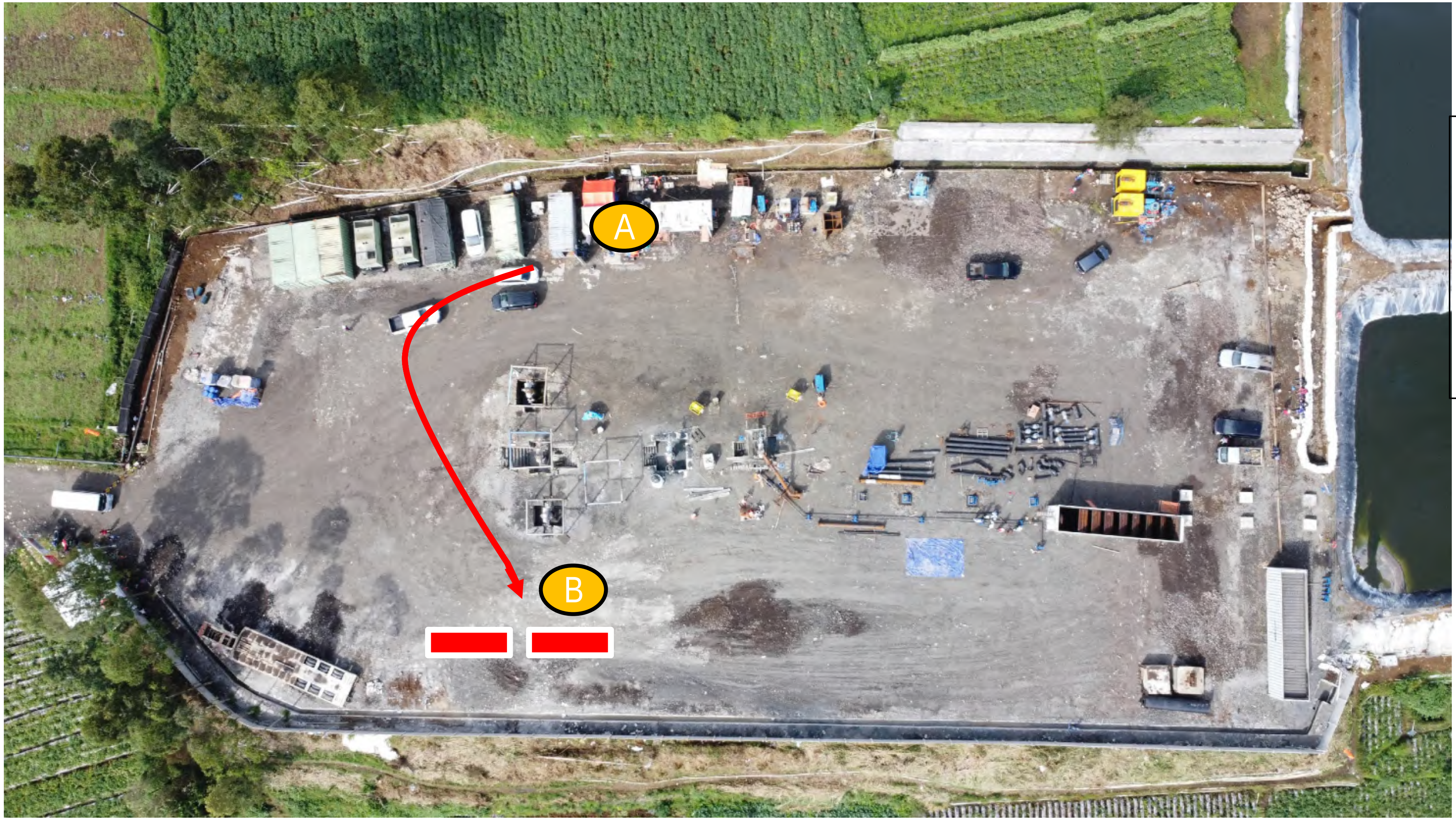
Sebagai bentuk antisipasi keselamatan di lingkungan kerja, kami juga mengimbau kepada seluruh pegawai dan mitra kerja untuk menghindari aktivitas di tempat rawan seperti tebing dan senderan. Dimohon kepada seluruh pegawai dan mitra kerja agar dapat saling mengingatkan dan menyampaikan himbauan ini dalam upaya saling menjaga keselamatan bersama.

Demikian disampaikan, agar menjadi perhatian. Atas kerjasamanya disampaikan terima kasih.

Herdian Ardi Febrianto

Memo from Dieng's GM

Corrective Action Pictures



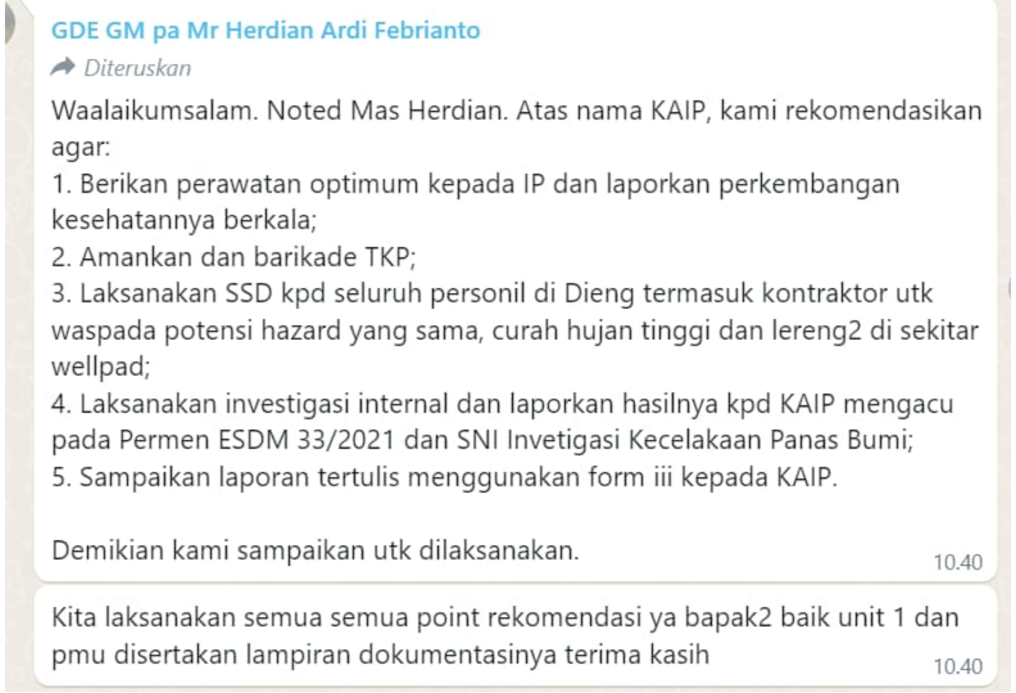
Legend :
A : Initial porta camp position
B : Porta camp repositioned from east to west side

END

Preliminary Report

The event has been reported EBTKE as Per Procedure send by KTPB (Herdian Ardi F) to KAIP (Roni) on thuesday at 09.00 WIB

Reply and recommendation from KAIP as Bellow


GDE GM pa Mr Herdian Ardi Febrianto

Diteruskan

Waalaikumsalam. Noted Mas Herdian. Atas nama KAIP, kami rekomendasikan agar:
1. Berikan perawatan optimum kepada IP dan laporkan perkembangan kesehatannya berkala;
2. Amankan dan barikade TKP;
3. Laksanakan SSD kpd seluruh personil di Dieng termasuk kontraktor utk waspada potensi hazard yang sama, curah hujan tinggi dan lereng2 di sekitar wellpad;
4. Laksanakan investigasi internal dan laporkan hasilnya kpd KAIP mengacu pada Permen ESDM 33/2021 dan SNI Invetigasi Kecelakaan Panas Bumi;
5. Sampaikan laporan tertulis menggunakan form iii kepada KAIP.

Demikian kami sampaikan utk dilaksanakan. 10.40

Kita laksanakan semua semua point rekomendasi ya bapak2 baik unit 1 dan pmu disertakan lampiran dokumentasinya terima kasih 10.40

Recommendation from KAIP :

1. To give optimum medical attention to Injury Person (IP) and reported medical status regulary
2. Secure and barricade incident location
3. To do safety stand down meeting to all GDE Employee including Contractor to give awarenees of the the same potential hazard , high rainfall and the slope surrounding the well PAD
4. To do Internal investigation and reported to KAIP refer to Permen ESDM 33 /2021 and SNI Investigation geothermal incident
5. Reporting use formular iii to KAIP

Appendix 7 Biodiversity Rapid Assessment of Pad 12

Biodiversity Rapid Assessment

The results of the assessment advised that the most area of Pad 12 is a converted forest land to GDE's lay down and storage area. In the other side, there is an existing electrical sub-station operated by PLN. While, the surrounding area was converted to cultivated land for potato. This conversion was reportedly occurred for more than 10 (ten) years ago according to the local villagers and several personnel of GDE's Dieng Unit 1. Currently, the surrounding area of Pad 12 is part of PT Perhutani's forest land. PT Perhutani is a state-owned enterprise responsible to manage the most protected forest in Java Island. The remnant forest within the interest area for proposed Dieng 2 power plant is dominated by pine trees (*Pinus merkusii Jungh. & de Vriese*). The other plants including carica (*Vasconcellea pubescens*) and terong belanda or Dutch Egg plant (*Solanum betaceum*) are found under pine trees canopy. Please see figure below.

Given the flora biodiversity of the interest area for proposed Dieng 2 power plant is low, it is expected that the fauna biodiversity of this area is considerately low also. Referring to the observation and study report (IEE, 2019), several common bird species of homogenic habitat (dominated by pine forest) including Sooty-headed Bulbul (*Pycnonotus aurigaster)*, Spotted Dove (*Spilopelia chinensis*), Javan Munia (*Lonchura leucogastroides*), Eurasian Tree Sparrow (*Passer montanus*), and Plaintive cuckoo (*Cacomantis merulinus*), None of them is categorized in protected species according to Government of Indonesia (GoI) regulation and they are categorized in Least Concern (LC) by the IUCN (International Union for Conservation of the Nature). A common Plantain Squirrel (*Callosciurus notatus*) was also observed in this area. There is no information regarding the other mammals as identified in IEE 2019 (i.e. Small Asian Mongoose - *Herpestes javanicus*, Sunda Procupine - *Hystrix javanica*, Common Palm Cive - *Paradoxus hermaphroditus*, etc).
Referring to above assessment, it is considered that Dieng 2 power plant development may result a low environmental risks and impacts. Several approaches as specified in the existing BAP might be sufficient for managing those environmental risks and impacts to the biodiversity at proposed area for Dieng 2 power plant development.

Pad 12 and Its Surrounding Area

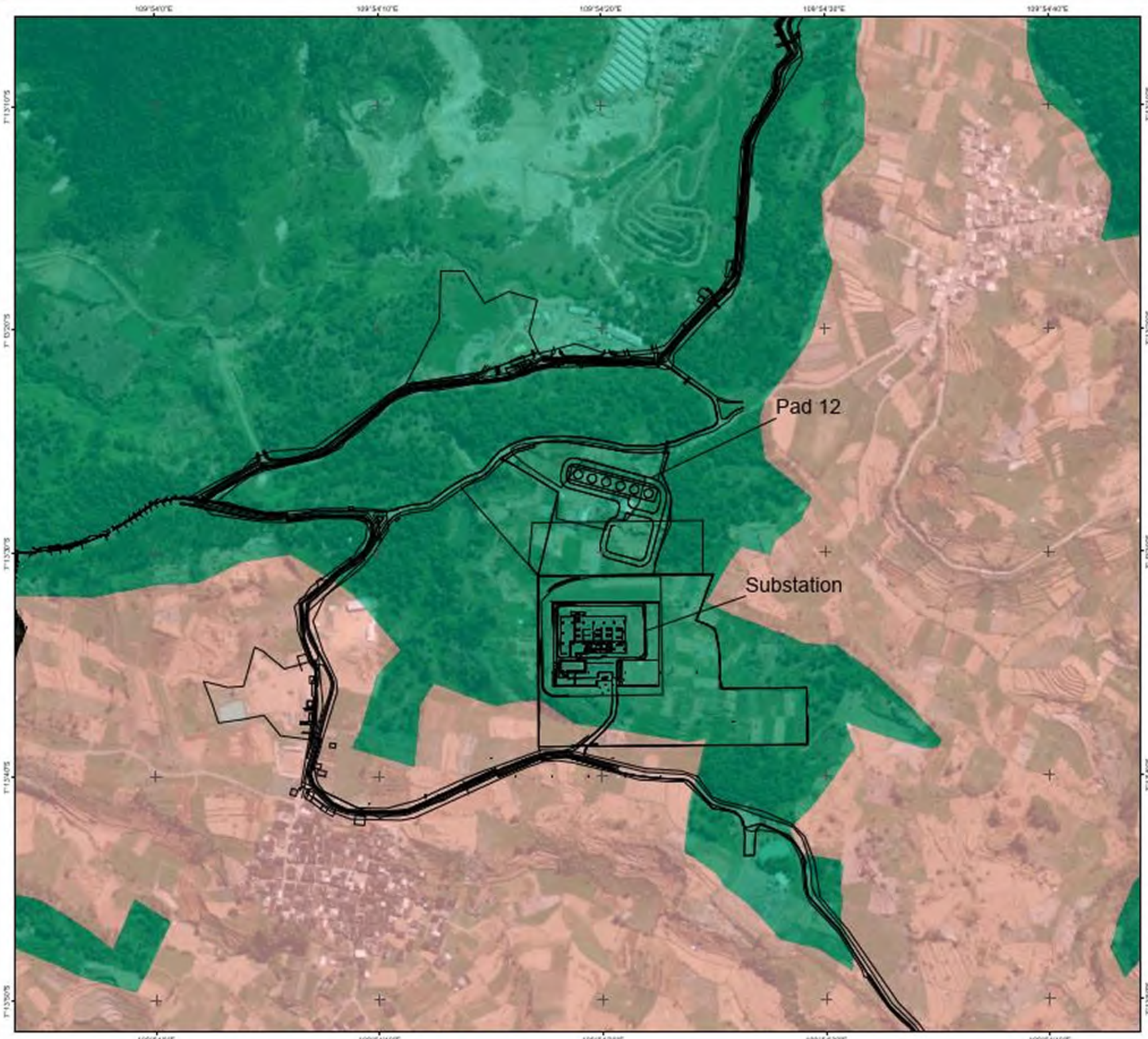


Figure -

CLIENT: GEO DIPA ENERGI

Map Title

FORESTRY STATUS

Administrative Details

Regency	Wonosobo
Province	Central Java

Scale Map Information

N S E W

Scale 1:5,000 on A3 Paper

0 25 50 100 150 200 Meters

Location Index

Legend

Project Footprint

Forestry Status

Protected Forest

Other Utilization Area

Data Sources

1. Indonesia Topographical Map - Geospatial Information Agency
2. ESRI Basemap Services

Map Information

Datum	World Geodetic System 1984
Projection	Universal Transverse Mercator
Zone	49 South
Unit	Meter

Provided By

AECOM
PT AECOM Indonesia

Drawn : DG	Date : Jan 2023
Checked : NHS	Project ID : JKTD21047