

# **Mitigating Interventions on COVID-19 of National Power Corporation-Mindanao Generation in the Protection of its Workforce**

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## **ABSTRACT**

This study examined how the National Power Corporation-Mindanao Generation protected its employees from COVID-19 while ensuring energy delivery. The Philippines faced pandemic risks in a period with no vaccines (June 2020 to May 2021). Despite precautions, ten workers got infected, with 81 suspected cases. Interventions covered prevention, detection, isolation, treatment, reintegration, and adapting to the new normal. Recommendations include strengthening collective efforts, enhancing epidemic preparedness, supporting technical innovation, fostering community resources like contact tracing and healthcare initiatives, bolstering workforce readiness, and promoting further research on COVID-19 and similar diseases.

**KEYWORDS:** COVID-19; interventions; NPC; protection; workforce

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## **1. Introduction**

How did the National Power Corporation-Mindanao Generation protect its workforce from COVID-19 in fulfilling the mandate of ensuring an unhampered delivery of energy products and services? This was the central question that this phenomenological research study sought to answer. Established in 1936 through Commonwealth Act No. 120 and later chartered in 1971 by RA 2641, the corporation operates seven hydro-electric power plants in the Agus-Pulangi Hydro-electric Power Plant Complex. These plants harness power from the Agus River, spanning from Lake Lanao in Marawi City, Lanao del Sur, to Maria Cristina Falls in Iligan City, Lanao del Norte, with the 7th plant utilizing the Pulangi River in Maramag, Bukidnon. These facilities are crucial for Mindanao's power needs, contributing significantly with an average net income of over eight billion pesos, aiding the government's "missionary electrifications" nationwide. NPC-MinGen's mandate extends to powering remote, off-grid areas through the "Small Power Utilities Group" (SPUG), currently operating 275 SPUG plants in 198 municipalities across 34 provinces in the Philippines.

COVID-19, caused by the novel coronavirus SARS-CoV-2, emerged in Wuhan, China, in December 2019, with the Chinese authorities reporting the outbreak on

January 7, 2020. The WHO declared it a Public Health Emergency of International Concern on January 30, 2020, as it spread to 18 countries, including the Philippines, with 98 confirmed cases by January 31, 2020. The Philippines' first two COVID-19 cases were a Chinese couple who arrived on January 30, 2020, with the woman recovering but the man succumbing on February 1, 2020. COVID-19 entered Mindanao through a 54-year-old man traveling from Manila to Marawi City, leading to his admission to Iligan City's private hospital on March 4, 2020, followed by transfer to a public hospital in Cagayan de Oro City, where he passed away on March 10, 2020.

President Rodrigo R. Duterte declared a state of Public Health Emergency on March 8, 2020, in response to COVID-19's threat to national security. He urged government agencies and local units to cooperate and allocate resources for urgent COVID-19 measures. On March 11, 2020, the WHO declared the coronavirus a pandemic, with 125,000 cases worldwide, resulting in 4,500 deaths and 68,000 recoveries by March 13, 2020. The President further declared the Philippines under the State of Calamity from March 15 to September 16, 2020, and signed the Bayanihan to Heal as One Act (Republic Act 11469) on March 25, 2020, granting him powers to mitigate the disease's impact.

Several researchers observed COVID-19's profound effects on the lives and the global economy, leading to loss of life, reduced productivity, and business closures [1]. Recognizing the workforce's importance in maintaining the economy, the Philippines prioritized worker protection. To ensure energy delivery and combat the COVID-19 pandemic among its employees, the National Power Corporation-Mindanao Generation established the "NPC-MinGen COVID-19 Isolation Coordinating Team" on June 3, 2020, following the Department of Energy's "Response Protocol" stated in Memorandum Order No. 2020-045. This team comprised five safety engineers, five senior nurses, two physicians, and one dentist. The four hydro-electric plants had two Isolation Coordinators each (a security engineer and a senior nurse), while Headquarters had one security and safety engineer, one senior nurse, two retainer physicians, and one retainer dentist. The Manager for Safety and Security led the team, responsible for implementing isolation processes when workers contracted COVID-19. The Department of Energy's Task Force on Energy Resiliency provided a handbook based on WHO, DOH, and IATF-EID guidelines to guide the team in implementing the "COVID-19 Response Protocol". Team members received training on responding to COVID-19 challenges, focusing on prevention, detection, isolation, treatment, reintegration into the workforce, and adapting to the "New Normal".

To mitigate the virus's spread, the President of the National Power Corporation emphasized strict adherence to health protocols through NPC Memo Circular No. 2020-11. Memoranda issued to NPC Cost Centers enforced contingency measures to ensure critical and necessary functions across all NPC work groups. Regardless of employment status, all NPC employees followed alternative work arrangements from March 17 to April 14, 2020, under NPC Memorandum Order No. 15, series of 2020. The Vice President of NPC Mindanao Generation, who also serves as the CEO for Mindanao, ordered mandatory quarantine for all Mindanao Generation employees starting on March 17, 2020, using an alternative working arrangement to ensure uninterrupted

operations at hydro-electric power plants. The MinGen workforce was divided into two batches, with Batch 1 working from March 17 to March 30, 2020, and Batch 2 from March 31 to April 13, 2020. Operations and Maintenance personnel continued on-site work at different hydro-electric power plant complexes to maintain continuous plant operations. In contrast, those working remotely, such as the Office of the Vice President, Administrative & Finance Department, Operations and Planning Department, and Community Development Department, could do so while fulfilling their responsibilities. The Department Head determined work arrangements for Maintenance and Technical Services Department personnel. All official travel outside the country except for critical NPC activities was suspended, subject to the Function Group Head's discretion and clearance. Shuttle buses were provided for NPC personnel reporting to work. During a flag-raising ceremony, the NPC Vice President, who also serves as the CEO of NPC-Min-Gen, reminded employees with this statement:

*“Remember, your greatest contribution to society’s welfare is your well-being. Always be cautious and mindful of all your dealings. During this pandemic, we should strengthen our faith in God, regardless of religious beliefs and offer prayers for health and safety.”*

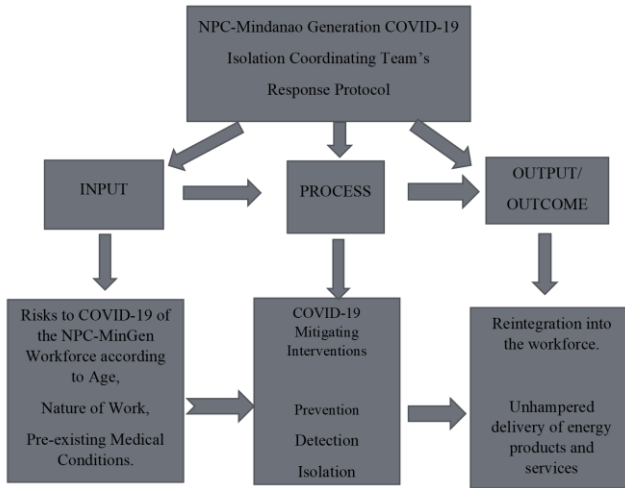
The study describes the mitigating interventions the National Power Corporation-Mindanao Generation implemented to protect its workforce from the COVID-19 pandemic, ensuring the uninterrupted delivery of energy products and services to Mindanao and remote off-grid areas throughout the country. Specifically, it aims to determine the:

- specific risks to COVID-19 the NPC-Mindanao Generation workforce has encountered, considering factors such as age, nature of work, and pre-existing medical conditions;
- interventions implemented by NPC MinGen to mitigate the spread of COVID-19 within the workplace; and
- challenges faced by NPC-MinGen in fulfilling its mandate of ensuring an unhampered delivery of energy products and services while simultaneously mitigating the spread of the COVID-19 pandemic.

## **2. Methodology**

### *2.1 Study Design*

This study adopted the input-process-output model as its conceptual framework and employed both qualitative and quantitative research approaches interactively. The NPC-MinGen COVID-19 Isolation Coordinating Team utilized the Rapid Risk Assessment Tool to collect data on the COVID-19 risk factors within the National Power Corporation-Mindanao Generation workforce, including age, job nature, and pre-existing medical conditions. The findings from this data analysis informed the team's efforts to create interventions aimed at safeguarding the workforce from COVID-19.



**Figure 1.** Input-process-output model used in the study.

These interventions followed a structured approach encompassing prevention, detection, isolation, and treatment, ultimately leading to the anticipated outcome of reintegrating the workforce while adhering to the "new normal" guidelines recommended by the World Health Organization and the Department of Energy.

The study was conducted at the seven hydro-electric power plant complexes of National Power Corporation Mindanao Generation. Six of the plants are located along the Agus River, connecting the two provinces of Lanao del Sur and Lanao del Norte; the 7th hydro-electric power plant is along the Pulangi River of Maramag, Bukidnon. Agus 1 Hydro-electric Power Plant (HPP) is situated in Marawi City, Lanao del Sur. Agus 2 HPP is located in the Municipality of Saguwaran, Lanao del Sur. Agus 4 HPP is an underground hydro-electric power plant located in Baloi, Lanao del Norte. Agus 5 HPP is located in Ditucalan, Iligan City, Agus 6 HPP is located in Fuentes, Maria Cristina, Iligan City. Agus 6 was initially known as Maria Cristina Falls Hydro-electric Plant, named after the famous scenic waterfalls just 100 meters in its background. Agus 7 HPP is located in Ditucalan, Iligan City. Pulangi IV HPP is located in Maramag, Bukidnon. The NPC –Mindanao Generation Headquarters is located in Ditucalan, Iligan City.

Lake Lanao, located in Marawi City, is the largest lake in Mindanao and the second largest in the Philippines. It has five watersheds with rivers and major tributaries totaling 431 kilometers. The lake's outlet is the Agus River, which flows from Marawi City to Iligan City via Maria Cristina Falls, the largest waterfall in the country that flows southwest into Iligan Bay. The Agus River supports six hydro-electric power plants of the National Power Corporation-Mindanao Generation (NPC-MinGen). The seventh hydro-electric Power Plant of NPC-MinGen is located in Maramag, Bukidnon.

Pulangi River supports the 255-MW hydro-electric power plant. The plant has three generating units, using the most advanced hydro-electric power technology.

The National Power Corporation is a government-owned hydro-electric power corporation mandated to energize Mindanao and far-flung, off-grid areas in the Philippines, called "missionary electrifications". Presently, NPC operates 275 SPUG power plants in 238 areas in 198 municipalities across 34 provinces all over the country.

## *2.2 Participants*

The entire workforce of 470 NPC-MinGen employees are the study participants. There were 85 workers (18%) who worked at Agus I and II Hydro-electric Power Plant Complex; 79 of them (16.8%) worked at Agus IV and V Hydro-electric Power Plant Complex; 92 of them (19.5%) worked at Agus VI and VII Hydro-electric Power Plant Complex; 65 of them (13.8%) worked at Pulangi Hydro-electric Power Plant Complex, and 149 of them (31.7%) worked at the NPC-MinGen Headquarters. Of the total workforce of 470, 359 workers (76.38 %) were male, and 111 workers (23.62%) were female.

## *2.3 Research Instrument and Data Collection*

A participatory approach was employed in the data collection process, involving the 14 members of the NPC-MinGen COVID-19 Isolation Coordinating Team. Various research survey tools and qualitative methodologies were utilized for data gathering.

One of the tools employed was the Rapid Risk Assessment Survey, which aimed to assess the workers' susceptibility to COVID-19 based on factors like age, job nature, and existing health conditions. The risks were classified into four categories: low risk (LR), medium risk (MR), high risk (HR), and most at risk (MAR), aligning with the World Health Organization's classification.

Another tool used was the Daily Health Checklist, a self-monitoring device completed by employees upon reporting to work. This checklist consisted of four yes-or-no questions related to COVID-19 symptoms, contact with cases, and recent travel. Employees provided consent for data collection, understanding that relevant privacy laws and regulations protected their information. Completed checklists were submitted to the Health and Welfare Section, and any signs of COVID-19 symptoms were promptly addressed.

Participant observation, a qualitative research method, involves the researcher closely observing the activities of the research participants. This entailed personal involvement in the process flow and procedures for handling COVID-19 cases among the workforce.

Key Informant Interviews were conducted to gather textual data through in-depth conversations with research participants, providing valuable insights into the research objectives.

Lastly, Focus Group Discussions were organized with individuals such as the NPC-MinGen COVID-19 Coordinating Team to explore specific topics of interest

regarding their tasks and responsibilities or with groups of study participants to validate or process collected data.

## *2.4 Data Analysis*

The participatory situational analysis was used to analyze and interpret data from the Rapid Risk Assessment and the Daily Health Checklist. Qualitative and quantitative data were analyzed interactively.

# **3. Results and Discussion**

## *3.1 Rapid Risk Assessment Results*

The primary question guiding the rapid risk assessment focused on identifying individuals susceptible to COVID-19 based on their age, job characteristics, and existing medical conditions. A survey questionnaire tailored for rapid risk assessment was employed to collect this information. The NPC MinGen COVID-19 Response Team, consisting of disease experts, conducted the data analysis, guided by recommendations from the World Health Organization. The risk categorization included four levels: low, medium, high, and most at-risk.

The age distribution of the NPC-Mindanao Generation workforce spans from 20 to 65 years old. A breakdown in Table 1 reveals that among the 470 employees stationed at various power plants and the headquarters, the majority, accounting for 42.34%, falls within the 50 to 59 age group. Additionally, 20.85% belong to the 60 to 65 age bracket, 19.36% fall in the 40 to 49 age range, 12.76% are aged 30 to 39, and the smallest group, comprising 4.68%, falls in the 20 to 29 age category. This data indicates a significant portion of the NPC workforce falls in the 50 to 65 age range, while the younger age group (20 to 29) is the least represented.

NPC-Mindanao Generation encompasses various job sections, each with its unique responsibilities and personnel. The Office Personnel category includes the Office of the Vice President, which encompasses divisions such as Legal Services, Security & Safety, Billings & Settlement, and IPPCM. Additionally, the Administrative & Finance Division, Operations & Planning Division, and Community Development Department, specifically the Watershed Management Division, fall under this category. The Central Maintenance & Technical Division is also part of this sector. Plant Operations Personnel are tasked with overseeing the continuous operations of the power plants, with roles including Division Managers, Plant Superintendents, Safety & Pollution Engineers, Electrical Control Operators, and Equipment Operators, working around the clock through rotational shifts. Maintenance Personnel consists of Division Managers, Maintenance Superintendents, engineers, foremen, technicians, electricians, welders, mechanics, and General Services (GS) workers responsible for equipment upkeep. Support Personnel cover roles such as Division Managers, Human Resource Heads, section chiefs, accountants, financial specialists, cashiers, property custodians, materials management specialists, information technology technicians, secretaries, bookkeepers, guesthouse caretakers, and records keepers. Transportation Personnel include the Transportation Officer, driver-mechanics, dam tenders, mechanics, heavy equipment operators, and pump tenders. Finally, the Health and Welfare Personnel category is composed of the NPC COVID-19 Response Coordinating

**Table 1.** Age bracket of workers per workplace cluster.

Workplace	Age Bracket					Total
	20-29	30-39	40-49	50-59	60-65	
Agus I and II HPPC	7	11	11	35	21	85
Agus IV and V	1	12	16	35	15	79
Agus VI and VII	4	10	24	37	17	92
Pulangí IV	1	8	18	25	13	65
Headquarters	9	19	22	67	32	149
Total	22	60	91	199	98	470
Percentage	4.68%	12.76%	19.36%	42.34%	20.85%	100%

Team, featuring the Manager of NPC In-charge of Safety and Security, senior nurses, retainer physicians, a retainer dentist, and principal engineers specializing in Safety and Security.

Table 2 provides an overview of the job distribution among the 470 employees in NPC Mindanao Generation. The majority, with 34.25%, belong to the Plant Operation Personnel category, followed by 25.10% in Support Personnel, 20.42% in Maintenance Personnel, 11.91% in Office Personnel (including some in managerial roles), 5.31% in Transportation Personnel, and 2.97% in Health and Welfare Personnel.

Based on self-reported checklists and cross-referencing with medical records, the analysis of pre-existing diseases among the workforce revealed nine prevalent conditions. The highest was hypertension, affecting 25.76% of workers, followed by arthritis (15.74%), diabetes (12.76%), cardiovascular diseases (5.31%), chronic kidney disease (2.77%), asthma (1.9%), liver cirrhosis (1.28%), goiter (0.9%), and breast cancer (0.4%). These findings are summarized in Table 3, which presents the distribution of pre-existing diseases across workplace clusters.

Furthermore, the COVID-19 Isolation Coordinating Team categorized workers' COVID-19 risk based on age groups. Those aged 60 and above, constituting 20.85% of the workforce, were classified as most at risk. Workers aged 50 to 59 (42.35%) fell into the high-risk category, while those aged 40 to 49 (19.36%) were considered medium risk. Those in the age groups of 20-29 and 30-39, totaling 17.45%, were categorized as low risk for COVID-19. The breakdown by age-related risk categories is presented in Table 4.

The workforce at NPC-MinGen was categorized into different risk levels based on two criteria. Firstly, with respect to their job roles, 14 workers (2.98%) were classified as most at risk due to their appointment as COVID-19 Isolation Coordinators, which included medical personnel like senior nurses, retainer doctors, a retainer dentist, and security and safety engineers. A significant portion, 34.26%, was deemed high risk as they were engaged in plant operation roles within the hydro-electric plant complex. Meanwhile, 20.43% were classified as medium risk, comprising plant maintenance personnel and transportation staff. In contrast, 25.10% fell into the low-risk category, primarily consisting of individuals working in the Office of the Vice President and support roles within NPC-MinGen. The distribution of risk categories based on job roles can be found in Table 5.

Secondly, when considering pre-existing medical conditions, two workers (0.4%) were classified as most at risk due to their immunocompromised status, having undergone breast cancer surgery and chemotherapy. Meanwhile, 25.74% were considered high risk due to having two or more pre-existing medical conditions, while

**Table 2.** Jobs of workers by workplace.

Type of Job	Agus I and II	Agus IV and V	Agus VI and VII	Pulangi IV	Head-Quarters	Total	%
Office Personnel	0	0	0	0	56	56	11.91
Managerial							
Plant Operations Personnel	43	39	49	29	1	161	34.25
Maintenance Personnel	24	20	22	13	17	96	20.42
Transportation Personnel	1	3	3	5	13	25	5.31
Support Personnel	15	15	16	16	56	118	25.10
Health and Welfare Personnel	2	2	2	2	6	14	2.97
Total	85	79	92	65	149	470	100

**Table 3.** Pre-existing medical conditions of workers by workplace.

Pre-Existing Illness	Agus I and II	Agus IV and V	Agus VI and VII	Pulangi IV	Head-Quarters	Total	%
Hypertension	13	8	33	20	44	118	25.10%
Arthritis	2	5	17	23	27	74	15.74%
Diabetes	4	3	15	10	28	60	12.76%
Cardiovascular	3	4	3	7	8	25	5.31%
Chronic Kidney	5	4	1	0	3	13	2.77%
Asthma	1	1	3	2	2	9	1.9%
Liver Cirrhosis	1	1	3	0	1	6	1.28%
Goiter	1	1	0	0	2	4	0.9%
Breast Cancer	0	0	0	1	1	2	0.4%

**Table 4.** Risk categories of NPC-MinGen workforce by age group.

Risk Category	Age group	Agus I and II	Agus IV and V	Agus VI and VII	Pulangi IV	Head-Quarters	Total	%
Most at Risk	60-above	21	15	17	13	32	98	20.85%
High Risk	50-59	35	35	37	25	67	199	42.35%
Medium Risk	40-49	11	16	24	18	22	91	19.36%
Low Risk	20-29	7	1	4	1	9	22	4.68%
Low Risk	30-39	11	12	10	8	19	60	12.76%
Total		85	79	92	65	148	470	100%
Percentage		18.09	16.80%	19.57	13.83%	31.49%	100%	



**Table 5.** Risk categories of NPC-MinGen workforce according the nature of job.

Risk Category	Job	Agus I and II	Agus IV and V	Agus VI and VII	Pulangi IV	Head-Quarters	Total	%
<b>Most at Risk</b>	COVID-19 Isolation Coordinators	2	2	2	2	6	14	2.98%
<b>High Risk</b>	Plant Operations Personnel	43	39	49	29	1	161	34.26%
<b>Medium Risk</b>	Maintenance Personnel	24	20	22	13	17	96	20.43%
<b>Medium Risk</b>	Transportation Personnel	1	3	3	5	13	25	5.32%
<b>Low Risk</b>	Support personnel	15	15	16	16	56	118	25.10%

20.21% fell into the medium-risk category with a single pre-existing condition. The majority, totaling 53.61%, were categorized as low risk as they did not have any pre-existing medical conditions. Table 6 summarizes the risk categories based on pre-existing medical conditions.

### 3.2 Mitigating Interventions

#### 3.2.1 Prevention

Prevention in the context of COVID-19 control involves ongoing efforts to reduce the disease's incidence, prevalence, morbidity, or mortality. To address vulnerabilities among its workforce, NPC-MinGen focused on workers aged 60 and above and those with pre-existing medical conditions, such as immunodeficiency and comorbidities. Out of these, 100 workers were identified as most at risk, with 98 being 60 years or older, and two undergoing chemotherapy for breast cancer. These high-risk individuals were offered the option of working from home (WFH), although not all could do so due to the nature of their jobs. NPC provided anti-flu vaccinations to protect them, as COVID-19 vaccines were not yet available. Many workers, including engineers at hydro-electric plants, faced challenges in maintaining physical distancing due to their job demands. Consequently, they were advised to use personal protective equipment (PPEs) like surgical masks, face shields, gloves, and observe minimum health standards. NPC-MinGen allocated a significant budget for essential supplies, tools, materials, and equipment for COVID-19 prevention and control, as well as medical supplies and equipment. Despite their high-risk status, two women reported to work—one in the office and the other as a COVID-19 Isolation Coordinator.

To reduce the transmission of the virus, NPC-MinGen implemented several measures. Sanitation stations were established at building and office entrances, stocked with alcohol and sanitizers. Restrooms were equipped with water, soap, and alcohol at all times, and regular disinfection of offices and buildings followed health protocols. Social distancing and the use of face masks and shields were enforced, and elevator occupancy was limited. Teleconferencing was encouraged to minimize face-to-face interactions. Table 7 outlines the provisions implemented by NPC MinGen to reduce vulnerability and prevent COVID-19 transmission.

**Table 6.** Risk categories of NPC-MinGen workers according to pre-existing medical conditions.

Risk Category	Medical Condition	Agus I and II	Agus IV and V	Agus VI and VII	Pulangi IV	Head-Quarters	Total	%
Most at Risk	Immuno-compromised	0	0	0	1	1	2	0.4%
High Risk	With more than one medical conditions	13	10	33	22	43	121	25.74%
Medium Risk	With one medical condition	15	10	20	15	35	95	20.21%
Low Risk	None	57	54	44	27	70	252	53.61%
	Total	85	79	92	65	149	470	100%

**Table 7.** Preventive measures implemented by NPC-MinGen.

Preventive Measure	NPC Provisions	NPC Memo/ Circular
Reduce Vulnerability for the “most at risk”	“Employees who are 60 years old and above, and those with immunodeficiency, comorbidities, or other health risks, adopted the work-from-home arrangement.”	NPC-MinGen Rec 048 dated 8 May 2020/ CSC Memorandum No. 10, s. 2020
	“Adopt flexible work reporting for vulnerable workers: senior citizens, and those having health issues.” Mass vaccination for flu sponsored by NPC-MinGen for all employees (in lieu of COVID-19 vaccines that were not yet available)	NPC-MinGen Memo 205-212, dated 27 May 2020  NPC-MGN 2020-34 Dated 24 July 2020
Prevent Transmission of COVID-19 to all workers	Compulsory wearing facemask or appropriate personal protective equipment (PPE) at all times in all NPC workplaces.”	
	Maintaining physical distancing of at least one (1) meter apart in workplaces;	
	Washing of hands as frequently as possible;	
	Maintaining good health, psychological soundness, and strengthening of immune system.	
	Practicing respiratory hygiene and cough etiquette while in the workplace area. No visitors or guests were allowed in offices unless authorized by the Head of Office. The holding of group activities is restricted. Small group meetings (10 at most) may be allowed with physical distancing. All official travels to other regions of the country are suspended except for travels involving critical activities. Employees were shuttled from home to workplace and back. Canteen operation was suspended.	Minimum Health Standards for MinGen. Memo-Order dated 30 April 2020

**Table 8.** Control measures for the detection of COVID-19 symptoms.

Detection	NPC-MinGen Provision	NPC Memo Orders
Accomplishing the Daily Self-reporting health checklist	All personnel reporting for duty must accomplish a "Daily Health Checklist" as a self-monitoring tool in the detection of COVID-19. The Daily Health Checklist must be submitted immediately to the Health & Welfare Section, and any signs and symptoms related to COVID-19 should be acted upon immediately.	Memorandum Order dated 19 May 2020. Observation of the Self-Reporting Daily Health Checklist, and temperature screening.
Temperature screening	All employees were required to submit to temperature screening at the NPC-MinGen entry points; and if found to have a fever of 37.5°C (99.5 °F) or above, the employee must immediately undergo a medical examination, which includes the mandatory Rapid Diagnostics test (RDT).	
Detection in the workplace for all workers	The personnel must report their condition to their immediate supervisor and to any member of the COVID Isolation Coordinating Team.	
Detection at Home for all workers	<p>The worker who is sick at home must inform the Supervisor or the Senior Nurse about the case to facilitate initial evaluation. The retainer doctors must evaluate the patient</p> <p>And if found to be suspected with COVIR-19, the Senior Nurse must report the case to local health authorities of the Department of Health for further evaluation.</p> <p>The patient shall be brought immediately to the NPC designated isolation area (guesthouse) for further tests, administered by DOH personnel. The NPC-MinGen provides food and medicines, while the patient awaits the results of the tests. The patient may stay in the isolation place for 14 days, depending on the recommendation of attending doctors. If the personnel manifest severe conditions (e.g., shortness of breath, diarrhea, nausea or vomiting), they are immediately brought to the hospital. If the personnel manifest mild symptoms, they are advised to undergo a home quarantine/ isolation process.</p>	Minimum Health Standards for MinGen Workforce dated 30 April 2020

### 3.2.2 Detection

Detection, in the context of COVID-19 control, involves systematically monitoring and collecting data specific to the disease's outcomes to inform public health practices. Temperature screening, a commonly used detection method, has limitations as it may not identify all cases, particularly since some infected individuals may not exhibit fever symptoms early in the infection. To address this, NPC-MinGen implemented a self-reporting system, requiring employees to complete a daily health checklist and report any COVID-19 symptoms they experience. Table 8 summarizes the control measures in place for detecting COVID-19 symptoms.

### 3.2.3 Isolation

As defined by Wilder-Smith and Freedman [2], isolation involves separating individuals with contagious diseases from those who are not infected. The primary objective of isolation is to prevent the transmission of the disease to uninfected individuals. NPC-MinGen has established two well-furnished isolation and quarantine

**Table 9.** Isolation guidelines for probable, suspected and COVID-19-positive workers.

	<b>NPC-MinGen Provisions on Isolation</b>
NPC-MGN 2020-34 dated 24 July 2020 Procedures in Handling PUIs and positive COVID cases	Any personnel who develops signs and symptoms of COVID-19 (cough, colds, fever, sore throat, loss of appetite, loss of smell) must undergo 14 days of home quarantine.
	If symptoms persist for about 3-5 days, a confirmatory Reverse Transcription Polymerase Chain Reaction (RT-PCR) test must be administered.
	If found positive for COVID-19, appropriate management of the disease has to be instituted by a hospital infectious specialist.
	After treatment, a repeat RT-PCR test must be given to ensure that the person has fully recovered
	If found negative, the person must complete the 14-day quarantine before reporting back to work.
	If the symptoms of COVID-19 are resolved after 2-3 days, a quarantine of 14 days must be continued/completed.
	At the end of the quarantine period, a Rapid Antibody Test to be administered by DOH accredited hospital/laboratory is required before one can be reinstated.
	A confirmatory RT-PCR test (Nasal and Oropharyngeal swab) may also be administered.
The personnel must get a Medical Certificate from the Retainer Physician for health clearance before he can be reinstated.	

facilities, located in Ditucalan, Iligan City, and Maramag, Bukidnon. These facilities undergo regular cleaning and disinfection after each use. Workers at NPC-MinGen were provided with specific guidelines for the isolation process.

In the event that an employee reporting for work is suspected of having COVID-19 symptoms, they are advised to take several steps: seek medical consultation at the NPC clinic's ground floor for initial evaluation, wear a face mask and shield to prevent potential contamination, isolate themselves in a designated NPC isolation room (PECCO office), and undergo further evaluation by the Iligan City Health Office in collaboration with the Iligan City Disaster Risk Reduction and Management Office. If the symptoms are mild, the employee is instructed to self-quarantine at home for 14 days and monitor their condition. Hospital admission at a designated COVID facility is recommended in cases of severe symptoms. The affected work area is cordoned off and subjected to decontamination using appropriate disinfectants like chlorine bleach and 1:100 phenol-based solutions. If an employee experiences COVID-19 symptoms at home, they are advised to notify the nurse and their supervisor, self-quarantine for 14 days, and seek hospitalization if their condition worsens. Table 9 provides an overview of NPC-MinGen's isolation guidelines.

### 3.3 Probable, Suspected and Confirmed Cases of COVID-19

#### 3.3.1 Description of Cases

On September 14, 2020, NPC-MinGen recorded its first case of COVID-19. This occurred during a period when Iligan City had the highest number of COVID-19 cases in Region X, Northern Mindanao, with 809 cases, 500 recoveries, and 28 deaths, according to the Iligan City Inter-Agency Task Force (IATF). Subsequently, on

**Table 10.** Probable, suspected and confirmed cases of COVID-19.

Workplace	Age				Job				Isolated	Treated	Recovered/ Reintegrated/ Adoption to the New Normal
	30-39	40-49	50-59	60-65	Plant Operations	Maintenance and Support Group					
Agus I and II	0	0	0	1	1	0	0	1	0	0	
Agus IV and V	1	2	5	3	10	1	1	11	3	3	
Agus VI and VII	3	12	8	3	16	10	10	26	4	4	
Pulangi IV	4	10	13	4	22	8	8	31	2	2	
Headquarters	7	0	4	1	1	12	1	12	1	1	
Total	15	24	30	12	50	31	31	81	10	10	
Percentage	3.19%	5.11%	6.38%	2.6%	10.64%	6.6%	6.6%	17.23%	2.13%	2.13%	

September 16, 2020, the President issued Proclamation No. 1021, extending the state of calamity until April 30, 2021. By December 31, 2020, the global COVID-19 tally included 83.5 million infections, 47.1 million recoveries, and 1.82 million deaths, as reported by Worldometers.info. In the Philippines, there were 470,000 cases, 440,000 recoveries, and 9,244 deaths. Northern Mindanao (Region X) reported 8,259 cases, with 7,242 recoveries and 160 deaths, while Iligan City had 1,046 cases, 957 recoveries, and 57 deaths, as documented by the Inter-Agency Task Force.

From September 2020 to March 2021, NPC-MinGen identified 81 workers, representing 17.23% of its workforce, as probable, suspected, or confirmed cases of COVID-19. These individuals were promptly isolated in NPC-MinGen facilities located in Iligan City and Bukidnon, where they underwent confirmatory tests and observed for varying durations, ranging from 2 to 14 days. Of these 81 individuals placed in isolation, 71 were considered probable cases, while 10 were confirmed cases of COVID-19. Details on these cases are presented in Table 10.

### 3.3.2 Treatment

In accordance with the Department of Energy COVID-19 Response protocol guidelines, confirmed cases of COVID-19 were to be referred to appropriate health facilities as advised by the Department of Health or the Local Government Unit. Following these guidelines, NPC-MinGen ensured that isolated workers at their NPC Isolation Facility received essential provisions like nutritious food, clean water, medicines, and vitamins. Each patient occupied separate air-conditioned rooms with attached bathrooms and received regular check-ups from NPC doctors.

Among the ten workers who tested positive for COVID-19, their risk levels were assessed based on age, job nature, and pre-existing medical conditions. Four were considered "most at risk," four as "high risk," and two as "medium risk" based on their ages. In terms of job roles, eight were categorized as "high risk," while two were labeled "low risk." Six were classified as "high risk" due to pre-existing medical conditions, while four were considered "low risk" as they had no underlying diseases. Four patients exhibited symptoms, while six were asymptomatic. Three symptomatic patients received treatment at hospitals; one was treated in an Iligan City Isolation facility by their doctor son. Symptomatic individuals experienced fever, cough, colds, breathing difficulties, and loss of taste. The six asymptomatic patients with mild cases were placed in Isolation facilities for treatment.

Furthermore, NPC workers were informed of their rights and privileges as government employees under the Bayanihan to Heal as One Act. Table 11 outlines the health benefits available to NPC-MinGen workers.

### 3.3.3 Reintegration into the Workplace

The 81 workers labeled as "Probable, Suspected, and Confirmed Cases of COVID-19" have been effectively reintegrated into the workforce after fulfilling the requirement of presenting pertinent medical certificates and clearances, duly signed by the NPC Retainer Physician and submitted to the HRD. This reintegration process was guided by several key measures enforced by NPC-MinGen to ensure the safety and well-being of returning employees and their colleagues. Firstly, pre-established working arrangements were put in place to facilitate a seamless return to their respective roles,

**Table 11.** Health benefits of NPC-MinGen workers.

Benefits	Coverage/Provision	Memo Circular
Reimbursement of rapid diagnostic test (RDT) polymerase chain reaction (PCR) swab test.	Coverage. Officials and employees (permanent, temporary, co-terminus, casual, contractual) engaged thru Contract of Service (COS), Job Order (JO), and institutional contract hiring (ICH) schemes, who by the nature of their job, travel from Mother Unit to various facilities/installations/plants are indispensable and inevitable. Personnel engaged under the Cadetship program who are undergoing immersion of their skills development.	NPC Circular 2020-25 dated 16, September 2020
Addendum to NPC Circular 2020-25-reimbursement of rapid diagnostic	Additional Coverage. Personnel who were identified as persons under investigation (PUI), persons under monitoring (PUM), and confirmed COVID-19 case.	NPC Circular 2020-26 dated 9 October 2020
PhilHealth Benefits for COVID-19 Tests	PhilHealth pays for Covid-19 tests from P2, 710 to P8, 150 depending on how the test kits were procured by the accredited testing laboratories.	PhilHealth Circular No. 2020-0010
PhilHealth benefits for COVID-19 patients	“Patients confirmed with Covid-19 and developed into severe illnesses will be compensated as follows: mild pneumonia for P43, 997; moderate pneumonia for P143, 267; severe pneumonia for P333, 519; and critical pneumonia for P786, 384.”	PhilHealth Circular No. 2020–0009
COVID-19 Vaccine Survey Form for all NPC Workers	NPC Management asked its employees to fill up COVID-19 Vaccine Survey Form to avail of the COVID vaccine that Management is procuring for employees regardless of status (regular or contractual).	NPC Circular 2021-009 dated 1 February 2021
COVID Vaccine Survey Form for NPC household members	NPC Management allowed the workers to include members of their household to avail of the COVID-19 Vaccine, by filling up a COVID Vaccine Survey Form.	NPC Circular 2021-010 dated 5 February 2021

taking into consideration the unique circumstances of each employee. Secondly, stringent safety measures were rigorously enforced in the workplace, aiming to prevent any potential relapse of COVID-19 cases and maintain a secure environment for all employees. Thirdly, debriefing sessions were conducted for employees who had previously tested positive for COVID-19 and their colleagues within the same unit, fostering a supportive atmosphere and encouraging the sharing of experiences. Additionally, the provision of essential vitamins and other health amenities played a crucial role in supporting the overall well-being of the returning employees, ensuring they were physically prepared for their reintegration. Lastly, a dedicated platform was established to allow employees to openly share their experiences related to the pandemic, promoting communication and understanding among the workforce.

### 3.3.4 Adoption to the New Normal

The advent of COVID-19 has ushered in a significant shift in how people live and work, necessitating an adaptation to the "new normal." This transformation applies to the NPC-MinGen workforce and the broader global population. Despite the challenges posed by the pandemic, NPC's crucial mission of ensuring uninterrupted energy product and service delivery must persist while mitigating the spread of COVID-19. Over a year into the pandemic, its impact continues to escalate in many regions worldwide, with the Philippines reaching a critical stage where the number of cases has

overwhelmed hospital capacity, leading to the loss of medical staff who bravely served as front liners.

The Department of Energy, as outlined in its COVID-19 Response Protocol, has emphasized the importance of embracing the "New Normal." This entails adopting various measures, including personal and environmental hygiene, adherence to health and safety protocols in the workplace, consideration of alternative work arrangements, provision of employee support mechanisms, and compliance with movement restrictions. These guidelines are essential for safeguarding the well-being of individuals and ensuring the continuity of essential services during these challenging times.

In response to the challenges posed by the ongoing COVID-19 pandemic, NPC-MinGen has introduced a multifaceted set of measures to safeguard the health and well-being of its employees and ensure the continuity of its essential services. These measures encompass various aspects, including personal and environmental hygiene, health and safety protocols, alternative work arrangements, employee support mechanisms, e-governance, and movement restrictions. Employees are required to adhere to minimum health standards, such as maintaining social distancing and wearing personal protective equipment while working, with offices and plants undergoing regular disinfection procedures. Health checks for workers are maintained, and individuals in high-risk categories have the option to work from home. Temperature checks and sanitation tools are provided at office entrances, and sick employees are immediately isolated. Clear task definitions are provided for those working from home, and employee support is extended through transportation and lodging facilities and psychosocial interventions. Electronic platforms are used to reduce face-to-face interactions, and IT systems are enhanced to support electronic transactions. Official travels are limited to critical missions, and errands outside the office premises are kept to a minimum. These measures collectively enable NPC-MinGen to navigate the "new normal" challenges while fulfilling its vital mission of energy product and service delivery while mitigating the spread of COVID-19.

### 3.4 Challenges Met

Several employees who had tested positive for COVID-19 were queried regarding their decision to continue reporting to work despite being given the option to work from home due to their classification as most at risk or high risk based on factors such as age, job nature, or pre-existing medical conditions. Their response was as follows:

*"We cannot delegate our work as plant superintendent/plant operations engineer/manager of operations and maintenance/equipment operator because of the nature of our work. We have to be sure that work at the plant is efficiently done to meet the electricity demand for Mindanao, including other services. The electricity demand is great, especially during summer, and we hope there will be no brownouts."* (P1-4)

When asked to describe their work, the workers from the maintenance and other technical services department said:



*“We are in preventive maintenance, and we have to be sure that water passes smoothly through the turbines by clearing the water from sediments that might erode the turbines. We need to check that all the machines are in top condition and repair those in bad condition.” (P5-7)*

When the workers at the plants were asked what working arrangement they followed during this time of COVID-19, they explained:

*“We worked alternately for seven days per week, day and night service. The plants had to be operated continuously 24 hours a day, seven days a week. We stay, sleep, eat in the plants for seven days, and go home for seven days alternately.” (P1, P6-10)*

When asked if the workers were observing health standards while working, some of the personnel from the maintenance department stated that:

*“We strictly complied with the minimum health standards like the wearing of personal protective equipment such as face masks, face shields, goggles, and gloves, the frequent washing of hands with soap and water, applying disinfectants in the workplace, and taking a bath daily, but sometimes, physical distancing is not possible when we assist each other in doing maintenance work.” (P7, P9, P10, P12)*

When asked about how they felt when they were sick with COVID-19, there were many reactions:

*“We thought we were going to die because we could not breathe, and we lost our sense of smell and taste. Our bodies ached all over, and our heads were aching. We were separated from our families. It was a terrible experience.” (P3-5)*

*“I volunteered to stay in the isolation facility, to protect my children and my mother at home. I did not want them to contract COVID-19 because the disease is so frightening.” (P12)*

*“I feared that my co-workers might ridicule me for having contracted COVID-19. The disease is terrifying, and I thought I might die. I hesitated to return to work because I feel embarrassed to face people with my skinny looks.” (P10, P12)*

Despite the interventions given to the NPC-MinGen workforce, some of them contracted COVID-19 while at work. Their commitment to work to meet the demand needed for electricity in Mindanao drove them to work. They followed health protocols by wearing personal protective equipment and frequently washing hands with soap and water. Still, some admitted that social distancing was sometimes impossible when they assisted each other in their work.

#### **4. Conclusion**

This research study concludes that the National Power Corporation-Mindanao Generation successfully fulfilled its mission of ensuring the uninterrupted delivery of energy products and services while simultaneously mitigating the spread of the COVID-19 pandemic. Despite the ongoing nature of the pandemic and the likelihood of its continued disruptions to people's lives and various industries, including the National Power Corporation, the demand for electricity remains constant, necessitating the continuation of work and the continued protection of workers from the virus. NPC-MinGen has committed to vaccinating its workforce once the COVID-19 vaccine becomes available, with the goal of containing the virus. As noted by previous researchers, challenges such as transportation connectivity, economic issues, and virus containment persist, requiring a unified effort to overcome [1]. Collaboration and collective action remain essential in addressing these challenges and healing as one.

#### **5. Recommendations**

The authors provide several key recommendations based on their findings. Firstly, they advocate for bolstering collective efforts, emphasizing the importance of unity and collaboration in addressing challenges, particularly in crises like the ongoing pandemic. Secondly, they suggest that the Philippine government should allocate resources towards epidemic preparedness. This includes supporting frontline workers, ensuring that hospitals are equipped with essential laboratory resources, and fostering the development of technical innovations to enhance healthcare capabilities. Thirdly, the authors emphasize the need to improve workforce preparedness, potentially through training and resource allocation. Lastly, they call for further research into strategies for mitigating pandemics and other highly contagious diseases, indicating a commitment to ongoing efforts to strengthen public health measures.

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#### **Conflict of Interest Statement**

The authors declare no conflict of interest.

**Author Contributions:** Both authors have contributed equally. They have approved the final version of this manuscript.

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