12.2 Distribution Line Facilities

12.2.1 Assessment of Disturbances due to Distribution Line Facilities

Sections a., b., c. and d. below sum up the extent of influence attributed to distribution line facilities and in sections e., f., g. and h., it is described on safety of power facilities.

a. Effect on land use

In contrast to a production factory or a power station, distribution line facilities do generally not produce any direct pollution such as noise, vibrations or noxious gases. However, to supply electric power to the consumers, it is necessary to install overhead lines or underground cables.

Generally, the practice in urban areas with a high load density is to lay underground cables and erect overhead lines in areas with a low load density. For economic and other reasons, however, overhead lines are also used in some urban areas with a high load density.

This necessitates the use of supports (poles) on the roadside and on sidewalks. The poles and overhead lines cause an impediment to the use of the surrounding land. Angle poles generally have stay wires to reinforce the supports, and these stay wires add to the problem by causing further restrictions in the use of the surrounding land.

In order to mitigate the adverse effect of distribution facilities on land utilization, the following measures should be considered.

- Change the existing overhead lines in urban areas to underground cables.

- Install supports in locations in which their effect on land use is small.

- Reduce the surface area taken up by distribution lines by using vertical conductor arrangement.

- Use supports of sufficient strength so that they do not require any stay wires.

- Modify and improve the installation methods of stay wires.

b. Detrimental effect on the urban landscape

Overhead lines, including their supports and service wires, installed on road sides and sidewalks in urban areas are readily recognized as an impairment to the city landscape. For various reasons, including economic factors and the ease of maintenance, the present situation still frequently favors the use of overhead lines even in urban areas. It is therefore recommended that efforts should be made to reduce this adverse effect on the cityscape and the following measures should be considered to achieve this.

- Use underground cables.
- Use supports that match the environment.
- Select routes causing little impairment to the cityscape.

c. Insulation oil leakage from pole-mounted transformers

Insulation oil leaked from some pole-mounted transformers and scattered on the ground. Oil leakage from the transformers may be due to temperature rises of the insulation oil. Continued operation under these conditions will eventually lead to rapid aging and deterioration of the insulation oil and the insulation material so that the life of the transformer will be shortened.

d. Adverse effect associated with construction work

When new distribution lines are constructed or existing one rehabilitated, the following environmental problems may occur.

(For overhead lines)

- Transport of materials : Noise and occupation of road by transport vehicles for materials

- Pole setting : Noise and occupation of road by construction machines

- Stringing work : Traffic obstruction during installation (closed roads and detours)

(For underground cables)

- Transport of materials: Noise and occupation of road by construction machines

- Excavation : Traffic obstruction during installation (closed roads and detours)

- Cable installation work: Traffic obstruction during installation (closed roads and detours)

- Backfill and pavement : Traffic obstruction during installation (closed roads and detours)

- Residual soil handling: Noise and dusts by transport vehicles

- Disturbance for other infrastructure : Telephone lines, water mains etc.

While the above disturbances are unavoidable during construction work, it is possible to mitigate, at least to some extent, these adverse effects by shortening the construction period through a better choice of the equipment, vehicles and machines used for the construction work and through the selection of more appropriate construction and management methods.

The current situation on disturbances caused to the environment by distribution line facilities has been described above, and the following section will therefore deal with the improvements in distribution facilities that should be introduced on an urgent basis. The importance of these improvements is due to the effect they have on the safety of the residents in the neighborhood of distribution line

facilities and on the sound operation of the distribution line facilities itself. The urgency is also clear the fact that the continued operation of the distribution line facilities without improvement will make the distribution lines liable to fault in the future and will result in a serious risk of electrocution accidents.

e. Corrosion of supports

The supports used by SENELEC for its distribution lines consist of concrete poles, wooden poles and H-section steel poles. To prevent rust or corrosion in metal or wood rot in wooden poles, all wooden poles are treated by chemical anti-rot agent injection while the H-section steel poles are coated with an anti-rust paint. As the H-section steel poles are installed in a coastal area subject to high airborne salinity, they are exposed to intensive salt contamination. At present, badly corroded poles are being used to support the conductors despite their serious extent of corrosion. It is evident that this constitutes a serious danger not only in strong winds but also in normal situations. The collapse or fall of supports is a direct threat to the safety of the residents in the neighborhood and can also be the direct cause of electrocution accidents. For reasons of public safety and to ensure the reliability of SENELEC's power facilities, it is important that urgent rehabilitation work should be carried out.

f. Crack formation in concrete poles

Some of the concrete poles used for the 30 kV and 6.6 kV distribution lines have cracks over their entire length. As these cracks grow they will expose the reinforcing bars inside the pole with the risk of corrosion. As a result, the concrete pole will reduce its mechanical strength and cause a risk of accident due to collapse. Concrete poles erected in residential areas qualify for particularly urgent measures to prevent the risk of accident and will need early replacement in the interest of public safety. Observation has shown actual evidence of exposure of the reinforcing bars in some concrete poles.

g. Pin corrosion (insulators)

Corrosion affecting the pins of the pin insulators used on the existing 6.6 kV distribution lines has already been reported. Such pin corrosion is the direct cause of accidents due to falling conductors with the immediate risk of electrocution accidents. In order to prevent the occurrence of accidents due to the destruction of pin insulators it is essential to patrol and inspect the lines on a regular basis and take measures for the early replacement of insulators with corroded pins. The likely causes of pin corrosion include:

- Electrolytic corrosion due to leakage currents
- Corrosion due to salt contamination

This suggests the need for an early survey on the safety of SENELEC's power facilities and for urgent rehabilitation work, including the replacement of the insulators. It is also important to take due care in the selection of the insulators by giving attention to technical details such as their specifications and the pin materials.

h. Clearance from buildings

Cases have been reported in which houses have been built or extended without ensuring a proper safe clearance from the existing overhead distribution lines (6.6 kV and 30 kV). As has already been reported in the past, house construction in close vicinity of existing distribution lines causes a direct risk of electrocution accidents during construction work. This also leads to the danger of line faults in strong windy conditions when the distribution lines make contact with building structures. It is clear therefore that the erection of structure near existing distribution lines hinders the proper and safe operation of the distribution lines. The countermeasures designed to avoid risks of this nature may include the obligatory submission of a report to SENELEC prior to the commencement of the construction work. It may also require the launch of PR activities to generate greater awareness among building contractor of the safety aspects of power facilities.

In the event of buildings being erected in the vicinity of existing distribution lines, it may also be necessary to take special precautions for the safety of workers with measures that may include the covering of conductors with protective cover.

12.2.2 Adverse Effect on the Social Environment

As has been stated in the previous section, the existing distribution line facilities are not a cause of pollution. However, it is true that overhead distribution lines are, to some extent, a hindrance to land utilization and have an adverse impact on the cityscape, especially in urban areas. These problems can essentially be resolved by using underground cables. Certain reasons, including the service life and economic aspects of the existing facilities, may leave no alternative but to use the existing facilities without improvement and accept a certain amount of inconvenience.

The existing 6.6 kV and 30 kV overhead lines currently use bare conductors so that it is dangerous to approach them without maintaining the appropriate clearance. In order to prevent electrocution accidents caused by contact with the distribution lines, it will be necessary to give serious consideration to the following activities and measures.

a. Keeping the correct clearance

   In order to prevent electrocution accidents, it is essential to maintain a correct clearance between the existing distribution lines and houses or other buildings. To prevent accidental contact with conductors, it will also be necessary to cut back street trees.

b. PR activities on safety

   With regard to a. above, it will be necessary to issue information on the safety of power facilities to the residents or to building contractors.

c. Mounting of protective covers

   For construction work in the vicinity of existing distribution lines, protective covers should be mounted between the sections of the

distribution lines affected by the construction work.

d. Elimination of risk factors

As has already been stated in sections e., f., and g. above, there is currently a risk on the existing distribution lines that supports may collapse or that conductors may fall down. In order to obviate accidents due to such dangers and to ensure the sound and safe operation of the distribution line facilities, efforts will be required to remove these risk factors by maintaining a regular patrol and by conducting proper inspection procedures.

Table 12.1.1 Noise Measurement

1. BEL AIR

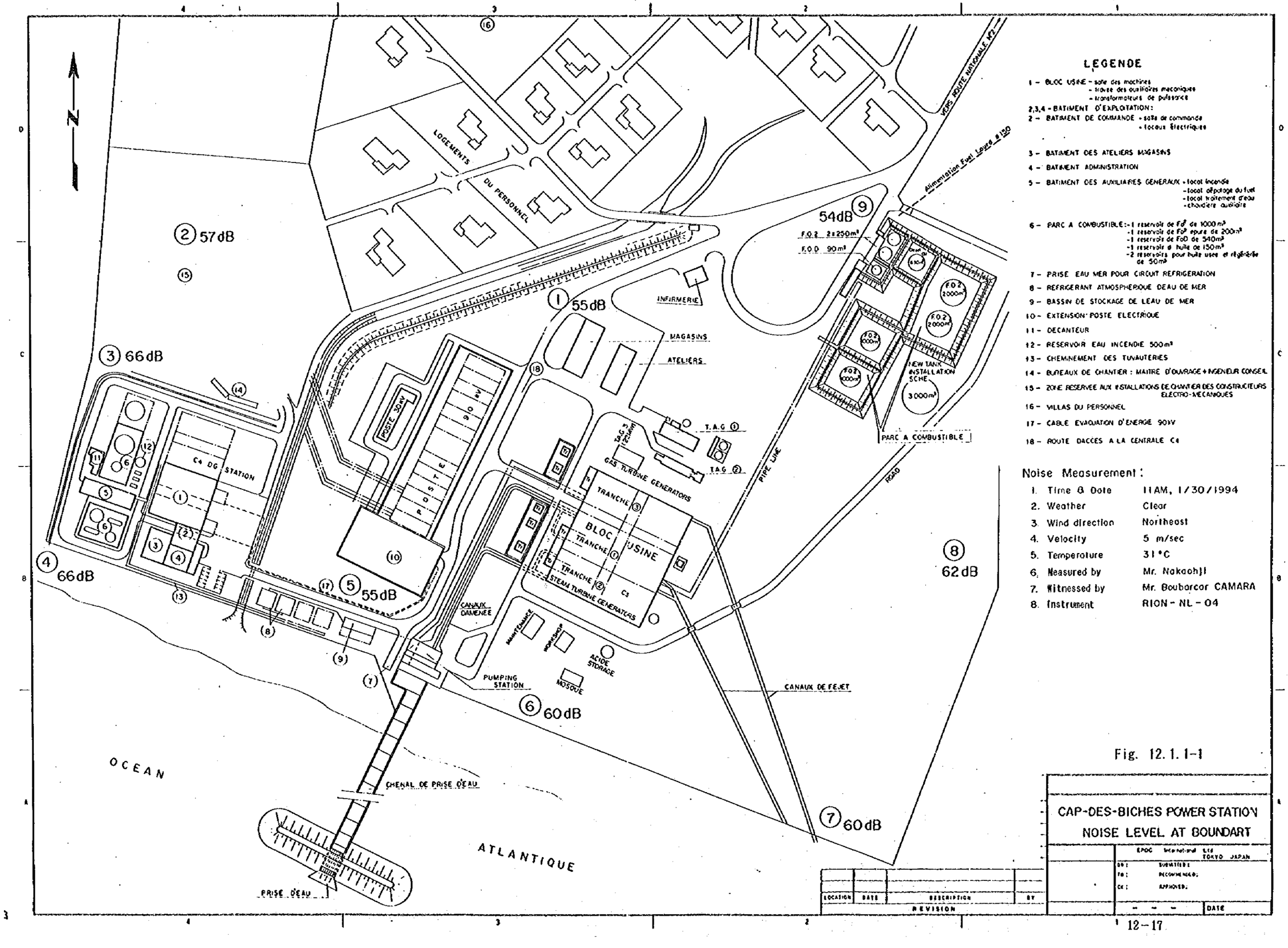
Generating facilities	Place of measurement	Results of measurement					Remarks
		dB	dB	dB	dB	dB	
		G105	G106				
CI (diesel)	Engine	102	105				
	Air intake	88	88				
	Exhaust	101	101				
	Radiator	89	87				
	Transformer	81					
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	
CII (steam)	Boiler	disuse	89	stop	95	94	
	Generator	92	stop	94	93	-	
	Air intake	-	98	-	100	98	
	Stack	68					

Year of measurement : 30/11/1994
Time of measurement : A.M.11
Measured by : Mr. Nakaohji
Witnessed by : Mr. Idrissa MANA (BEL AIR)
Instrument : RION NL-04

2. CAP DES BICHES

Generating facilities	Place of measurement	Results of measurement					Remarks
		dB	dB	dB	dB	dB	
		G301	G302	G303	-	-	
CIII (steam)	Engine	90	88	92			
	Air intake	90	92	88			
	Exhaust	88	88	87			
	Radiator	72	84	84			
	Transformer	74					
		TAG1	TAG2	-	-	-	
CIII (gas)	Gas turbine	104	92				
	Air inlet	90	88				
	Exhaust	90	92				
		C401	C402	-	-	-	
CIV (diesel)	Engine	108	109				
	Air intake	108	108				
	Exhaust	105	107				
	Cooling tower	65					

Year of measurement : 1/12/1994
Time of measurement : A.M.11
Measured by : Mr. Nakaohji
Witnessed by : Mr. Boubacar CAMARA (CAP DES BICHE)
Instrument : RION NL-04



LEGENDE

1 – BLOC USINE – salle des machines
- travee des auxiliaires mecaniques
- transformateurs de puissance

2,3,4 – BATIMENT D'EXPLOITATION:

2 – BATIMENT DE COMMANDE – salle de commande
- locaux électriques

3 – BATIMENT DES ATELIERS MAGASINS

4 – BATIMENT ADMINISTRATION

5 – BATIMENT DES AUXILIAIRES GENERAUX – local incendie
- local dépotage du fuel
- local traitement d'eau
- chaudiere auxiliaire

6 – PARC A COMBUSTIBLE: – 1 reservoir de FO² de 1000 m³
- 1 reservoir de FO² epure de 200 m³
- 1 reservoir de FOD de 540 m³
- 1 reservoir à huile de 150 m³
- 2 reservoirs pour huile usee et régénérée de 50 m³

7 – PRISE EAU MER POUR CIRCUIT REFRIGERATION

8 – REFRIGERANT ATMOSPHERIQUE D'EAU DE MER

9 – BASSIN DE STOCKAGE DE L'EAU DE MER

10 – EXTENSION POSTE ELECTRIQUE

11 – DECANTEUR

12 – RESERVOIR EAU INCENDIE 500 m³

13 – CHEMINEMENT DES TUYAUTERIES

14 – BUREAUX DE CHANTIER : MAITRE D'OUVRAGE + INGENIEUR CONSEIL

15 – ZONE RESERVEE AUX INSTALLATIONS DE CHANTIER DES CONSTRUCTEURS ELECTRO-MECANIQUES

16 – VILLAS DU PERSONNEL

17 – CABLE EVACUATION D'ENERGIE 90KV

18 – ROUTE D'ACCES A LA CENTRALE C4

Noise Measurement:

1.	Time & Date	11AM, 1/30/1994
2.	Weather	Clear
3.	Wind direction	Northeast
4.	Velocity	5 m/sec
5.	Temperature	31°C
6.	Measured by	Mr. Nakaohji
7.	Witnessed by	Mr. Boubacar CAMARA
8.	Instrument	RION – NL – 04

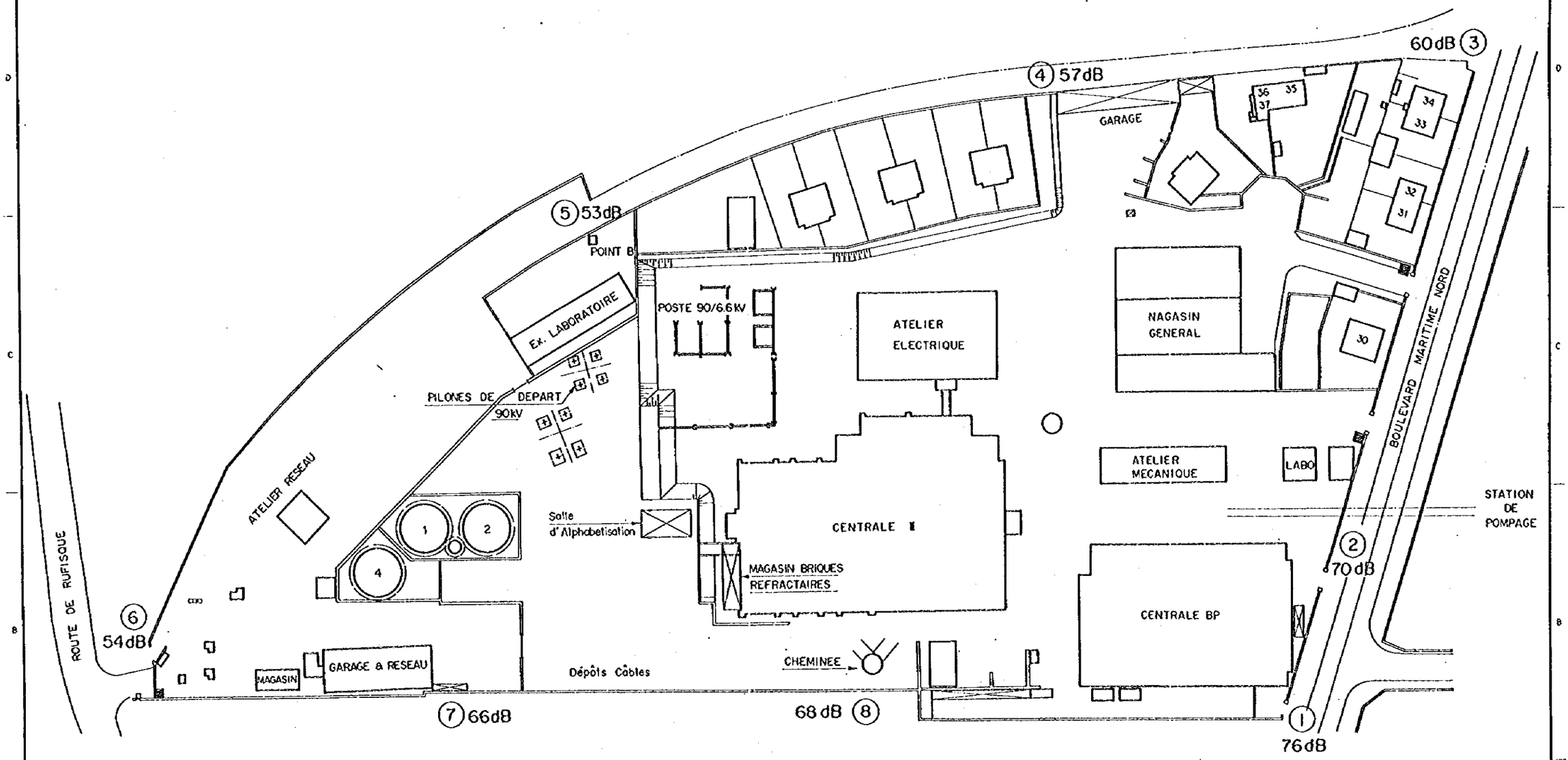
Fig. 12.1.1-1

CAP-DES-BICHES POWER STATION
NOISE LEVEL AT BOUNDART

EPDC International K.K. TOKYO JAPAN

DR: SUBMITTED
FR: RECOMMENDED
CK: APPROVED
DATE

LOCATION	DATE	DESCRIPTION	BY
REVISION			



Noise Measurement

1.	Time & Date	11 AM, 1/12/1994
2.	Weather	Clear
3.	Wind direction	—
4.	Velocity	Calm
5.	Temperature	31 °C
6.	Measured by	Mr. Nakaohji
7.	Witnessed by	Mr. Idrissa MANA
8.	Instrument	RION - NL - 04

Fig. 12.1.1-2

BEL-AIR POWER STATION
NOISE LEVEL AT BOUNDART

EPDC International Ltd TOKYO JAPAN

DR.: SUBMITTED:
CH.: RECOMMENDED:
CK.: APPROVED:
DATE

LOCATION	DATE	DESCRIPTION	BY

REVISION

JICA