(2) Noise

1) Noise under Stable Operation of TES4

The result of noise measurement under usual stable operation is shown in Table 6.3-15 to 6.3-16, and the Mongolian environmental standard is shown in Table 6.3-17.

The noise standard concerning the plant is 85 dB (A), and since the noise level of the circumference under usual operation was in the range of the standard value, it is considered that there is almost no influence on the periphery.

2) Unsteady Noise (Noise occurring by emitting steam from a safety valve)

When the safety valves release the steam in order to perform pressure adjustment between boilers, a loud noise with sharp, high frequency occurs occasionally.

A complaint has been made from residents within the circumference regarding this noise. Moreover, although the Ministry for Nature & the Environment has advised the improvement of this situation, TES4 has replied that it is technically impossible.

The result measured in the periphery on September 5, 2001 is shown in Table 6.3-18.

The sound level at seven points located at a distance of about 550 to 1,440 m from the safety valve of boiler unit No.3 was in the range of 81 to 96 dB(A) and the noise value of several measurement points exceeded the standard of 85 dB(A).

As for this unsteady noise from the safety valve, it is considered that measures such as installing silencers, etc. are required.

In addition, the sound source level at the time of steam discharge is about 140~150 dB (A) according to the calculation result by the following formula:

$$L_1 - L_2 = 20 \log r_2 / r_1$$

**$L_1$: Sound pressure level at $r_1$ (m)**
**$L_2$: Sound pressure level at $r_2$ (m)**
**$r_1$: Distance from sound source**
**$r_2$: Distance from sound source**

(3) Waste Water

All the waste water excepting sewage is fed to the slurry pit at TES4. The waste water is pressured up to the 3rd ash disposal pond and the amount is about 2,000 t/h. This pond is located on the west side of about 4 km from the power station and the circumference of the pond is about 2 km. The ash is settled in the pond and the surface water is sent back to the power station for recycling without being discharged outside.

Although this system has not a waste water treatment facility, it is conceivable that there is no influence on the periphery, unless the wastewater is discharged outside.

In addition, the sewage from the household of TES4 is discharged to the city sewer.

Fig 6.3-9 shows the waste water flow and Table 6.3-19 shows analysis data of circulation water and make up water (well water).

Table 6.3-15 Noise Measurement Result

(Inside of TES4)

Unit: dB (A)

| Point | Sound Level | Point | Sound Level | Point | Sound Level |
|---|---|---|---|---|---|
| (a)Bldg inde | 67 (57) | (l)Stack side | 70 (70) | 1: No.3 IDF | 82 (86) |
| (b)Cooling tower | 72 (84) | (m)ditto | 72 (71) | 2: No.5 IDF | 83 (91) |
| (c)Turbine side | 69 (66) | (n)ditto | 74 (66) | 3: No.6 IDF | 86 (88) |
| (d)ditto | 79 (73) | (o)ditto | 68 (64) | 4: No.8 IDF | 87 (86) |
| (e)ditto | 77 (76) | (p)ditto | 73 (62) | 5: No.3 FDF | 84 (84) |
| (f)ditto | 82 (71) | (q)ditto | 72 (61) | 6: No.5 FDF | 84 (91) |
| (g)ditto | 77 (63) | | | 7: No.6 FDF | 89 (94) |
| (h)ditto | 67 (66) | | | 8: No.8 FDF | 92 (92) |
| (i)Cooling tower | 58 (77) | | | 9: No.3 Mill | 81 (90) |
| (j)Stack side | 70 (66) | | | 10: No.5,6 Mill | 102 (102) |
| (k)ditto | 71 (69) | | | 11: No.8 Mill | 90 (100) |

Date: July 2, 2001 (Value within parentheses: October 23, 1998)

Recorded by: TES4

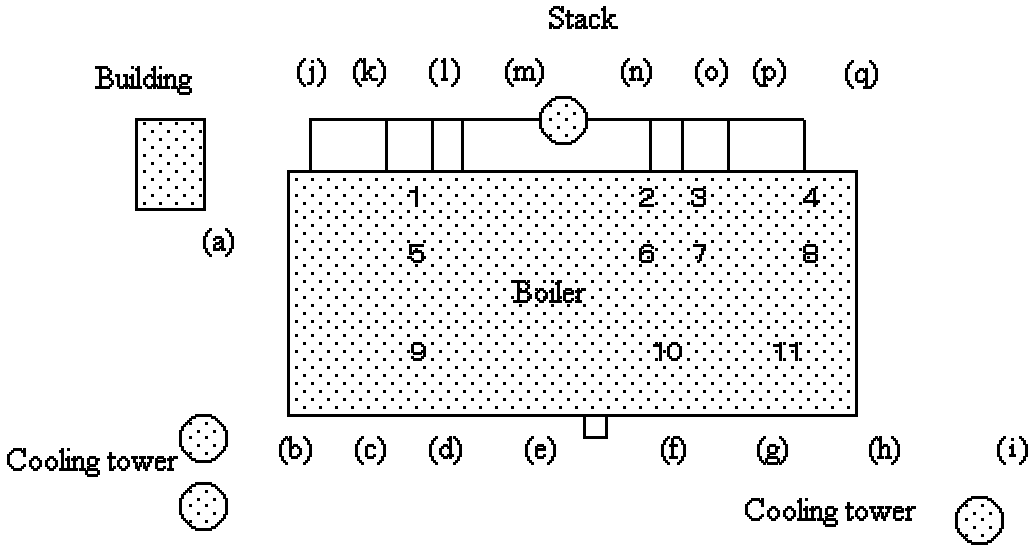


Table 6.3-16 Noise Measurement Result

(Periphery of TES4)

Unit: dB (A)

| Point | Sound Level |
|---|---|
| (1) Road | 63 (46) |
| (2) Gate | 54 (51) |
| (3) 600m from Gate(2) | 45 (45) |
| (4) Road | 50 (48) |
| (5) Road | 52 (44) |
| (6) Gate | 49 (45) |
| (7) Road | 50 (46) |

Date: July 2, 2001 (Value within parentheses: October 23, 1998)

Recorded by: TES4

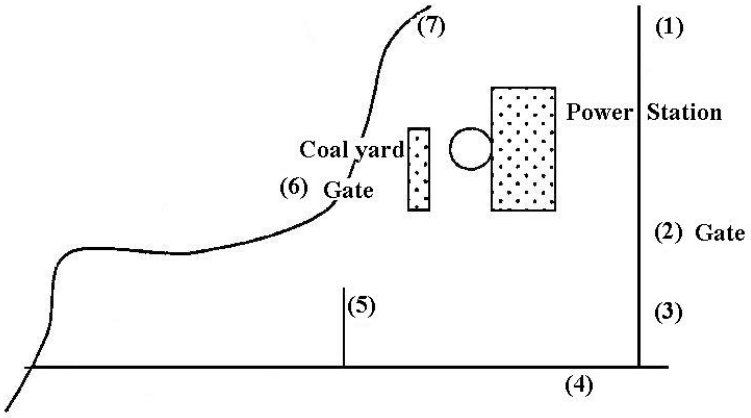


Table 6.3-17 Environmental Quality Standard of Noise

| Factory, Government office, Company | Geometric Average Frequency Sound pressure level in an octave zone Unit: dB | | | | | | | | Sound Level Equivalent level dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1. Machine Design<br>Places for making hardware, software and experiment reports. Hospital institution for receiving patients | 71 | 61 | 54 | 49 | 45 | 42 | 40 | 38 | 50 |
| 2. Control Institution<br>Control room, management office | 79 | 70 | 68 | 63 | 55 | 52 | 50 | 49 | 60 |
| 3. Surveillance Place<br><br>Control and control equipment<br>Room with telephones<br>without telephones | <br><br><br>94<br>83 | <br><br><br>87<br>74 | <br><br><br>82<br>68 | <br><br><br>78<br>63 | <br><br><br>75<br>60 | <br><br><br>73<br>57 | <br><br><br>71<br>55 | <br><br><br>70<br>54 | <br><br><br>80<br>65 |
| 4. Installation of precision machine<br>Room for detailed work of assembly or typing | 83 | 74 | 68 | 63 | 60 | 57 | 55 | 54 | 65 |
| 5. Laboratory.<br>Room established computers or machines with noise | 94 | 87 | 82 | 78 | 75 | 73 | 71 | 70 | 80 |
| 6. Factory and circumference, permanent machine, agricultural relation, Mine | 99 | 92 | 86 | 83 | 80 | 78 | 76 | 74 | 85 |
| 7. Railroad traffic<br>Railway, tram, diesel train, car & train, cabin, crane truck | 95 | 87 | 82 | 78 | 75 | 73 | 71 | 69 | 80 |

Table 6.3-18 Noise Measurement Result During a Safety Valve releases Steam

(Periphery of TES4)

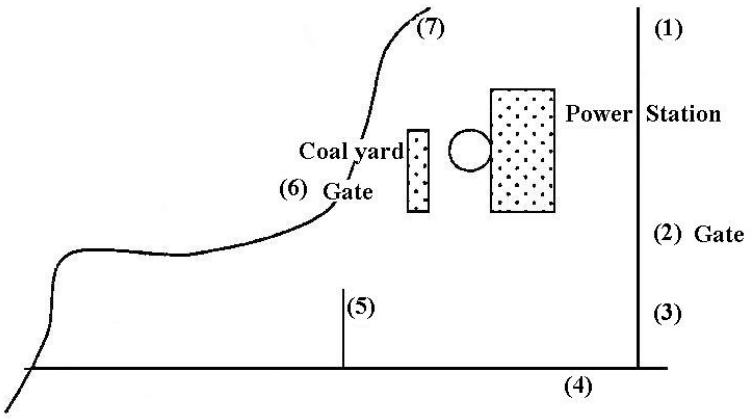
Unit: dB (A)

| Point | Sound Level during a Safety Valve releases Steam | Distance from Sound Source (m) | Sound Level of #3u Safety Valve (Predicted Value) |
|---|---|---|---|
| (1) Road | 90.1 (63) | 550 | 145 |
| (2) Gate | 84.5 (54) | 560 | 140 |
| (3) 600m from Gate(2) | 81.1 (45) | 1,100 | 142 |
| (4) Road | 82.4 (50) | 1,350 | 145 |
| (5) Road | 87.4 (52) | 1,430 | 151 |
| (6) Gate | 84.6 (49) | 540 | 139 |
| (7) Road | 96.2 (50) | 850 | 155 |

Date: September 5, 2001

(Value within parentheses: under normal operation, July 2, 2001)

Recorded by: TES4



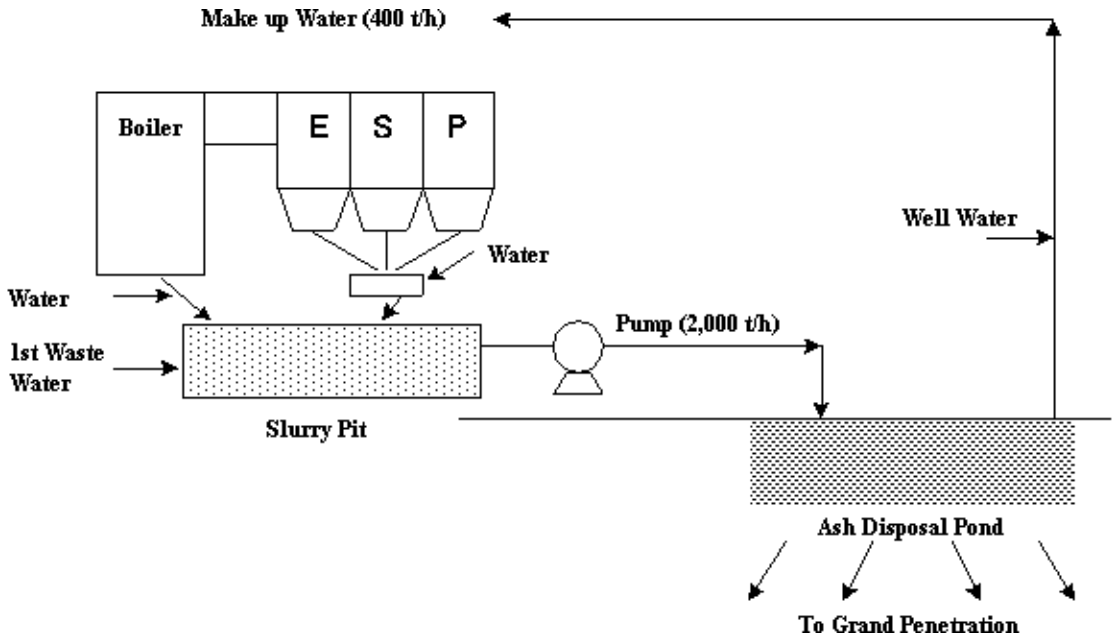



Fig. 6.3-9 Flow Diagram of Waste Water

Table 6.3-19 Water Quality Analysis

(Unit : mg/l)

| Item | Supply Water (Well) | Circulation Water |
|---|---|---|
| PH | 8.35 | 9.45 |
| Ca | 2.4 | 5.8 |
| Mg | 0.7 | 1.5 |
| Alkali | 1.7 | 1.24 |
| NaCl | 165 | 446 |
| Si | 12.9 | 19.8 |
| Cl | 40 | 280 |
| Fe | 0.098 | -- |
| Cu | 0.005 | 0.003 |
| Ni | 0.007 | 0.05 |
| Na | 7.44 | -- |
| $NH_3$ | 0.05 | 0.25 |
| $PO_4^-$ | -- | 0.3 |
| $SO_4^{2-}$ | 35.9 | 173 |
| Oil | 0.22 | 0.14 |
| SS | 0.7 | 1.1 |
| Transparency(cm) | 38 | 12 |

Recorded by TES4

(4) Situation of the 3rd Ash Disposal Pond

The ash disposal pond was constructed in 1983 based on Russian design. During the operation period, the pond was divided to two small sections and the ash reclamation started in first section. At present, the 2nd section is under reclamation. This section is the 3rd ash pond with a volume of 1,961,000m$^3$ and has been under reclamation since 1995.

In addition, since groundwater existed under the ash pond, digging of the soil was omitted during the construction. Figure 6.3-10 shows the status of ash reclamation in the 3rd ash pond.

1) Scale and Structure of the 3rd Ash Pond

The structure of the 3rd ash pond is shown in Fig. 6.3-11 and Fig. 6.3-12.

(a) Scale of Ash Pond

- Reclamation area: 280,870 m$^2$ (about 553 m x 552 m)
- Reclamation capacity: 1,961,000 m$^3$

(b) Structure of Ash Pond

a) Structure of Embankment

The embankment of the 3rd ash pond is developed with earth and sand (sand and gravel) carried from a point 40 km away (Height of embankment: about 8.5 m, upper width: about 6 m, bottom width: about 50 m).

As a result of an examination on embankment stability based on the physical property values of the raw material, the embankment design is considered to be adequate. (Refer to Table 6.3-20).

The waterproof structure is formed from 4 layers in the order of a sand layer (thickness: 0.3 m), polyethylene sheet (Russian product, thickness: 0.2 mm), sand layer (thickness: 0.5 m) and a soil layer (thickness: 0.2 m) containing gravel on the embankment ground surface.

Therefore, it is not an overstatement to say that prevention against exudation is carried out only by use of a polyethylene sheet with a thickness of 0.2 mm.

Although there is no actual result of waste waster disclosure in the 1st and 2nd ash pond with the same structure according to TES4, the intensity of the sheet and a waterproof problem are apprehended in comparison with Japanese standard of ash pond structure.

b) Waterproofing Structure of Ash Pond Bottom

The waterproofing structure is formed from three layers in the order of sand layer (thickness: 0.5m), polyethylene sheet (thickness: 0.2mm) and soil layer (thickness: 0.5m) containing gravel on the pond bottom surface. Because of the measure against waterproofing only by a polyethylene sheet, the same concern as the structure of embankment remains.

c) Underdrain for Collecting Wastewater

As the measure against excessive water of ash pond and rainwater, two underdrains are installed in the ash pond in order to adjust water level. Four steel frames are installed on each intake made from concrete and the wooden plate is gradually framed in these steel frames on all sides, in order to adjust intake level to ash deposition height, so that only overflow water is gathered. The gathered wastewater is circulated to the power station to reuse for ash transportation.

This water level adjustment means is considered to be an appropriate system, unless drainage leaks.

In addition, Mongolian standard regarding structure and maintenance of the ash pond does not exist.

West Corner of the North Side Embankment

Nearby West Side Embankment

Fig. 6.3-10(1)　Ash Accumulation Status of the 3rd Ash Pond (On October 5, 2001 shooting)

Nearby South Side Embankment

Nearby South Side Embankment

Fig. 6.3-10(2)　Ash Accumulation Status of the 3rd Ash Pond (On October 5, 2001 shooting)

カラーの裏