

3. Responses to the Remarks and Proposals of the Department of Environment of the Republic of Latvia

Remark 1: The documentation about influence on the environment does not contain a qualitative and quantitative estimation of the possible radiation contamination which may influence on the territory of Latvia in case of the accident. Such estimation is required for assessment of the conditions of probability of the worst scenario and the unfavourable meteorological conditions.

Response: The dose limits and the target probability factors established for the power unit of the Nuclear Power Plant–2006 completely correspond to the requirements of the acting Russian Regulations, the recommendations and safety norms of IAEA, the International Advisory Group on Nuclear Safety (INSAG 1– INSAG12) and the requirements of the European exploiting organizations to the projects of the Nuclear Power Plants of the new generation with the reactors of PWR type. The Table presents for comparison the target indices of the radiation and nuclear safety of the power units of the increased safety for different projects of Nuclear Power Plants and the requirements to them.

Table –Indices of Radiation and Nuclear Safety of the Nuclear Power Plant

Criterion	EUR INSAG - 3	Standard regulations of RF	Project «NPP – 2006»	Project USA – AP WR
The quota of radiation of the population in the result of discharge at normal operation of NPP, $\mu\text{Sv}/\text{year}$	Not being regulated	50 (50)	10 (10)	-
The quota of radiation of the population in the result of discharge at abnormal operation of NPP, $\mu\text{Sv}/\text{year}$	100	Not being regulated	100	100
The effective dose for the population in case of design-basis accidents, mSv/event .		Not being regulated		
- with frequency of more than 10^{-4}	1		1	1

1/year				
- with frequency less than 10^{-4} 1/year	5		5	5
The effective dose for the population in case of design-basis accidents, mSv/year	-	5	-	-
The probability of a serious damage of the active zone, 1/year, reactor	1E - 5	1E - 5	1E - 6	1E - 6
The probability of large discharge for which it is necessary to take prompt countermeasures outside the site, 1/year, reactor	1E - 6	1E - 7	1E - 7	1E - 7

The Table presents for comparison the calculated values of maximum permissible discharge and the requirements to them established in different countries and projects. Implementation of the planned strategy in the projects lowered the expected levels of maximum permissible discharge grounded according to the above-mentioned requirements.

Table – Maximum Permissible Discharge and Requirements to them, TBq

Dose-forming nuclide	Requirements to location of NPP, USSR, 1987	Requirement of the Council of State of Finland 395/91	Tianwan NPP	Project NPP - 2006	USA APWR
Xenon - 133	Not being regulated	Not being regulated	10^6	10^5	3×10^5
Iodine - 131	Not more than 1000	Not being regulated	600	100	349
Cesium - 137	Not more than 100	Not more than 100	50	10	5.6
Strontium - 90	Not being regulated	Not being regulated	1	0.12	0.15

* The requirement has been excluded at reissuing of the document. The document PNAEG-03-33-93, NP-032-01 harmonized the requirements of the Russian standard regulations with the recommendations of IAEA (INSAG – 3): the measures for control and reduction of the consequences of the serious accidents should reduce the probability of large discharge outside the limits of the site, for which prompt countermeasures are necessary outside the site with the level of 10^{-7} 1/year reactor.

The Table shows the quantitative and qualitative composition of the discharge in case of a serious out-of-design-basis accident being used to estimate the radiological consequences in case of an accident at the Belarusian Nuclear Power Plant.

Table – Discharge of Radionuclides to the Environment, Bq

Radionuclide	Activity, Bq	Radionuclide	Activity, Bq	Radionuclide	Activity, Bq
Kr – 85	1.00E + 13	Kr – 85m	4.2E +14	Kr – 84	8.4E +14
Kr – 88	1.2E + 15	Sr – 89	3.9E +13	Sr – 90	1.5E +12
Sr – 91	4.60E + 13	Y – 91	3.30E +12	Mo – 99	1.80E +13
Te – 99m	1.80E + 13	Ru – 103	1.20E +13	Ru – 106	2.70E +12
Sb – 127	1.2E + 13	Sb – 129	6.9E +13	Te – 129m	1.1E +13
Te – 131m	2.5E + 13	Te – 132	2.5E +14	I – 131	4.1E +14
I – 132	5.8E + 14	I – 133	8.3E +14	I – 134	9.2E +14
I – 135	7.3E + 14	Xe – 131m	1.7E +13	Xe – 133	3.0E +15
Xe – 133m	1.1E +14	Xe – 135	5.8E +14	Xe – 138	3.0E +15
Cs – 134	2.6E + 13	Cs – 136	1.0E +13	Cs – 137	1.70E +13
Ba – 140	8.8E + 13	Za – 140	4.40E +12	Ce – 144	1.2E +13
Np – 239	2.3E + 14	Rb – 88	1.2E +15	Rh – 106	2.7E +12
Te – 129	1.10E + 13	Xe – 135m	1.2E +14	Ba – 137m	1.70E +13
Pr - 144	1.2E + 13				

The comparison of the data of the Tables and MPD of LNPP–2» shows that more powerful discharge has been used for calculations: on iodine – 131 – by 4 times, on cesium–137 – by 1.7 times and on strontium–90 – by 10 times. The results of the calculation have shown that the maximum calculated dose of irradiation of the thyroid gland at the given scenarios of out-of-design-basis accident will exceed the criteria of interference of 50 mSv during the first seven days after the accident at a distance up to 25 km from the Nuclear Power Plant, hence, in radius of 25 km from the Nuclear Power Plant the necessary countermeasure will include the iodine prophylaxis at the early stage. Taking into account that the distance from the Nuclear Power Plant to the border of the Republic of Latvia is 110km, it is possible to say that there will be no consequences for the Republic of Latvia in case of the accident at the Belarusian Nuclear Power Plant.

Remark 2: We consider it is necessary to discuss the problems of monitoring and control in detail, and also to describe in detail the information about the system of the preliminary warning and about the International cooperation, especially in case of an accident in order to receive more effective information and to control the risks.

Response:

The monitoring of environment is being carried out within the framework of the National System of Monitoring of Environment (NSME) in the Republic of Belarus as per the legislation of the Republic of Belarus and other standard legal acts:

- The Law of the Republic of Belarus “On Environment Protection”;
- Regulations on the National System of Environment Monitoring in the Republic of Belarus approved by Resolution № 949 of the Council of Ministers of the Republic of Belarus dated July 14, 2003/

As per point 2 of the Regulations on the National System of Environment Monitoring in the Republic of Belarus the NSME includes the following types of environment monitoring being organizationally independent and carried out on the ground of the basic principles:

- land monitoring
- surface water monitoring
- ground water monitoring
- atmospheric air monitoring
- radiation monitoring
- geophysical monitoring etc.

The Figure represents an approximate scheme of location of the points of observation of radiation control and monitoring within the radiation control area of the Belarusian NPP.

The procedure and the system of prompt warning of the neighboring countries in case of the accident is being worked out by the competent organizations as a part of the project of the Belarusian Nuclear Power Plant and is not the object of EIA. It should be noted that the named procedure must provide for carrying out of the obligations undertaken by the Republic of Belarus within the framework of the treaty “The Government of the Republic of Belarus, the Government of the Republic of Poland dated October 26, 1994”, “The Treaty between the Government of the Republic of Belarus and the Government of the Republic of Poland on Prompt Warning about the Nuclear Accidents and Cooperation in the Field of Radiation Safety”.

In accordance with the “Technical Protocol” of the Ministry of Natural Resources and Environment Protection of the Republic of Belarus and the Ministry of Environment of the Republic of Lithuania about cooperation in the field of monitoring and exchange of information about the state of the trans–border surface water dated April 10, 2008, at present the trans–border monitoring on the hydro chemical indices at the transborder rivers of Viliya River (settlement of Bystritsa) on the Belarusian territory and of Nyaris River (settlement of Buividzhay) – on the territory of Lithuania is being carried out. Besides, the interlaboratory comparison of the results of measuring of the contents of the chemical contaminating substances are being conducted.

The Belarusian party has prepared the proposals for conducting of radiation monitoring at the same range lines and the interlaboratory comparison within the framework of the above-mentioned “Technical Protocol”.

Remark 3: We also consider it is necessary to discuss in detail the problems of the spent fuel and the control of radioactive waste.

The conclusion about the influence on the environment must contain more extensive information about the supposed actions on storage of radioactive waste, their distribution and control, and not only the description of possible or supposed variants.

Response: In EIA of the Belarusian Nuclear Power Plant the problem of radioactive waste handling is being discussed in Section 7.5.2. The Section contains the classification of the radioactive waste, the description of the technology of handling of various radioactive waste being used in the project of the Nuclear Power Plant–2006, the approximate information about the radioactive waste subject to handling and storage at the Nuclear Power Plant is presented; it is shown that the final volume of solid waste (after treatment and not subject to treatment) does not exceed the value of 50m³/year from one unit. The Section describes the storage of solid radioactive waste at the Nuclear Power Plant.

The problem of nuclear fuel handling on the territory of the site of the Nuclear Power Plant is described in Section 8 of EIA of the Belarusian Nuclear Power Plant.

The problems of radioactive waste and nuclear fuel handling outside the site of the Nuclear Power Plant are not the subjects of EIA of the Belarusian Nuclear Power Plant.

At that at present the concept on spent fuel handling is being worked out in the Republic of Belarus. The concept on radioactive waste handling has been developed in 2000. At present the concept is being revised. Both concepts will be considered in detail in the course of development of architectural (engineering) project of construction of the Nuclear Power Plant in the Republic of Belarus.

As for your question concerning Verkhnedvinsky site we inform you that on the basis of the works carried out at the stage of choosing the site for the Belarusian Nuclear Power Plant it has been decided that on the basis of all essential factors the Ostrovetsky site is prior (basic), and Krasnopolyansky and Kukshinovskiy sites are the reserve sites. The Verkhnedvinsky site has been rejected and is not being considered as the site for possible location of the Nuclear Power Plant in the Republic of Belarus.

4. Responses to the Remarks and Proposals of the Radiation Safety Department of the Republic of Latvia

Remark 4: - The text of IEA contains the results concerning only the neighbouring state – the Republic of Lithuania. But there are no quantitative data concerning the Republic of Latvia, the borders of which are at a comparatively small distance - at a distance of 110 km from the Nuclear Power Plant.

- Latvia needs the information about the maximum supposed radiological contamination on the territory of Latvia in case of the accident on the above-named Nuclear Power Plant, especially in case of unfavourable meteorological conditions.

Response: In EIA two scenarios of the out-of-design-basis accidents have been considered which differ in various weather conditions at the moment of maximum concentrations of radionuclides in the atmosphere. This leads to a diametrically different character of precipitation on the earth surface:

- the first scenario was characterized by a relatively low wind velocity and by moderately stable state of the atmosphere which determined

precipitation of a large quantity of radioactive substances (up to 20000 kBq x m² by the trace axis) at a relatively small territory (several thousand of hectares);

- the second scenario was characterized by high speed of displacement of air mass with a moderate fluctuation which caused the formation of large areas (many hundred of hectares) of fields of radioactive contamination with a relatively small surface activity (0.5 – 37 kBq x m⁻²).

The following values of discharge have been taken for modelling: iodine – 131 = 3.1×10^3 TBq and cesium – 137 + 3.5×10^2 TBq which is higher than the maximum permissible discharge for the Nuclear Power Plant–2006 on iodine by 31 times, and on cesium - by 35 times. Even at these values of discharge the maximum density of the contamination of the territory – under the worst weather conditions amounted to, on cesium – 137 1.9×10^5 Bq/m² (5.1 Cu/m²) at a distance of 30 km from the Nuclear Power Plant.

Hence, we consider that there is no sense to calculate the density of the contamination at a distance of 110km.

Remark 5. In the text of EIA there is not enough information about observing of such an important International requirement as the prompt warning about an accident or an incident, about the readiness to react and the reliable operation of the warning system.

Response: The procedure and the system of prompt warning of the neighboring countries in case of the accident is being worked out by the competent organizations as a part of the project of the Belarusian Nuclear Power Plant and is not the object of EIA. It should be noted that the named procedure must provide for carrying out of the obligations undertaken by the Republic of Belarus within the framework of the Treaty “The Government of the Republic of Belarus, the Government of the Republic of Poland dated October 26, 1994”, “The Treaty between the Government of the Republic of Belarus and the Government of the Republic of Poland on Prompt Warning about the Nuclear Accidents and Cooperation in the Field of Radiation Safety”.

Remark 6. It is not specified which conditions are being used for choosing of three possible sites subject to examination for choosing the optimum site for location of the Nuclear Power Plant.

Response: The detailed information about the competitive sites (Krasnopolyanskaya, Kukshinovskaya, Ostrovetskaya) is represented in the summary volume on the complex of research and investigation works for choosing the site for location of the Nuclear Power Plant in the Republic of Belarus (1588 – PZ – OIZ. General Explanatory Note. Part I).

The choice of the site for location of the nuclear object is a multifactor task connected with taking into account the influence of the environment on the nuclear object and vice versa. The safety of the Nuclear Power Plant, the radiation safety of the population and protection of environment in the region of the Nuclear Power Plant in case of the normal operation and with regard to the design-basis accidents and out-of-design-basis accidents along with the technical facilities and organizational measures are being provided for by the choice of the favourable location for the Nuclear Power Plant and its proper remoteness from the populated areas, the industrial enterprises, the objects of culture and health services, etc. Thus, when taking the decisions about the suitability of the site for location of the Nuclear Power Plant, the following factors have been taken into account:

- connected with the influence of the Nuclear Power Plant on environment and the radiation safety of the population;
- stipulated by the events and actions connected with the activity of people;
- connected with the influence of the natural conditions on the safety of the Nuclear Power Plant.

Criteria of Comparison

The choice of the priority site has been conducted on the basis of the analysis of the competitive sites according to the chosen criteria of comparison, on the following directions;

- correspondence to the requirements of the normative documents of the Republic of Belarus and the recommendations of IAEA;
- natural and technogenous factors;
- social and demographic factors;
- ecological factors, including the radiation contamination;
- technical and economic factors.

Question 4. There is an insufficient experience of operation because other reactors of the similar type are only at the stage of construction.

Question 5. There is an insufficient analysis of the reason why just this type of the reactor has been chosen. Probably, the choice to a great extent has been grounded by the experience of using the technologies of the Russian Federation, and also possible economic, but not technical considerations.

Response to questions 4-5: Among the reactors of PWR type of generation III+ the world market proposes: - AP – 600, 1000 (USA and Japan);

- EPWR – 1600 (France and Germany);
- «NPP – 2006» (Russia).

The project AP – 600 and AP – 1000 exists only on the paper, it is not being constructed anywhere.

The Project EPWR-1600 is superfluous on power (1600 MW) for the energy system of the Republic of Belarus and does not provide for stability of the energy system in case of introduction of it to the energy budget of the Republic.

The project «NPP – 2006». Russia is the only country which is actively engaged in construction of the Nuclear Power Plants with PWR–1000 abroad during the last ten years: China, India, Iran, Bulgaria. Some Nuclear Power Plants have been put into operation: Rostov Nuclear Power Plant in 2001, Kalinin Nuclear Power Plant in 2005, the Nuclear Power Plant “Temelin” in 2001 and 2002, Tianwan Nuclear Power Plant in 2007. The closest prototype of the project of the Nuclear Power Plant – 2006 has been put into commercial exploitation in 2007 in China (2 power units). As per the Russian projects of the third generation construction of two units in India is coming to an end, construction of two units was started in Bulgaria and of four units – in Russia.

As for the Tianwan Nuclear Power Plant, on September 23, 2009 in Lyanjungan (China), the negotiations between ATOMSTROYPROJECT Close Corporation (NPP, Close Corporation) and Jszyansus Nuclear Power Corporation (JNPC) took place in connection with termination of the term of the guaranteed operation of the second unit of the Tianwan Nuclear Power Plant.

The parties signed the joint “Protocol of Negotiations on the Issue of Final Acceptance of unit 2 of TNPP in accordance with which the two–year period of the guaranteed operation of the second unit of the Tianwan Nuclear Power Plant is considered to be completed. The Protocol has been signed on the Russian part by the First Vice–President of ATOMSTROYPROJECT Close Corporation Alexander Nechaev, on the Chinese part – by the Director General of JNPC Mr. Tszyan Gouan.

The similar Protocol of the final acceptance after completion of the guaranteed period of operation of the first unit of the NPP has been signed in June of this year.

The guaranteed period of operation demonstrated the reliable operation of the Nuclear Power Plant. Both power units of the Tianwan Nuclear Power Plant operate stably at the level of the rated contract power of 1060 MW and have high technical and economical indices. Since the moment of the start of the first two units the Nuclear Power Plant has worked out more than 30 mlrd kW x hour of electric power. The Tianwan Nuclear Power Plant which has been constructed as per the modified Russian project is the most safe among the Nuclear Power Plants operating in the People’s Republic of China.

The proposed projects of the Nuclear Power Plants with the reactors of generation III+ have the comparable indices by reliability, frequency of the maximum accident discharge etc. It should be admitted that a definite role has been played by the experience of using the technologies of the Russian Federation, the community of the language, of the technical requirements, etc. However, the major role in choosing the project played the problems of safety of the Nuclear Power Plant.

Question 6. There is insufficient information about the quantity of radioactive waste and discharge to the environment just from this type of the reactor.

Reponse: The Table contains the data on the quantity of the solid radioactive waste coming for treatment and further storage to the building for the treatment of the low–activity waste from two units of the Nuclear Power Plant-2006.

Table – Quantity of Solid Radioactive Waste Subject to Treatment and Further Storage in the Building for Treatment of the Low –Activity Waste from two Units

Name of Waste	Place of formation	Quantity of Waste from Two Units Coming to the Building 00UKS, m ³ /year (at normal operation, maintenance and repairs /at accidents)	Notes
1. Low – activity Solid Radioactive Waste			
1.1. Combustible	Building of the zone of the controlled access	220 (110/110)	

1.2. Noncombustible mouldable	Building of the zone of the controlled access	130 (65/65)	
1.3. Metal	Building of the zone of the controlled access	20 (5/15)	50% for grinding
1.4. Tubular electric heating elements	RW	1.0 (1/-)	50% for grinding
1.5. Filters			
1.5.1. Noncombustible, mouldable	Building of the zone of the controlled access	32	Once per two years
1.5.2. Combustible	Building of the zone of the controlled access	36	Once per two years
1.5.3. Solidified	Building of the technological, control systems of normal operation and special water purification		
2. Medium- Activity Solid Radioactive Waste			
2.1. Metal	Building of the zone of the controlled access	10 (10/-)	90% for treatment
2.2. Other waste			
2.2.1. Combustible	Building of the zone of the controlled access	23 (11.5 / 11.5)	90% for treatment
2.2.2. Noncombustible	Building of the zone of the controlled access	54 (54/-)	90% for treatment
2.3. Filters			
2.3.1. Noncombustible	Building of the zone of the controlled access	75	Once during the period of operation (50 years)
2.3.2. Combustible	Building of the zone	87	Once during the

	of the controlled access		period of operation (50 years)
2.4. Solidified waste	Building of the technological, control systems of normal operation and special water purification	25.7	
2.5. Solidified waste of waters of the special laundry, combustion installation	Building for treatment and storage of radioactive waste	16.8	
3. High – Activity Solid Radioactive Waste			
3.1. Intra – reactor detectors	RW	1.0	
3.2. Detection assemblies	RW	1.0	

The final volume of the solid waste (after processing and not subject to processing does not exceed 50m³/year from one unit.

The real discharge of radioactive substances from the Nuclear Power Plant with the reactors PWR–1000 are listed in EIA of the Belarussian Nuclear Power Plant according to the data of the “Annual Report on the Activity of the Federal Department on Ecological, Technological and Nuclear Supervision in 2005”. The portion of the radionuclides being discharged and dropped relative to the fixed SpNPP – 03 values have been also stated there.

Question 7. The analysis of the information is being complicated because there is of ten no references to the sources of literature.

Response: We accept this remark. In the final wording of EIA of the Belarussian Nuclear Power Plant this drawback has been removed.

Question 8. The reference to page 93 to the computer program MULTIBOX and comparison of its results with the other programs on analysis of migration of radionuclides is not sufficiently grounded because for checking of the model and the system the data about temporary storages of radioactive waste, the initial information of which is not correct enough, at the same time there is no ground to affirm that the system of supporting of the given decision within the limits of the error is as reliable as many others being tested more thoroughly.

Response: The program complex MULTIBOX describes a multi–chamber model with a variable cell, in the basis of which the method of system analysis lies. This type of models has found wide use both in solving the practical migration and hydrogeological

problems for prompt predictions, and in solving of complicated problems of spreading the radionuclides in the lithosphere, hydrosphere, biosphere in the native and International practice. The model and computing programs MULTIBOX have been tested by comparing the results of the computations on the International programs such as DUST, GWSCREEN, AMBER, ECOLEGO. The International models DUST, AMBER, ECOLEGO which are also mult –chamber models have been recognized, approved and widely used at the International level.

The verification and approval of the model MULTIBOX has been carried out on the basis of comparing the calculated and experimental research being conducted at the points of the burial of waste of deactivation of the Chernobyl origin which have been examined, certified and controlled during 10 years. This model has also proved itself when being used during examination of the profiles of contaminations of the soil layers as a result of migration of radionuclides on the territories contaminated by radionuclides in the result of the Chernobyl and global accidents.

The satisfactory consent of the results of computations by the model MULTIBOX and International models, and also with the data of the field research gives the grounds for applying the developed model to evaluation of the potential danger of the radioactive contamination of the underground water in cases of local and site sources of contamination in the zone of observation of the planned Nuclear Power Plant at the stage of investing to its construction.

The received conclusions on the calculated research carried out on the basis of using the developed models, coincide with the conclusions of the Russian geological expeditions, which during the last twenty years actively carry out the geological research in the regions adjacent to the operating Nuclear Power Plants (Smolensk, Kursk, Novovoronezh, Kalinin, Leningrad). The main direction of these research was to find out by geochemical methods the influence of the atomic power objects on the environment within 30 km zone from the Nuclear Power Plant. The main content of these conclusions is that at normal operation of the Nuclear Power Plants rather unsatisfactory radiation situation is being provided for on the territories adjoining to them. The standard methods of control of the radiation situation in the environment do not permit, in the majority of cases, to detect the influence of their activity.

Question 9. There is no grounds for the scenario at page 94 – how were the boundary conditions chosen – 15m^3 and 600 Cu of the liquid radioactive waste the influence of which is further being analyzed, and that the isotopic composition of the waste is not characteristic of the reactors of PWR type.

Response: The hypothetical scenario of the local source of contamination of the underground water has been synthesized on the basis of the analysis of the emergency situations at the operating Nuclear Power Plants in Russia which caused the local contamination of the geosphere at the sites of the Nuclear Power Plants. (Kuznetsov V.M. “The Basic Problems and Modern State of Safety of the Enterprises of the Nuclear Fuel Cycle of the Russian Federation”, 2002). As an example, the incident has been considered which took place at the Beloyarsk Nuclear Power Plant when at the Plant of pumping the liquid radioactive waste the room for servicing the pumps of the storage of the liquid radioactive waste has been flooded. The liquid radioactive waste passed into the safety tray and, because of absence of tightness, as well as because of overfilling of the tray, got in the soil under the storage of the liquid radioactive waste, and then – to the cooling reservoir. The total quantity of the liquid radioactive waste being accumulated in the tray amounted to 15m^3 . Other characteristics of the liquid radiotechnical waste (isotope composition, specific activity of the radioisotopes, summary activity of the discharge etc.) have been formed from different sources in view

of lack of reference information. The calculations on the given scenario were carried out only for the purpose to evaluate protection of the underground water against radioactive contamination in the zone of the influence of the Nuclear Power Plant and to develop later on the systems of radiation monitoring and the measures for preventing spread of the radioactive contamination in the water-bearing strata in the emergency situations.

Question 10. On page 96 the analysis of the epidemiology is being carried out by means of using the data about the Belarusian people only, and the planned location of the Nuclear Power Plant is situated at a distance only 40 km from Vilnius – therefore the analysis should be executed for the population of the neighbouring countries.

Response: The Ministry of Nature and Environment Protection of the Republic of Belarus on request of the Ministry of Energy of the Republic of Belarus (Letter №15/992 dated March 9, 2009) has sent to the Ministry of Environment Protection of the Republic of Lithuania by Letter № 14-16/1487-ВН dated March 24, 2009 an enquiry on submission of the necessary information. The information on the demographic situation within the area of 30 km zone of the Belarusian Nuclear Power Plant has not yet been received from the Ministry of Environment Protection of the Republic of Lithuania till now, in view of which it cannot be clarified in EIA of the Belarusian Nuclear Power Plant. The authors of EIA had at their disposal only the information on the population of the territory of Belarus.

Question 11. On page 110 there is no correspondence of the scale or location of the object.

Response: On page 110 a drawing is presented but not a map, therefore the scale has not been observed. The drawing bears a reference character.