**NACAG Public Bid**

**Questions and Answers**

 **NOTE:** This document is replicated based on the new questions due to the extension of the timeline deadlines.

For the design of the tertiary abatement system it is important to know the composition of the tail gas, and on this point we have some doubts:

1. It is important to know the amount of water at the reactor inlet, could you please send us this information?

*Answer: The water content in the air stream entering the reactor is 570.4 kg/h (31.7 kg-mol/ hr).*

1. As the amount of N2O in the tail gas at the reactor inlet we assume 1500 ppmv, do you know this value or do you have a more accurate estimate?

*Answer: We do not have an N2O measurement. The value comes from a simulation so it is estimated; take as reference a content of 1,500 ppmv.*

3) What concentration of N2O do you want at the reactor outlet?

*Answer: An N2O reduction of at least 90% is expected. Based on the estimated content of 1,500 ppmv, the value at the outlet should decrease. In the case of NOx, the maximum value is 50 ppm.*

1. Estimated N2O value before current NSCR? 1000ppm?

*Answer: Idem question N°2.*

1. Is the current NSCR reactor in a state that would allow it to be reused? If so, could you provide drawings?

*Answer:* The 10-R-203 equipment and its catalyst:

1. The equipment can be maintained by replacing the NSCR catalyst with SCR.
2. The equipment can be changed by replacing the NSCR catalytic converter with SCR.

Both options must be rigorously evaluated, because it will depend on the volume of catalyst required.

*See attached documentation in the technical information package.*

1. Should the downstream burner be an in-line or external ignition heater (i.e., add heat via heat exchange)? The expander must be able to handle a higher flow rate if an in-line burner is to be used. Can we get information on natural gas availability and the expander data sheet?

*Answer: The objective is to install a heater downstream of the abatement reactor. We have not defined a limit for the use of natural gas for this heater but we need the consumption to be as low as possible. See attached information about the expander.*

 *Attached in the technical specifications folder: A1290-01-1042-M-GEN-003\_B (STATE A) and EB-2458-9*

1. Could you please send technical information about the equipment 10-R-203, 10-BO-155 as drawings, data sheets, natural gas flow rates, 3D, photos, 3D in the short term NAVIS and then in autocad (.dwg extension). From the outlet of the equipment 10-E-151 (Hot Tail Gas line) to the outlet of the reboiler 10-B-155. Containing the line between the chiller 10-R-2039 and the reboiler 10-B-155 with the gantry and its support, as well as the pipe rack that is on the gantry.

*Answer: Technical information package sent to all interested bidders who signed confidentiality agreement.*

1. The proposed technology should ensure a reduction in N2O concentration from 90% of the current N2O concentration. Provide N2O content to the NSCR.

 *Answer: Idem question N°2.*

1. APASA requires that technology to co-abate NOx emissions from tail gas be included in this proposal and that this NOx abatement system not be negatively dependent on O2 (oxygen) concentration. The N2O abatement system can also handle NOx abatement, but due to the large amount of NOx (5500 ppmv), high abatement conversion cannot be achieved and this may be critical for a standard SCR with ammonia. In addition, this will require an ammonia mixer to feed ammonia to the catalyst to perform NOx reduction by SCR. The reason for this request, since according to NACAG-ANEX-001-Technical Specifications for Nitric Acid Plant (EN) item 5.10 “NOx content after reactor (ppm)” is 50 ppmv, which shows that NSCR is already capable of handling NOX reduction.

*Answer: The NOx content at the inlet of the gas reduction reactor is 5,000 ppm (approx. 3,000 ppm NO2 and 2,000 ppm NO). With the NSCR we are able to reduce NOx up to 50 ppm, when we manage to keep the O2 content stable and in the optimal range for the reaction in the abatement (when the Pt screens lose efficiency, we are not able to reach these values). We are interested in changing our current system (NSCR) to one that does not depend on O2 content to reduce NOx gases.*

1. Is the application to abate NOx together with N2O mandatory?

*Answer: It is not mandatory, but it’s APASA's interest.*

1. If yes, what is the NOX level required at the outlet of the abatement system?

*Answer: The NOx limit in the tail gas stream is 50 ppm.*

1. Does the project foresee the elimination of the NSCR?

*Answer: The project is to reduce N2O gases but it is a good opportunity to replace the current NSCR system with SCR and we are interested in moving forward with this.*

1. If NSCR is installed, why is it necessary to increase the temperature to 610 °C with indirect heating?

If heating to 610°C is requested to be performed by an indirect heating system,

*Answer: We are interested in replacing the current NSCR system and, with a selective system, it will probably not reach the proper gas temperature at the expander inlet (wasting energy in this equipment).*

*The goal is to install a heater downstream of the abatement reactor. We do not have a defined limit for the use of natural gas for this; although we would like to consume as little as possible.*

 14) Clarify the reason for having carried out a new commissioning in 2018.

*Answer: The plant was operating in the 1960s in Canada and then the nitric acid plant was moved to Salta-Argentina and started up in 2018/19; operating continuously in 2020.*

15) Is it technically possible to increase the NOx concentration at the outlet of the existing NSCR to, for example, 500 ppmv?

*Answer: No*

16) Does the 10-B-155 tail gas heat recovery boiler (downstream of the NSCR) have sufficient capacity to handle a higher inlet temperature from the upstream abatement system?

*Answer:* The maximum admissible temperature of the recovery boiler 10-BO-155, gas side, is 687.6 °C. *The idea is to replace the 10-B-155 with a heater: it can be direct with burner or indirect through convection heating and external natural gas burner.*

17) **Is the outlet temperature of the tail gas heat recovery boiler 10-B-156 (upstream of the NSCR) controlled?**
Answer: The gas temperature to the recovery boiler 10-BO-156 can be controlled in a certain range by a manual bypass on the tail gas heater (10-E-151) but it is not an automatic control and the range is limited. The gas temperature at the outlet of this boiler can also be corrected in a limited range by a manual bypass of the boiler, but it is not automatic either.

18) What is the tail gas temperature range upstream of the 10-B-156 heat recovery boiler? Please provide the range for the different cases in summer with EOR (End of Run for platinum screens) and winter with SOR (Start of Run for platinum screens) or other cases defining the minimum and maximum temperatures.
*Answer*:

Shell side operating temperature: 104/197.7°C
Tube side operating temperature: tube 547/482°C

19) Does the tail gas heat recovery boiler 10-B-156 (upstream of the NSCR) already operate at the limit or can the load be increased to reduce the outlet temperature?

Answer: Operates at maximum capacity.

20) Please provide the mechanical design pressure of the tail gas system (should be similar to the NSCR design pressure).

*Answer*: 9kg/cm2g

**21) Does the expander operate continuously with a bypass or does the tail gas flow completely through the machine at all times during normal operation?**Answer: While the expander is bypassed, it is operated continuously with full gas through the equipment.

22) Please provide operating costs for ammonia, natural gas and electric power to allow us to select the best technology for the process heater upstream of the expander.

Answer: This information cannot be provided.

23) What type of streams do we have available and enabled for the project? Example **Is compressed air available for the process heater upstream of the expander, e.g. from the ammonia plant?**

*Answer*:

Currents available:

* Natural gas
* Ammonia
* Purge gas

Compressed air is not available for this service, so if necessary, it should be considered in the offer.

**24) Can the expander be operated with a lower inlet temperature than what they operate at, approximately 550°C?**
Answer: With the decrease in gas temperature at the expander, energy would be lost and steam consumption in the turbine would increase or; a reduction in nitric acid production would be seen. For this reason it is in APASA's best interest to maintain the temperature in the range of 590-610°C.

25) **Will proposals that do not include NOx abatement, but only tertiary N2O abatement, be accepted? Consequently, the existing NSCR must continue to operate with the same NOx level at the outlet.**
Answer: No.

26) **Does the customer have a specific preference on the heating method?**
Answer: We do not *have a specific preference on the heating method.*

27) **The NSCR outlet is currently between 710-730°C, and heat from the NSCR is recovered by generating steam and reducing the temperature to 590-610°C at the expander inlet.
In case of a new heating system, can steam generation be eliminated to reduce the tail gas outlet temperature to match the expander inlet (590-610°C) in order to minimize natural gas consumption in the new burner?**

Answer: *Yes.*

28) **One design option may be to reduce N2O and NOx with technologies other than the NSCR and leave the existing NSCR for tail gas heating only. The NSCR should be dismantled and removed if necessary.**

Answer: Keeping the NSCR catalyst only for tail gas heating should be evaluated by the technology company in conjunction with the EPC, since they must perform a technical-economic analysis.

Regarding the 10-R-203 equipment:

1. The equipment can be maintained by replacing the NSCR catalyst with SCR.
2. The equipment can be changed by replacing the NSCR catalytic converter with SCR.

Both options must be rigorously evaluated.

29) One design option could be to reduce N2O and NOX emissions with technologies other than the NSCR, leaving the NSCR operating only for tail gas heating.
The NSCR will operate with a large excess of O2, thus independently of the upstream operation. Can this be a design option?
Answer: *A comprehensive techno-economic study should be performed to evaluate the effects on the thermal and energy efficiency of the system, considering all the variables involved.*

30) **Does the customer require the NSCR to be decommissioned and dismantled?**Answer: Yes, *the reactor and NSCR must be decommissioned, removed if necessary (APASA could be responsable for the disposal of equipment and catalyst). In addition to the assembly of the new reactor if so. According to the bidder's technical proposal.*

31) **What chemical pollutants are measured in the stack?**Answer: *N2O and NOx* are measured in the stack*.*

*In addition, there is an O2 measurement upstream and downstream of the abatement.*

32) **What compounds are measured?**Answer: We’ll measure the following: N2O, NOx in the stack, and we measure O2 upstream and downstream of the abatement.

33) **ANNEX-001 - Nitric Acid Plant Technical Specifications, point 6.6 mentions that the O2 in the stack is 1.3% - 1.5%.** Is the NSCR working properly in de NOx decomposition with such excess of O2?
Answer: If we maintain this O2 content, the NSCR system is working properly.

34) **ANNEX-001 - Nitric Acid Plant Technical Specifications, point 5.16 mentions that the O2 in the SCR is 1.3%-1.5%.** Is any SCR currently installed in the plant or is it a typographical error?
Answer: *It is a typographical error, we currently have an NSCR. It has been corrected and the bidders have been advised.*

|  |  |  |
| --- | --- | --- |
| 5.16 | O2 content of the NSCR (% vol.) | 1.3 - 1.5 % |

35) **ANNEX-001 - Nitric Acid Plant Technical Specifications, point 4.3 mentions that the available depth for a secondary catalyst under the screens is 260 mm.**
The client should confirm that N2O will be reduced only with a tertiary catalyst and that the installation of a catalyst II is not foreseen within the scope of the project.
*Answer: N2O abatement will be performed using tertiary technology (no secondary technology for N2O abatement). In addition, NOx abatement should be considered, either in the same unit or in a different one; one bed with a mixed catalyst or two beds. Technologists should evaluate possible alternative improvements.*

36) **ANNEX-001 - Nitric acid plant technical specifications, point 1.8. The production design capacity is 180 MTD, and point 1.9 mentions 160 MTD. Should the new unit be designed for 180 MTD or 160 MTD?**
Answer: *It should be designed for a design capacity of 180 MTD.*

37) **Confirm what operating capacity the figures reported in ANNEX-001 refer to (180 MTD or 160 MTD) and whether specific considerations should be made to modify the flow proportionally in the design of the new equipment.**

Answer: *idem question N° 36*

38) R**equests a NOx reduction from 5500 to 50 ppmv with a NOx abatement system that is "not negatively dependent on O2 (oxygen) concentration."**This means that the NSCR can no longer be used effectively for NOx abatement and a SCR reactor should be used to break down NOx to 50 ppmv. Doing so using an ammonia SCR will lead to an additional ammonia consumption of about 16-20 kg/MT HNO3. Confirm that such additional ammonia consumption has been contemplated within the project.

Answer: *Yes.*

39) Does Austin Powder have its own safety regulations, for example for the safety distance between equipment? The question is based on the requirement to place a direct or indirect gas furnace (preferably) in the area close to the outlet of the future chiller, what complications in the layout could arise.

Answer: *Yes, see it attached in the technical information folder.*

1. We understand that the scope of the project includes the replacement of the following equipment: 10-V-255, 10-R-203 and 10-B0-155.

Answer: *Yes.*

1. It is our understanding that the currently installed instruments are not to be modified or changed, but will be calibrated by Austin Powder and must be reinstalled by the contractor.

Answer: If necessary, they will be changed, if it is considered really necessary, the case for changing them will be evaluated, otherwise they will be maintained**.**

1. What kind of piping does the plant have or what materials is Austin Powder requesting for this application?

Answer: *Yes, see it attached in the technical information folder.*

43) In the ENG version of the document NACAG-POT-RQC, some paragraphs are repeated many times inside the tender: for example language requirements (ENG/ESP) are repeated at pages 8, 26, 46. Evaluation criteria are repeated at pages 18-20, 36-38, 57-59

Answer: *They repeated paragraphs, but they aren’t incorrect; they are just repeated. It’s uploaded the version without repetitions in our web.*

44) The composition of NG shows 5.5 % ETHYLENE (i.e., C2H4), which is rather uncommon in NG composition. We assume that this 5.5 mole % is ETHANE (i.e., C2H6).

Answer: Yes, it is a typographical error: 5.5% C2H6 ETHANE in NG.

45) The purge does not contain CH4 which is the common inert along with He and Ar in the Ammonia loop purge with upstream methanizer.

Answer: In the specification, precisely in ANNEX-NACAG-ANEX-001-Plant Information (EN)-we place information about the composition of NG and Purge Gas with the corrections of % of chemical compositions. It’ll be corrected.

|  |  |  |
| --- | --- | --- |
| 5.26 | * Purge gas composition
* Composition GN
 | 30 % CH4; 7 % H2; 26 % Ar; 37 % N291% CH4 - 5.5% C2H6 - 0.5% C3H8 - 0.2% C4H10 - 2.8% others |

47) We are interested in receiving a calculation report of the support structure of the current chiller and a calculation report of the foundations, to determine if it is feasible to reuse it for a new chiller. Below is the reference of the documents



*Answer*: *Yes, it is attached in the technical information folder (in dropbox) for companies that have signed the confidentiality agreement.*

48) Under what conditions is the purge gas delivered (temperature and pressure)? Confirm whether it is in molar basal or mass % described in shared document.

*Answer: For purge gas conditions see question 66.*

*The balance was performed on base mass.*

49) Is purge gas of any use today?

Would the use of this purge gas in a possible technical solution generate any value for its utilization?

*Answer*: *It has 2 possible uses: to the auxiliary burner of the primary reformer of the ammonia plant or to the NSCR abatement of the nitric acid plant. But at the moment it is being sent to the stack.*

50) According to the last reply received, the purge gas does not contain ammonia. Please confirm this.

*Answer*: *It is answered in question 45.*

51) In case of needing ammonia or natural gas in an intervention zone, whose responsibility is it to bring the supply to that zone?

*Answer*: *The project is a turnkey project, in case of need, the successful bidder is responsible for*

52) Indicate the collective bargaining agreement and/or specific agreements to be used.

*Answer*: *The winning bidder must define which union he/she is to work with.*

53) Indicate working hours and schedule. Regimes to be adopted.

*Answer: As indicated in the public bid, plant shutdowns are worked 7 days a week, 24 hours a day, to meet scheduled deadlines.*

54) Will we be able to use any existing plant dining room for our resources or will it be at the contractor's expense?

*Answer*: *Yes, they will have a physical space available on the floor that they will be able to use.*

55) If you have a physical space for the client's dining room, please indicate the approximate distance from it. Do you have a vendor list for contacting local suppliers or manufacturers that can supply us?

*Answer*: Between 200-500m *approximately and yes we’ve suppliers.*

56) We need to have some description requested for the new control system of the new reactor to be installed.

*Answer*: *Compatibility with ABB DCS 800xA.*

57) Indicate the estimated dates of plant shutdowns and their duration, in order to optimize our resources and work fronts. Estimated start and completion of work (will there be any plant shutdown milestones?). Estimated total duration of the work.

*Answer*: *As indicated in the public bid documents, the plant shutdown is scheduled for July/August 2026, with an approximate duration of 25 days.*

58) Geographical and location data of the area of the works to be contemplated.

*Answer: Geographical data*

*The site is surrounded by:*

*o To the east: Locality of Joaquín V. González.*

*o To the west: El Galpón City and Medina River*

*o North: El Tunal Dam and National Route No. 16.*

*o To the South: Department of Rosario de la Frontera*

*ENVIRONMENTAL AND SEISMOLOGICAL CONDITIONS*

*For the Basic Engineering of the CFIh Company, it was agreed to set the design parameters*



*(1) Environmental Impact Study Nitrate Production Complex of the Nitrates Company*

*Austin S.A (NASA), Page 1.*

*(1)(2) Comments to document: A1290-01-90-P01-TEC-001-0 (Process Design Basis)*

*(2)(3) According to the records (years 1934 to 1990) F.C.G.B. El Tunal Station (25º 15' S, 64º 39' S, 64º 39' S).*

*W.- 454 masl) (Bianchi and Yáñez, 1994).*

*(4) Annual average - Environmental Impact Assessment Nitrate Production Complex of the*

*Nitratos Austin S.A. (NASA), Page 6.*

*(3)(5) Average - Environmental Impact Assessment Nitrate Production Complex of the*

*company Nitratos Austin S.A. (NASA), Page 7*

*Works area: attached in the technical information folder (in dropbox) for companies that have signed the confidentiality contract*.

59) Will the soil, topography and Georadar surveys be provided by Austin Powder or should they be performed by the contractor?

*Answer: Soil studies from the project stage are available and will be provided at the next stage if required.*

60) Will electricity and water be provided by the customer or will we have a specific connection point?

*Answer: To be paid by the customer*

61) If there is contaminated soil, indicate its disposal or treatment. Will the final disposal and treatment be by the client?

*Answer: The final disposal is seen with SHES and the treatment is in charge of APASA.*

62) For disassembly of equipment (if necessary), indicate the disposition of the equipment. Will the transportation be by Austin Powder?

*Answer: If it is necessary to dismantle the equipment, the movement (crane) is at the contestant's expense, but the final disposal of the equipment is in charge of APASA.*

63) We understand that there will be a physical location for our work shops near the work area. Please indicate distances.

*Answer: Yes, between 100 - 500 m.*

64) The Q&A document mentions "attached in the technical information folder" What does it refer to?

*Answer*: All the contestants, with whom we signed a confidentiality agreement and sent the form 8 where they declared their interest in participating, were sent a dropbox link with the technical information requested in each question (such as: P&ID, Pipping class, etc.) *for the companies that have signed the confidentiality agreement*

65) Check the purge gas composition and clarify whether it is mol% or wt%.

*Answer: Idem question 48 and in question 45 the corresponding arrangements were made.*

66) Provide the normal, minimum and mechanical design for the following current in the new installation.

*Answer*: *We adapt to your needs*

*Ammonia*

*T(°C) 29 normal max, 13 min and 40 mechanical design*

*Pressure Up to (barg) 15 normal, 16 max, 14 min and 41 mechanical design*

*NG*

*T(°C) normal 30 max, 10 min and 40 mechanical design*

*Pressure op filter C act A40 (barg) 20 normal, 21 max, 15 min and 30 mechanical design*

*Purge gas*

*T(°C) 35°C normal; 36 max, 34 min and 232 mechanical design*

*Pressure op (barg) 15 normal, 16 max, 14 min and 25 mechanical design*

67) Provide data sheet and mechanical details of purge mixer +tail gas existing today prior to NSCR.

Answer: *Yes, it is attached in the technical information folder (dropbox) for companies that have signed the confidentiality agreement.*

68) In the "guaranteed N2O reduction efficiency" paragraph, it is mentioned that the higher the efficiency, from 95% N2O reduction: 10 points, does this mean that: for efficiencies higher than 95%, proportional points are assigned more than 10 points? (Ex: 11 points for 96%, 12 points for 97 and so on).

*Answer: No, since the maximum score for this item in the matrix is 10 points. Therefore, if the efficiency is from 95% or higher, you get the highest score (10 points)*

69) Technical evaluation ITB "operating cost" The formula is not shown. It says: "Scoring will be assigned linearly as follows."

*Answer: There is no formula, the bid received with the highest combined consumption of ammonia and natural gas will be assigned 0 points and the bid with the lowest combined consumption will be assigned 25 points. Bids with intermediate consumption will be assigned a proportional score on a linear basis.*

70) In addition to N2O reduction, is NOx reduction to at least 50 ppm required?

*Answer: Yes, idem question 11*

71) In case a heater is used before the expander, confirm whether the NOx level in the flue gas in the heater stack should be limited to 50 ppmv or whether a different limitation should be considered.

*Answer: Yes, idem question 11*

72) Confirm that the maximum allowable gas temperature at the inlet of the 10-BO-155 boiler is 710-730°C.

*Answer: Yes*

73) We need to know some technical characteristics of:

*Answer:*

*steam turbine 10-TB-001:*

* 1. *a. Axle power: 1580 HP maximum*
	2. *b. Steam inlet condition Steam consumption flow rate 8tn/h, Temperature 260 °C and Pressure 13.7895 bar*
	3. *c. Make and model Worthington, serial number 24932 Frame 5-6*
	4. *TB-C-001A/B compressors:*
	5. *d. Shaft power at each stage: 4620 HP between high and low*
	6. *e. Consum Normal outlet temp: 253C, Max.: 371.11°C Normal inlet pressure: 7.17 bar*
	7. *f. Make and model: Ingersoll - Rand S/N EB-2458/9 E-516/EXI*
	8. *10-TB-C-002:*

*Steam consumption: flow rate No steam consumption Kg/h, Temperature 593.3°C and Pressure 8.2 bar*

*i. Make and model: Dresser -Rand E-516*

74) In the information sent, the location of the natural gas and ammonia lines from which the tie ins for the reactor and the furnace would be taken would be missing.

*Answer: We’ll adapt ourselves to the needs of the successful bidder. I’s attached in the technical information folder (in dropbox) for companies that have signed the confidentiality agreement.*

75) The specification talks about the durability of the catalyst for N2O, does this apply to NOx as well?

*Answer: Yes.*