ΗΡΑΚΛΗΣ
ΟΜΙΛΟΣ ΕΤΑΙΡΙΩΝ

Volos Plant

Management Review Report

Year: 2019

Date: 31/03/2020

Μέλος του ομίλου LafargeHolcim

ΗΡΑΚΛΗΣ
ΟΜΙΛΟΣ ΕΤΑΙΡΙΩΝ

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A. INTRODUCTION

Volos Plant Management Review of the Quality, Environment and Energy Management Systems took place on March 31 2020 with the participation of the Plant's Management Team.

All aspects of the QMS and EMS, product, environment and process performance have been reviewed in accordance with the requirements of ISO 9001, 14001 and 50001 respectively.

The hereunder report summarizes all that were discussed and reviewed. Actions identified during the review are mentioned in the various sections of this report and summarized in section 11. Resources needed for the effective implementation of the QMS & EMS are described in section 12.

This report has been approved by all members of the Plant Management Team.

B. REVIEW INPUTS

1. HEALTH & SAFETY

Concerning health & safety, the following actions took place in 2018:

- 1334 VPC discussions, by 37 persons
- 72 Near Misses were reported
- 2 Good Practice, has been implemented “Safety exit of forklift from the warehouse” and “Emergency remote control of ammonia in case of leakage”
- Database for Risk Assessments Audits record and management. 1759 RA Audits

In 2019 the plant had 2 LTIs Incident one with employee and one with contractor, 1 Medical Incident and 4 contractor FAs (First Aids).

The Frequency Rate (LTI FR) was 2.51 both for LH and contractors vs 1.1.

The annual Health & Safety improvement plan has focus on the following topics:

Mobilization on H&S

- Promote Reward & Recognition program "Εχω μια Ιδέα" e.g. "one idea" out of each H&S coffee
- Technical Training on Energy Isolation
- Professional Licenses for Electricians / MM Operators

Health

- Drill in emergency preparedness, case First aids&WAH
- Implementation of medical examinations, finalize medical records
- Improve hygiene facilities (4th locker room for contractors)
- Hygiene in Alternative Fuel Areas (training in handling, vaccination)

Road Safety

- Perform Defensive Driving Training
- Implement ‘’Safe Pass’’ for the trucks
- Review of IVMS fleet & Equipment installation update
- Reduce Risk of vehicle slipping (combination of raining/downhill)

Housekeeping

- **Corrective Housekeeping & Beautification actions:**
    - Creating a new industrial cleaning contract - Improving efficiency (modernization)
    - A new contract for a broom / water carrier vehicle
    - Implassion of RM, bagging area, RDF port elevator
    - Painting of carbonate building
    - Improve the pedestrian path from RK5 to PROOMO
    - MIAG, new automation and mechanical improvements (lower dust emission)
    - Limitation of internal transport, replacement of limestone discharge conveyor belt in silo No2 (with larger)

- **Demolition of obsolete equipment**
  - Chimney RK3
  - Port Cranes C1, C2, C3
- **Housekeeping Root Causes elimination (Preventive actions) :**
  - Minimize leakage , modify the inlet for MT 7, 8
  - Improve of dedusting, new bag filter MT8,MT7 (limestone C/B)
  - Installation new scrapers on the limestone discharge C/B
  - Establishment of a morning shift restoration workshop team (subcontracted)
  - Expand the central air network to BagFilter of "T" (improve the dedusting)

Fatality Elimination Control

- **Upgrading of electrical installations**
  - Replace at + 20% -> 35% of MCCs based on priorities
  - Improvement of lighting in the areas of MT6, 7, 8 replacement of LED lighting and sockets
- **Design safety & construction quality program:**
  - Restoration of 5/30 cantilevers (with priority more risky, near miss)
  - Rehabilitation of vertical overlays (mainly RK)
  - Reflamator of overlays in Preheater
- **Improvement of Safety on conveyor belts / machinery (C/B of raw material in port, Almyros):**
  - Creating an Equipment Inspection List (nip points, pre-balloons, etc.)
  - Equipment evaluation (inspection)
  - Improve of equipment
  - Establishment of regular systematic control of transport systems and equipment

Initiative H&S Days

The Global H&S Days is a period of strong mobilization for all our stakeholders to help us achieve our Ambition "0" the mobilization has targeted:

- Primarily focus on the main theme - Resist doing TOO MUCH!
- Involve all workers at every level, both in operations and offices
- Include stakeholders across the value chain (customers, suppliers, distributors) and local communities
- Go on for at least two weeks of this period, at your convenience
- Contribute to the local action plan to improve H&S

2019 campaign focuses on the Minimum Safe Behaviors (MSB) which are:

1. Distracted Driving or Machinery Operation (Rule 1)
2. Lockout/Tagout (Rule 2)
3. Safe Work Permits (Rule 2)
4. Seatbelts (Rule 3)
5. Personal Protective Equipment (Rule 3)
6. Drugs and Alcohol (Rule 4)
7. Reporting of Incidents (Rule 5)

2. RESULTS OF AUDITS

2.1 QUALITY

2.1.1 AUDIT PERFORMED BY EUROCERT FOR CE CERTIFICATION & ISO 9001:2015

On 4 June 2019 EUROCERT audited and assessed the QMS of Volos plant plus Product Certification. They were found to be in compliance with the requirements of ISO 9001:2015 and EN 197-1/EN 197-2 respectively. For CE certification none finding and 1 remark was identified. For ISO 1 finding and 1 remark were identified during the audit. The finding has been retrieved since 2nd of September 2019.

2.1.2 AUDIT PERFORMED BY AFNOR FOR CE CERTIFICATION

On 14th and 15th November 2019, AFNOR audited and assessed the Product Certification of CEM I 52,5 N CE NF. They found that the product meets the requirements of EN 197-1/EN 197-2. None findings and 1 remark were identified.

2.1.3 EXTERNAL SII (ISRAEL STANDARDS INSTITUTION)

The Standards Institution of Israel (SII) performed an external QMS and Quality compliance audit on 28th January 2020 in order to gain the Israeli Marking for its cement types. Volos quality system was found in compliance with the requirements of SII Procedure and Volos plant achieved to obtain the Israeli Mark for the cement types CEM I 52,5 N and CEM III/B 42,5 N-SR.

2.1.4 ANNUAL INTERNAL AUDIT FOR ISO 9001 AND EN CEMENTS

The annual internal Audit was performed by BU ISO Coordinator on 23rd April 2019. No findings or remarks were identified.

2.2 ENVIRONMENT

2.2.1 EXTERNAL AUDITS (EUROCERT)

The environmental management system was audited on Jul 12 2019. There were 0 findings and 4 remarks that are listed below.

#	Corrective Actions	Type
1	It has not been identified adequately the opportunities from the implementation of the EMS	Remark
2	The Dioxin monitoring system (DMS) recently installed in the stack of RK1 for the continuous sampling of PCDD/F has been included in the VOL ENV F 01 01	Remark
3	SGS results for imported RDF were not available for 2019	Remark
4	During the audit of the storage area of dangerous wastes, there were found 2 fire extinguishers not properly maintained	Remark

The CO2 emissions verification audit 2019 performed by EUROCERT in Feb 2020. There were neither findings nor remarks.

In Jan 2020 a measurement campaign was organized by the Env. authorities for radioactivity. This campaign covered both local and imported RDF as well as RDF workshop. All results showed no sign of excessive radioactivity vs. background radiation.

2.2.2 COMPLIANCE WITH LEGISLATION

Volos operates in compliance with the latest environmental legislation and preventive planning is taking place in order to ensure compliance with future environmental terms. The management team is committed to ensure that both company policy and Greek legislation are effectively implemented.

2.3 ENERGY

2.3.1 EXTERNAL AUDITS (EUROCERT)

The energy management system was audited on Sep 04 2019. There were 1 non-compliance and 2 remarks that are listed below.

#	Corrective Actions	Type
1	Although the data for power of 2018 (electrical and thermal) have been calculated in other Energy Management System files, the same data has not been transferred to the Energy Report (as in the one submitted to the Ministry with 2017 information)	Non-compliance
2	Power consumption as it appears in TIS for 2018 and 2019 does not incorporate corrections based on PPC invoices	Remark
3	System file VOL NRG F 02 02 was not complete for all improvement actions	Remark

2.3.2 COMPLIANCE WITH LEGISLATION

Volos operates in compliance with the latest legislation and preventive planning is taking place in order to ensure compliance with future terms. The management team is committed to ensure that both company policy and Greek legislation are effectively implemented.

3. CUSTOMERS & STAKEHOLDERS

3.1 CUSTOMER FEEDBACK

Volos Plant is the main supplier of the domestic cement market and exports clinker and cement in various destinations worldwide. Customer feedback, including complaints, is forwarded to the Plant through the SALES and BU exports dpt. A database to record and analyse domestic cement market complaints is existed. The complaints of 2019 are the following.

Type of complaint	Number
Logistics	1
Delays	2
Order taking	1
Packaging	18
Quality	21
Services	9

The number of complaints from the domestic market are 52 in total with the most important one the presence of lumps in CEM I 42.5R. For each complaint a detailed analysis performed to investigate the cause of the deviation.

Moreover, 27 complaints were about damaged packaging for all the plant's products (Bagged cement, Masterblock, etc.)

Finally there were 7 complaints regarding lower strengths, mainly during May and June. A detailed analysis performed to define the cause of the issue. The change of alkalies in clinker was the reason of lower strength. For that a new software for strength prediction is used to avoid similar deviations in the future.

3.2 STAKEHOLDERS COMMUNICATION (ENVIRONMENT, ENERGY & OTHER)

The communication with external stakeholders of the plant (municipality, public authorities, local associations, etc.) is the responsibility of the Plant Manager together with the ExCo of the company**.** There is a dedicated electronic tool (mybase lotus notes tool) where the whole stakeholder management data of the plant is incorporated and processed (contact data, assessments, donations etc.)

4. PERFORMANCE

4.1 QUALITY

4.1.1 CEMENT PERFORMANCE

	Strength 2 days (MPa)	Strength 7 days (MPa)	Strength 28 days (MPa)	Normal Consistency (%)
CEM I 52,5 N CE NF				
Target	**33,5**	**46**	**57**	**29,0**
Low Internal Limit	**31,5**		**55**	**28,0**
High Internal Limit	**35,5**		**60**	**30,0**
Actual	**34,6**	**47,1**	**57,7**	**28,4**
CEM I 42,5 R				
Target	**32,5**	**46,0**	**56,5**	**28,8**
Low Internal Limit	**29,5**		**53,5**	**28,0**
High Internal Limit	**35,5**		**59,5**	**29,7**
Actual	**34,0**	**47,6**	**57,6**	**29,0**
CEM II/B-M (P-W-L) 42,5 N				
Target	**29,5**	**43,0**	**52,0**	**30,5**
Low Internal Limit	**27,0**		**49,0**	**29,5**
High Internal Limit	**32,0**		**55,0**	**31,5**
Actual	**30,7**	**43,1**	**52,6**	**29,8**
CEM II/B-M (W-L) 32,5 R				
Target	**22,0**	**34,0**	**43,0**	**29,9**
Low Internal Limit	**19,0**		**39,5**	**29,0**
High Internal Limit	**25,5**		**46,5**	**30,8**
Actual	**24,3**	**35,9**	**44,1**	**29,8**

Main objectives for 2020 are to (1a) put in operation the new APM, PSD and XRD and (1b) repair silo 311 to improve raw mix uniformity and thus expecting better clinker uniformity/ reactivity, improved stability of cement recipes and higher potential for AF utilization without compromising other critical KPIs related to electrical and thermal power consumption, (2) optimize raw mix composition in terms of cost and Cr2O3 content with the (a) use of imported AR (blast furnace slag from Arcellor Mittal, Italy) and (ii) the addition of ferrous sulfate in the final product instead of the mill, (3) launch MC 12.5 and ground limestone products as well as investigate

commercial opportunities for CEM III/B in the local market; all actions will improve the overall clinker factor, (4) optimize cement recipes in terms of (a) cement fineness and % fly ash vs. clinker and (b) cost by partially replacing quarried gypsum with synthetic gypsum for cement recipe cost optimization, (5) increase CaF2 in raw mix for producing clinker of higher reactivity which will lead eventually lead to lower clinker factor, (6) test industrially (a) whether the use of strength enhancing aid in CEM II 32.5 could balance the benefit from the clinker factor reduction in this cement product vs. the increased cost of the chemical aid and (b) investigate opportunities for being supplied with a strength enhancing aid having a better balance between cost and performance. Last but not least there are additional actions related to daily management of cement recipe (i.e. an already plant developed tool and a tool developed by the group) targeting to reduce the standard deviation of the 28d-CS in CEM II32.5 and CEM II 42.5 cement products which could bring additional benefits on clinker factor.

4.1.2 NON-CONFORMITIES AND QUALITY ISSUES

No non-conformities were recorded.

4.1.3 QUALITY KPIS

The 5 LH KPIs are monitored on a monthly basis. The evolution of these KPIs for 2018 is presented at the following tables.

	KPI3				KPI4					
	CEM II 32,5 R	CEM II 42,5 N	CEM I 42,5 R	Plant	CEM II 32,5 R		CEM II 42,5 N		CEM I 42,5 R	
					stdev 2d	stdev 28d	stdev 2d	stdev 28d	stdev 2d	stdev 28d
January	96,3	91,2	89,7	94,2	1,15	1,80	1,08	1,32	0.93	1,24
February	97,6	90,1	93,9	94,1	1,13	1,68	0,88	1,78	0,65	1,34
March	93,0	91,5	92,6	92,3	1,33	1,53	0,75	1,53	0,73	1,16
April	89,3	98,8	93,9	93,3	1,34	1,76	0,78	0,88	0,49	1,15
May	86,7	98,5	91,2	91,4	1,26	1,67	0,54	1,40	1,06	0,88
June	100	85,9	100	94,8	0,71	0,92	0,98	1,05	0,88	1,03
July	96,5	87,7	94,4	93,0	1,02	1,20	1,31	1,81	0,89	1,44
August	93,0	66,7	96,3	82,9	1,51	2,08	1,76	2,30	0,31	1,12
September	92,1	91,2	93,3	91,9	1,04	1,25	1,17	1,25	0,75	1,20
October	93,7	95,5	100,0	94,6	1,12	0,98	1,30	1,16	0,49	0,94
November	100,0	86,7	93,3	93,9	1,37	1,71	2,00	2,06	1,04	1,62
December	100,0	93,3	100	97,0	0,62	1,20	1,07	1,50	0,41	1,21
Year 2019	94,1	90,3	94,8	92,7	1,21	1,78	1,27	1,84	0,77	1,52

KPI3 is the percentage of the sample that the characteristics are into the range agreed by the plant and the sales (Contract with Sales). For 2018, the plant improved the results. In general there were samples that the strength determination was higher than the required. The higher strength level was achieved in many samples in order to be sure that we will secure the parameter target. At the new contract with sales, the targets are more clearly defined and we expect an additional improvement at this KPI.

The KPI4 is the standard deviation for strengths in 2 days and 28 days respectively. The results are better than 2017 due to the use of a new grinding aid system supply. In 2018, for the composite cements the SDs were high in both ages. The reason for that is the use of lower quality of clinker, as well as the use of Fly Ash that is not a uniform material. For 2018 a new grinding aid system supply is designed and installed. Internal and external mill audits are expected to improve further KPI 4 in 2019.

	KPI5			KPI6		
	fCaO	LSF	Clinker	CEM II 32,5 R	CEM II 42,5 N	CEM I 42,5 R
January	72,3%	95,8%	74,6%	100,5	95,0	99,2
February	68,0%	92,4%	73,3%	102,4	101,0	108,9
March	85,7%	87,3%	79,7%	99,3	99,0	104,0
April	85,6%	93,2%	85,0%	96,5	100,8	107,9
May	89,3%	91,8%	85,2%	108,2	105,2	104,9
June	79,1%	95,8%	82,7%	105,1	102,8	102,8
July	78,8%	89,0%	79,1%	101,9	96,1	103,7
August	69,4%	88,4%	71,3%	104,3	97,2	103,5
September	78,6%	89,9%	78,6%	103,0	97,6	102,4
October	72,8%	90,7%	75,8%	102,0	98,4	102,2
November	80,7%	82,0%	74,3%	101,4	98,8	109,3

December	68,1%	84,6%	66,5%	91,6	95,6	103,0
Year 2019	77,6%	90,2%	77,7%	101,6	99,2	104,5

KPI5 presents the results for the clinker uniformity. They are the percentages of fCaO, LSF and both that are into the acceptance limits. In general LSF satisfies the criteria of uniformity. For the fCaO there is a deviation mainly to lower values as expected. The main reason for that is the use of Fluorite that improves the raw meal burnability. The low percentage of both parameters is mainly driven by the low percentage of fCaO.

KPI6 is the ratio of clinker percentage in budget per cement type to the actual clinker percentage. In general the acceptance limits are >95. In all cem types these limits are satisfied and there is an improvement during the year. This improvement is expected to be continued into 2019.

Volos lab participated in ATILH interlaboratory campaign with excellence performance (all parameters within the acceptance range), as well as in 9 per year interlaboratory tests, which are organized by EUROCERT. These results are pending.

Finally, Volos lab participated in an interlaboratory test concerning the alternative fuels, which was organized by LH. All the results were within the limits.

Main actions for 2019:

- Effort to increase ARM in the Raw Meal (i.e. use of waste glass and alumina dross).
- Installation of a new weigh feeder for adding flourite in the mill and not in the pile

4.2 PERFORMANCE

4.2.1 PLANT OBJECTIVES

The main Plant objectives for 2019 are summarized hereunder:

- **HSIP realization**
  - "Συν_μετέχω" (I participate) mobilization program
  - Health
  - Transport & Road Safety
  - Housekeeping
  - Fatality Elimination control (ATEX - Solid Fuels Workshops, Electrical safety

- **Performance acceleration**
  - Continue optimization of RK1 (STEC, SEEC) and CMs (SEEC) specific energy consumption
  - Fully utilize AF Shop to be able to significantly increase TSR in the coming years and reduce fuel cost without compromising kiln productivity.
  - Continuous optimization of RK1 fuel mix cost
  - Optimize Solid Fuel Mills to increase flexicoke participation in Fuel Mix

- **Quality and customer orientation**
  - Optimize Cement Recipes to further improve the quality of our products, based on customer priorities
  - Improve further Clinker Uniformity
  - Reduce further Raw Mix Cost by substituting existing raw materials with alternative ones.

- **People development**
  - Implement targeted hires to cover identified needs, and successfully implement induction training programs for all new hires.
  - Enlarge population participating in the annual performance cycle.
  - Successfully complete Leadership & Behavioral program for identified key supervisors ("Leading Safely - Καθοδηγώ Ασφαλώς W@H on the field" program, initiated in 2016).
  - Further develop managerial & technical competencies of personnel, implementing the defined 2019 training program. Design and implement training plan in order to further enhance employee skills and competencies. Use IDPs as basic input for training plan development.
  - Main Training implemented in 2019 focused on Health & Safety (Elototo, Working@Hight, First Aid, Fire Protection, Energy Isolation, Oxygen Cutting/welding, Protecting Eyes, Incident Analysis), Technical Expertise (Kiln Shutdown Management workshop, Raw Mix & Clinker Optimization, BE READY, Industrial Fixed Cost workshop, Crisis Management Plan, Job Evaluation/Job Measurement Wave 1 & 2, MS Project), Soft Skills (People for Tomorrow/Performance Cycle, Negotiation Skills) & targeted Development for senior management team (IMPACT Plant Manager Development Program, Business School, Be Ready Facilitation, Performance Management Cycle).
  - In total, 2.458 training hours were implemented for LH employees in 2019.
  - Promote participation of plant engineers in Group programs (CIF assessment team, IDEAL training (Preventive maintenance development program).

- **Sustainability**

The main KPIs for monitoring our performance throughout the year and the targets are summarized in the following table: For comparison reasons the actual results of 2019 and 2018 and the budget of 2020 are included.

Volos plant KPIs	**UNIT**	**2018-A**	**2019-A**	**2020-B**
Volumes				
Clinker production volume	[t,'000]	1542	1547	1400
Cement production volume	[t,'000]	1901	1407	1451
Clinker factor production	%	81,0	76,9	75,8
Performance				
Net availability index (NAI)	%	88,0	90,3	89,1
RF (kiln)	%	96,0	95,7	96,0
Electrical Energy				
SEEC clinker	[kWh/t]	67,7	67,9	67,8

SEEC grinding	[kWh/t]	49,1	46,6	47,6
SEEC in bin	[kWh/t]	103,9	98,8	98,9
Thermal Energy				
Thermal substitution rate (TSR)	%	20,3	27,6	40,5
Spec thermal energy consumption (kiln)	[MJ/t clin]	3457	3569	3541

Comments on 2019 performance:

- Product quality is at a high level. Further improvement in stability should be realized in 2020
- CO2 quota was successfully achieved with only RK1 in operation.
- STEC of K1 at 3569 MJ/t vs. 3457 (2018)
- TSR for K1 at 27,6% vs. 20.3% (2018)
- SEEC for CMs grinding stage at 46,6kWh/t vs. 49.1 (2018).
- SEEC in clinker stage at 67,9 vs. 67,7 (2018)

As a general comment, we consider Plant Performance for 2019 improved vs previous years. However there is still a great potential for improvement in terms of cost & quality with main levers the increase in AF and ARMs.

4.2.2 PROCESS AUDITS

A kiln audit was performed in Jul 2019 and two mill audits was performed on Cement Mills 8 (Mar 2019) and 7 (Feb 2020). The main targets were to analyse the gas & material balance of the different streams and identify potential bottlenecks for cement production increase.

4.3 ENVIRONMENT

4.3.1 PERFORMANCE

4.3.1.1 Air emissions

2019	NO_x (mg/Nm^3 dry @ 10% O_2)		TOC (mg/Nm^3 dry @ 10% O_2)		SO_2 (mg/Nm^3 dry @ 10% O_2)	
	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit
Jan	462	0.0			0.2	0.0
Feb	476	0.0	3.5	0.0	0.3	0.0
Mar	476	0.0	3.8	0.0	0.1	0.0
Apr	471	0.0	4.8	0.0	0.2	0.0
May	468	0.0	6.5	0.0	0.2	0.0
Jun	469	0.0	5.1	0.0	0.3	0.0
Jul	476	0.0	3.8	0.0	0.7	0.0
Aug	479	3.0	7.0	0.0	0.6	0.0
Sep	469	0.0	7.1	0.0	0.3	0.0
Oct	459	0.0	5.9	0.0	0.2	0.0
Nov	460	0.0	10.1	0.0	0.2	0.0
Dec	439	1.5	5.1	0.0	0.2	0.0
Average	**467**		**5.7**		**0.3**	
Sum		**4.5**		**0.0**		**0.0**

2019	NH_3 (mg/Nm^3 dry @ 10% O_2)		HCl (mg/Nm^3 dry @ 10% O_2)		HF (mg/Nm^3 dry @ 10% O_2)	
	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit
Jan	2.5	0.0	0.8	0.0	0.01	0.0
Feb	2.2	0.0	0.9	0.0	0.01	0.0
Mar	2.0	0.0	0.8	0.0	0.00	0.0
Apr	2.4	0.0	0.6	0.0	0.01	0.0
May	3.3	0.0	0.7	0.0	0.02	0.0
Jun	2.7	0.0	1.6	0.0	0.01	0.0
Jul	3.1	0.0	2.1	0.0	0.00	0.0
Aug	4.4	0.0	1.7	0.0	0.01	0.0
Sep	3.2	0.0	0.6	0.0	0.02	0.0
Oct	3.4	0.0	0.8	0.0	0.00	0.0
Nov	4.7	0.0	0.8	0.0	0.01	0.0
Dec	2.3	0.0	0.4	0.0	0.01	0.0
Average	**3.0**		**1.0**		**0.01**	
Sum		**0.0**		**0.0**		**0.0**

2019	Dust (RM_1) (mg/Nm^3 dry @ 10% O_2)		Dust (cooler) (mg/Nm^3 dry)	
	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit
Jan	2.8	0.0	6.0	0.0
Feb	3.5	0.0	6.3	0.0
Mar	5.5	0.0	6.6	0.0
Apr	2.4	0.0	7.6	0.0
May	2.1	0.0	8.9	0.0
Jun	1.9	0.0	9.3	0.0
Jul	1.2	0.0	6.6	0.0
Aug	0.6	0.0	6.4	0.0
Sep	0.7	0.0	6.7	0.0
Oct	0.8	0.0	6.7	0.0
Nov	1.2	0.0	7.5	0.0
Dec	0.9	0.0	5.5	0.0
Average	**2.0**		**7.0**	
Sum		**0.0**		**0.0**

2019	Coal M1 (mg/Nm^3 dry @ 10% O_2)		Coal M2 (mg/Nm^3 dry @ 10% O_2)		Cement M5 (mg/Nm^3 dry)	
	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit
Jan	6.1	0.0	273.7	2.3	7.9	0.0
Feb	6.6	0.0	464.2	6.1	4.4	0.0
Mar	7.0	0.0	127.5	8.3	2.9	0.0
Apr	1.0	0.0	451.5	4.3	2.4	0.0
May	1.0	0.0	547.4	4.5	3.1	0.0
Jun	1.0	0.0	531.1	4.3	2.4	0.0
Jul	1.5	0.0	450.5	3.0	2.6	0.0
Aug	0.7	0.0	199.6	2.3	2.7	0.0
Sep	0.8	0.0	330.3	2.0	3.0	0.0
Oct	2.3	0.0	450.4	4.6	2.8	0.0
Nov	1.2	0.0	400.0	4.2	3.1	0.0
Dec	1.2	0.0	187.7	5.1	3.8	0.0
Average	**2.5**		**4.2**		**3.4**	
Sum		**0.0**		**0.0**		**0.0**

2019	Cement M6 (mg/Nm^3 dry)		Cement M7 (mg/Nm^3 dry)		Cement M8 (mg/Nm^3 dry)	
	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit	Monthly average	Num of hrs above limit
Jan	6.1	0.0	10.6	0.0	0.0	0.0
Feb	7.0	0.0	10.8	0.0	0.7	0.0
Mar	2.7	0.0	9.8	0.0	0.7	0.0
Apr	2.8	0.0	13.0	0.5	0.7	0.0
May	2.4	0.0	13.3	0.0	0.9	0.0
Jun	2.3	0.0	8.7	0.0	1.3	0.0
Jul	2.5	0.0	7.3	0.0	1.4	0.0
Aug	2.6	0.0	9.1	0.5	1.4	0.0
Sep	2.1	0.0	5.8	0.0	1.2	0.0
Oct	3.0	0.0	8.7	0.0	1.2	0.0
Nov	5.0	0.0	11.2	0.0	1.4	0.0
Dec	0.0	0.0	10.4	0.0	2.0	0.0
Average	**3.2**		**9.9**		**1.1**	
Sum		**0.0**		**1.0**		**0.0**

4.3.1.2 Water consumption

2018	Γ1 (m3)	Γ2 (m3)	Γ3 (m3)	Γ4 (m3)	Γ5 (m3)	Γ6 (m3)
Jan	995	1092			0	0
Feb	14863	16735	5000		0	0
Mar	13494	15183	32000		0	0
Apr	192	175	27000		0	0
May	3425	3475	37000		0	0
Jun	8967	519	10000	26000	0	0
Jul	5054	4806	22000	4000	0	0
Aug	1010	764	12000	33000	0	0
Sep	3607	665	12000	32000	0	0
Oct	8112	5100	14000	19000	0	0
Nov	2230	1045	18000	13000	0	0
Dec	95	13	15000	2000	0	0
Total	**62044**	**49572**	**204000**	**129000**	**0**	**0**
Limit values	**220000**	**220000**	**225000**	**225000**	**250000**	**160000**

4.4 TRAINING

The main trainings / activities for safety, quality & environment implemented in 2018 are the following:

- Leading Safely
- Lubrication training (safety and environmental aspects included)
- IVMS
- TBT on basic H&S rules
- ATEX
- First Aids training
- Lifting and rigging training
- WAH on the field
- Offices' evacuation drill
- Ammonia leakage drill
- Firefighting drill
- Port - Exercise (table talk) on scenario of CBRN (chemical) threat
- Coast cleaning
- Planting in different areas of the plant

5. PREVENTIVE AND CORRECTIVE ACTIONS

5.1 QUALITY

Corrective actions derived from external or internal QMS audits have already been discussed in section 2 of this review and considered closed.

5.2 ENVIRONMENT

Corrective actions derived from external EMS audits have already been discussed in section 2 of this review. Not all of them are closed but all will be closed by June 2020.

5.3 ENERGY

Corrective actions derived from external EMS audits have already been discussed in section 2 of this review. Not all of them are closed but all will be closed by August 2020.

6. FOLLOW-UP ACTIONS FROM PREVIOUS MANAGEMENT REVIEWS

6.1 QUALITY

Actions identified during 2018 have progressed as follows:

- The XRD equipment is scheduled to be back in operation (stopped for technical reasons) early 2020.
- New APM equipment is going to be installed at 2nd semester 2020, to increase the accuracy of measurements.
- A new PSD diffractometer is going to be installed at the 2nd semester 2020 to have completed results regarding the product's granulometry.

All the above actions are part of the semi-automatic project in Volos lab.

6.2 PROCESS

Actions identified during 2018 have progressed as follows:

- The operation of kiln master contributed to the stabilization of kiln operation with higher AF.
- The import of RDF from Italy contributed to the TSR increase
- Mill master is in operation in all cement mills (CM5, 6, 7 & 8). The process control system is well accepted by the panel operators and contributed significantly in the reduction of cement mills specific grinding energy as a result of a mill audit that took place last year. These are summarized below:

  (a) change of the design of the mill inlet chute in CM 6

  (b) opening of the mill inlet (removal of the HGG ductis) in CM8,

  (b) replacement of the upper part of mill dedusting cyclone in CM6 contributing to false air reduction and

  (c) diversion of ESP rejects back to the mill again in CM6

  (d) changes in operating parameters concerning CM8 separator aeration

  All above helped to spillage reduction, improved mill aeration and therefore reduction in water spraying inside the mill, productivity increase and reduced complaints from customers related to lumps.

6.3 ENVIRONMENT

Actions identified during 2019 have progressed as follows:

- Use of AF with impact on CO2 emissions and less consumption of fossil fuels
- Strict control on incoming AFR to avoid increase in HM and POPs. Actually the emission of persistent pollutants like mercury and PCDD/F are reduced.
- Starting from late 2018, the PCDD/F emissions are monitored on a monthly basis and the results are uploaded automatically to heracles-footprint.gr site that is open to the public.
- All daily average results of the installed continuous monitoring systems (dust, NOx, etc) are uploaded automatically daily on the above mentioned web site.

7. CHANGES THAT COULD AFFECT THE QUALITY / ENVIRONMENT / ENERGY MANAGEMENT SYSTEMS

7.1 QUALITY

7.1.1 POLICY

The Quality Policy has been reviewed by the Management Team during the Annual review meeting and has been reissued to reflect the organizational changes in Plant management team.

The new team members have co-signed the policy document.

7.1.2 NEW PROJECTS/ TOOLS/ PRODUCTS

List of main CAPEX projects (>20K**€**) implemented in 2019:

Project description	Amount (K€)
Revamp of kiln cooler ESP north chamber	28
Electrical Master Plan - Phase 2	827
Structures integrity (DSCQP)	40
Belt repl. bucket elev. VOLX.59D-BE01	32
Chain repl. clink.storage apron conveyor	35
ESP fan Drive Inverters 10-year maint.	77
Replacement of 350m of belt of 9104/291-	35
Repair of motor CM8	40
AF increase by 2tn/hour	26
Hybrid filter bags replacement	256
10-year maintenance forID Fan	99

Drag Chain replacement 471-CV01	22
Purchase of CM6-7 reducer bearing	21
Replacement of RM_1 roller bearings	36
DSCQP phase II	323
Chain of Bucket conveyor 491-BE01	129
MV cables replacement	73
Uninterruptible supply and UPS	40
Volos dscqp specific inspections-studies	110
Substitution of 536-CV01 by BC	53
Replacement of outlet bearing 567-BM01	46
Replacement of dip tube 441-ZY08	36
Limestone from silos 6-7 to silotrucks	106
Replacement of CM5 PLC	38
Hydraulic cylinder replacement 361-RM01	22
Guarding installation on conveyors	46
Lab Automation (APM-PSD)	25
Capitalization of spare parts	174
Vecoplan commissioning	25
UPS supply and connection to network	52
Belt 9104.291-BC02. Replacement of 330m	39
Replacement of belt BC04 470m. BASELOAD	47
Total	2959

7.1.3 CEMENT STANDARDS (EN, ISO) UPDATES

The status of EN standards governing the production of our products has been reviewed and all found to be at the latest edition.

7.1.4 ORGANIZATIONAL CHANGES

The following main organizational changes took place in Volos plant in 2019

- New appointments in PMT members: New HR Manager since September 2019.
- 4 hires took place to cover gaps in identified positions (1 HR Manager, 1 Port Responsible/Captain, 1 electronic maintenance engineer, 1 mechanical maintenance area execution responsible). Induction program implemented for all new hires.
- Management Associates Program (MA program) was implemented with 2 young talents in project assignments & coaching in Volos Plant. Finally absorbed 1 Management Associate as Financial Analyst at the end of 2019 to strengthen the Plant Controlling function.
- 1 employee retired & 2 employees left Volos plant. Smooth transition of the leaves achieved to keep the performance stable.
- 1 employee was dismissed.

7.2 ENVIRONMENT

7.2.1 LEGISLATION

Plant operation has been reviewed vs. legal obligation and found to be at the required level.

8. ANALYSIS OF SUPPLIER PERFORMANCE

Supplier evaluation has taken place in accordance with internal procedures, using excel files developed by the purchasing department. Concerning suppliers with an immediate effect on product quality (raw material for cement, calibration services) the performance is at expected levels with no observed deviations that could pose a risk on quality.

9. RESULTS OF RISK ASSESSMENT

- Cement recipes are being optimized for customer's demands together with sales and marketing under the frame of product development meetings performed on a monthly basis.
- Clinker storage outside is temporary and according to exports schedule. The forecast is to be reduced as a result of the higher domestic demand and the increasing exports of cement vs clinker.
- Rotary Kiln 5 and Cement Mill 4 have ceased operation and are mothballed.

10. RECOMMENDATIONS FOR IMPROVEMENTS

10.1 PRODUCT QUALITY & QUALITY OBJECTIVE

- Maintain cooperation with marketing & sales department to build a better understanding of customers' needs and adapt accordingly our product offer (monthly follow up through "Quality Day")

- Continue following up chlorine level of raw materials and kiln feed
- Replace expensive raw materials with cheaper alternative raw materials.
- Launch masonry cement for the local market (MC 12.5) and ground limestone for specific applications, i.e. cement boards, dry mortars etc.

10.2 PROCESS PERFORMANCE

- Our main objectives are the reduction of energy consumption (thermal and electrical) and fossil fuels substitution increase in our process for producing cement and clinker.
  - On power and heat consumption, we focus on cement grinding and burning processes.
  - On increasing the substitution of our fossil fuels with alternative, we are focusing on developing sourcing upstream, debottlenecking and rendering safer our alternative fuels workshop installation.
- Plan and execute projects focused on the utilization of other industries byproducts without compromising kiln productivity, quality and environmental legislation.

10.3 ENVIRONMENT

- Continue the project of demolishing inactive plant facilities with a view to enlarge green areas and drastically improve housekeeping status.
- Focus on permanently stopping leakages that are fugitive dust and environmental burden mainly on cement mills area.
- Increase the substitution of fossil fuels and raw materials with alternative ones.
- Minimize gas emissions risk by performing on a regular basis trace elements analysis of all clinker raw materials.
- Investigate the opportunity of drilling a new borehole inside the plant and avoid pumping water from boreholes outside plant perimeter

C. REVIEW OUTPUT

11.SUMMARY OF ACTIONS FROM THIS REVIEW

A summary of all the actions identified during the Management review relating to the improvement of the QMS and the product quality, as well as the EMS stated in different parts of sections 1 to 10, is presented hereunder:

1. LIMS utilization for all samples
2. Follow up of chlorine in kiln feed and raw materials.
3. Continue the regular contact between the plant quality team and technical sales support.
4. Launch new masonry cement for the local market and ground limestone for third parties..
5. Decrease STEC, SEEC
6. Project of demolitions of inactive plant facilities with a view to enlarge green areas and drastically improve our housekeeping status.
7. Increase the substitution of fossil fuels and raw materials with alternative ones.
8. Apply strict control of the incoming ARMs and close follow up of dioxins/ furans emissions to minimize associated risks
9. Improve plant water management
10. Investigate opportunities for the optimum management of the existing water sources
11. Increase alternative raw materials (AR) in the raw mix

12.RESOURCES NEEDED

- Resources concerning the availability of raw materials, equipment, maintenance etc have been described in the Budget 2020.
- Training needs have been described in the annual training Plan and summarized in section 4.6 of this report