Santa Clara County Department of Planning & Development

Planning Commission Lehigh - Permanente Quarry Reclamation Plan Condition Compliance

November 20, 2014



Presentation Outline

- Hearing Objectives
 - Framing Today's Hearing
- Background
 - What is Reclamation
 - Lehigh Quarry & the 2012 Reclamation Plan
- Annual Report Number 2
- Selenium Impacts and Treatment
- EMSA Discharge Evaluation
- Selenium Treatment Evaluation
 - WMSA / Quarry Pit
 - EMSA

Hearing Objectives

Decisions related to the 2012 Reclamation Plan for Lehigh Permanente Quarry:

- (1) Accept the Annual Report No. 2 Compliance with Conditions of Approval (2012 Reclamation Plan)
- (2) Compliance with Stormwater Discharge Requirements for EMSA
- (3) Feasibility of Selenium Treatment for the WMSA/Quarry Pit
- (4) Feasibility of Selenium Treatment for the EMSA

Framing Today's Hearing

 Reclamation Activities in Accordance with 2012 Reclamation Plan

- <u>Not</u> part of Hearing:
 - Existing surface mining Legal Nonconforming
 Use (vested, 2011 BOS Decision).
 - Lehigh Cement plant Authorized under approved Use Permit 1939
 - Environmental issues not related to the 2012
 Reclamation

What is Reclamation?

- Every Surface Mine <u>must</u> have a Reclamation Plan
- Reclamation = Exit Strategy, Leave the Site in a usable end state.

Past surface mining without Reclamation



Abandoned Talc Mine – Death Valley, CA

What is Reclamation?

Past surface mining without Reclamation









Lehigh Permanente Quarry

- Located in foothills west of Cupertino
- Quarrying began early 20th Century Limestone
- 1985 Reclamation Plan (post mining restoration)
- 2011 Vested Mine (Board of Supervisors)
- 2012 Reclamation Plan





Reclamation Plan Amendment 20 years - Phases

Phas e	Duration	WMSA / Quarry Pit	EMSA
1	10 years Until 2021	Mining / Operations	Reclamation
2	5 years <i>2021-2026</i>	Reclamation Starting	Reclaimed
3	5 years <i>2027-2032</i>	Reclamation Finishing	Reclaimed

2012 Reclamation Plan



Final Reclamation of Pit



Phase	Duration	WMSA / Quarry Pit	EMSA
End		Reclaimed	Reclaimed

Annual Report

- Is Lehigh complying with the Reclamation Plan for the 2013-2014 period (7/1/13 – 6/30/14)?
 - Compliance with Conditions of Approval
 - Compliance with EIR Mitigation Measures
 - SMARA Annual Inspections
 - SMARA Financial Assurance

All documents may be viewed and downloaded from the County Planning website

Annual Report

- Reclamation Plan Activities
- Condition Compliance
 - Replaced with metal stakes boundary demarcation
 - Greenhouse gas reduction plan
 - Biological Surveys
 - Permanente Creek limestone boulders
 - Water quality testing
- Inspections
 - Historically one inspection per year, 2014 began monthly quarry inspections
- Financial Assurance
 - Increased to \$54.7 Million

Annual Report

Staff Recommends that the Planning Commission accept the Annual Report

Selenium Impacts and Treatment

Selenium & 2012 Reclamation Plan

- Selenium @ Lehigh
 - Limestone exposed to air and water = selenium
 - Soluble and highly mobile in water
 - Surface mining exposes limestone to air and water
 - Surface water runoff into Permanente Creek
- Permanente Creek listed as impaired for Selenium (RWQCB, 2007)
- Water Quality Standards
 - Human Health (drinking water) 50 μ g/L
 - Fish and Wildlife 5 µg/L



Selenium & 2012 Reclamation Plan

- SMARA Comply with water quality standards
- 2012 Reclamation Plan reduce exposure of limestone for final reclamation.
- EMSA Overburden Area (Phase 1, up until 2021)
 - One foot thick cover of non-limestone materials (greenstone, chert, greywacke)
 - Plus one foot soil cover and vegetation

Final Reclamation - Selenium

- Main Quarry Pit
 - Backfill Pit with WMSA
 Overburden
 - Blend top 25-50 feet with organic material
 - Creates Anaerobic Environment
 - Reduces Selenium concentration



• <u>WMSA / Other Areas</u> – cover all remaining exposed limestone with non-limestone material

Final Reclamation and reduction in Selenium

(table is 2012 data)



2012 EIR Analysis Interim Stage – Active Reclamation

 Movement of the overburden <u>could increase</u> <u>limestone exposure – increase selenium</u>

Phase	Duration	WMSA / Quarry Pit	EMSA
1	10 years	Mining / Operations	Reclamation
2	5 years	Reclamation	Reclaimed
2		Starting	
3	5 years	Reclamation	Reclaimed
		Finishing	

EIR, Selenium & Today's Hearing Scope of today's hearing – selenium impacts and treatment during active reclamation (interim stage)

> Surface Mining – **No** Final reclamation – **No** Interim reclamation – **Yes**

- 1. Exceed selenium discharge requirements for interim reclamation at EMSA?
- 2. Is the installation of water treatment for selenium feasible for the Quarry Pit/WMSA?
- 3. Is the installation of water treatment for selenium feasible for the EMSA?

EIR Analysis - Interim Reclamation

- 2012 EIR unknown if selenium treatment feasible need more analysis / time.
- <u>1st Approach</u> Implement Best Management Practice measures (BMPs) to prevent contact between limestone and stormwater
 - Water Sampling and Analysis to verify BMP's work
- <u>2nd Approach</u> seek treatment options and conduct two year pilot testing to determine if selenium treatment is feasible.

2012 EIR Mitigation & Conditions

- Condition #80 (EMSA) water quality test
 - Planning Commission Hearing required when water test results exceed selenium standard for two consecutive years
 - PC Decision: Did water discharge exceed standard?

- Condition #82 study / pilot test selenium treatment plant – 30 months @ PC
 - PC Decision: Is treatment (or alternative) feasible?

How these are connected:

Reclamation Area	Exceed Discharge Requirements?	Treatment (or alternative) is Feasible?	Result
EMSA	Yes	Yes	Install Treatment (or alternative)
EMSA	Yes	No	Continue w/BMP's No Treatment
EMSA	No	Yes	Continue w/ BMP's – continue water monitoring

EMSA - Water Quality Testing

PC Decision: Complying with discharge requirements?

- Stormwater collected at Pond #30 before discharge into Permanente Creek
- Qualifying rain event significant rainfall enough to discharge from pond
- Two years of testing
 - 2012 / 2013 Winter Season (2 tests, 1 exceedance)
 - 2013 / 2014 Winter Season (2 tests, 2 exceedances)

Water Quality Testing

Water Quality Standard = 5 µg/l

Pond 30 Sampling Results 2012-2014			
Date	Result (in ug/l)		
12/5/12	5.9		
12/26/12	Non-Detect		
2/27/14	14.6		
4/2/14	29.2		

EMSA – Water Quality Testing

Determine if Lehigh is complying with Stormwater discharge requirements for EMSA

Option #1 – Is Not Complying with discharge requirements

–Both seasons the test results in excess of standard (5.9 μg) and (14.6 μg , 29.2 μg)

Option #2 – Is Complying with discharge requirements

-First Season (2012/2013) – test results were below or just above standard and BMPS are working, statically narrow.

EMSA – Water Quality Testing

Staff recommendation:

Planning Commission determine Lehigh is complying with discharge requirements

•2012 / 2013 Test Results (below detectable level & 5.9) BMPs worked or else results would have been significantly higher, limited survey data

•Continue water quality testing for 2014 – if test results exceed standard, bring to PC in Spring 2015 for determination

Feasibility of Selenium Treatment

LEHIGH SOUTHWEST CEMENT COMPANY PERMANENTE PLANT ORDER No. R2-2014-0010 NPDES No. CA0030210



Attachment B-Facility Map

Selenium Treatment since 2012

- 2013 Consent Decree Lehigh / Sierra Club
 - Install Interim Treatment Plant to treat Quarry (WMSA) Pit water by <u>October 2014</u>
 - Final Water Treatment Plant by <u>September 2017</u> for all quarry areas
- Frontier Technologies System
 - Biological treatment / micro-bacteria
 - Preliminary Testing Fall 2013, positive results
 - Interim Treatment Facility installed October 2014 29

Frontier Technology System



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Selenium Treatment Evaluation

Is it feasible to install a Selenium treatment facility (or alternative) <u>for interim reclamation</u> at WMSA / Quarry Pit?

Is it feasible to install a Selenium treatment facility (or alternative) <u>for interim reclamation</u> at EMSA?

Selenium Treatment – WMSA / Pit

Staff Recommends the Planning Commission Determine Selenium Treatment Feasible for WMSA / Quarry Pit

- Pilot Testing shows selected Frontier system can treat to 5 ug/l standard.
- Interim Treatment Facility installed and operational
- Required to treat to meet RWQCB standards by September 2017
- Interim Reclamation does not start until 2021

Selenium Treatment - EMSA

- Lehigh in active reclamation, currently installing the cover ("cap")
- Cover forecast to be completed in 2015
- Consent Decree meet standards or treat by September 2017

Selenium Treatment - EMSA

- Stand Alone Treatment Plant *infeasible*
 - Financial Cost, relationship to time period

Technology

• Alternatives to Treatment

- Pipe / Truck to Frontier Technology Site
- Pipe / Truck to Quarry Pit
- Enlarge Pond 30

Alternatives

- Pipe / Truck EMSA stormwater to Frontier Technology – <u>infeasible</u>
 - Technology challenge
 - RWQCB permit conflict
- Pipe / Truck EMSA stormwater to Quarry Pit <u>infeasible</u>
 - Technologically OK
 - RWQCB permit conflict
 - Cost / relationship to time period

Alternatives

- Enlarge Pond 30
 - Will reduce potential for selenium discharge into Permanente
 - Capacity for more detainment
 - More dillution
 - Geotechnical studies needed
 - Design Criteria

Continue Hearing to January 2015 to finish studies – determine feasibility

Overall Staff Reccomendation

- 1) Accept Annual Report No. 2.
- 2) Determine Lehigh is complying with Stormwater discharge requirements for EMSA
- Determine selenium treatment for the WMSA/Quarry Pit is feasible and in compliance with COA #82.
- 4) Continue hearing until January 22, 2015 to determine if Pond 30 enlargement is feasible *(alternative approach to Selenium treatment)*

Questions or clarifications?

Background from DEIR is available upon request.

2012 EIR Mitigation Measures & Conditions of Approval

- Conduct BMP's during reclamation to prevent limestone exposure selenium runoff.
- Test surface water discharge into Permanente Creek (Pond #30)
- Lehigh to continue research, pilot testing feasibilility of installing selenium treatment facility.
- In 30 months (12/2014), re-evaluate feasibility of installing selenium treatment facility.

CH2M Hill Study

• DEIR Comments – Infeasibility of treatment

- CH2MHill Feasibility Study
 - No system in operation for similar site constraints
 - Possible to engineer system for Quarry Pit
 - Fluidizied Bed Reactor (FBR) System
 - Need water management study, additional study
 - Cost \$33 million to \$127 million construction
 - \$6.5 million/yr. operations (\$100 million total)

Interim Selenium Impacts

 Due to uncertainty in costs, further site evaluation needed—treatment as mitigation measure <u>today</u> infeasible.

- New Mitigation Measures (4.10-2b, 2c, 2d)
 - Requires additional evaluation feasibility
 - Hearing in 30 months determination of feasibility

Past water Testing Results – Permanente Creek



Environmental Impact Report

- Significant and Unavoidable impacts
 - Impacts from Reclamation 22 significant impacts
 - All mitigated except following areas
 - Visual impacts during reclamation
 - Adverse impacts to historic resources
 - Interim selenium concentrations in runoff into
 Permanente Creek during reclamation (Water Quality and Biological impacts)

Selenium

• What are Selenium levels downstream (SF Bay)?

- RWQCB Standard = $5 \mu g/L$

Permanente	Near WMSA	Downstream -	Below Cement	Downstream of
Creek		Quarry Pit	Plant	site
Selenium Concentration (average – μg/L)	7.2	62	24	9.9

Charleston Road (2003)- 1 mile before SF Bay **2.9** μg/L

- Coyote Creek (1997) = 1.2 μg/L
- Guadalupe Creek (1997) = 2.7 μg/L

Selenium

- What are the Human Health Effects of Excessive Selenium?
- Drinking Water Standard $50 \mu g / L$ (EPA)
- An early toxic effect of selenium is on <u>endocrine function</u>, particularly on the synthesis of thyroid hormones following dietary exposure of around <u>300 micrograms Se/d</u>, and on the metabolism of growth hormone and insulin-like growth factor-1
- Other adverse effects of selenium exposure can be the impairment of natural killer cells activity and at higher levels, hepatotoxicity.
- <u>Dermatologic effects</u>, such as nail and hair loss and dermatitis, occur after exposure to high levels of environmental selenium.

(Source: . Department of Hygiene, Microbiology and Biostatistics, University of Modena and Reggio Emilia, Italy).

Selenium Treatment - Costs

- During Reclamation could exacerbate selenium.
- CH2M Hill Study Treatment Options
 - Need water management study, additional study
 - Cost \$33 million to \$127 million construction
 - \$6.5 million/yr. operations (\$100 million total)
- Uncertainty of treatment- further studies needed
- Once studies completed, costs known future determination of feasibility - Planning Commission

Water Quality Monitoring

• Is there sufficient water quality monitoring?

- Groundwater emergence from Pit following Reclamation – 14 years.
- Requirement to monitor 5 years to demonstrate compliance with standards - before reclamation complete.