



Stephen Koshy

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Formerly:

March 28, 2012

Director,

The Central Water
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of Water Resources,
Government of India.
1977 - 86

Member,

PEOPLES ACTION for
DEVELOPMENT INDIA,
Ministry of Agriculture,
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To: Thomas P. Guarino
County Counsel, County of Siskiyou
205 Lane Street, Yreka, CA - 96097

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Rita Haas, Executive Assistant
Office of the County Counsel, County of Siskiyou
205 Lane Street, Yreka, CA - 96097

Subject: Klamath Facilities Removal - Sept 2011 (EIS/EIR).

Reference: My submission on March 23, 2012, to the Honorable Supervisors.

I respectfully submit that it is not technologically feasible to remove the Iron Gate and J.C. Boyle earth dams. I reaffirm and reinforce my comments, edit and add a few missing details, such as the general cross sections of the earth dam.

This is an 'engineering' issue. I alerted BOR engineers of their error, justified my assertion, provided its scientific proof and also explained a few technical terms to assist even non technical people. The BOR has not responded, as required by law, customs and practices.

Civil Engineers learn in their 2nd year of engineering about an earth dam's three sections:

- An inner "Clay Core". The clay prevents reservoir water from leaking through.
- "Filters" on both sides of "Clay Core" that prevent clay particles from escaping.
- An outer "Gravel shell" that gives stability to the dam.

The "Gravel shell" exerts lateral pressure on the clay core. The "Clay Core" is topped with dry compacted gravel, to safely "confine" the Clay on all sides; by "Filters" on both sides and the weight of earth on top. Such "confinement" prevents the clay from yielding to the Gravel's pressure, even after the reservoir fills and the "clay" gets soaked in water.

RECEIVED
MAR 28 2012
COUNTY COUNSEL

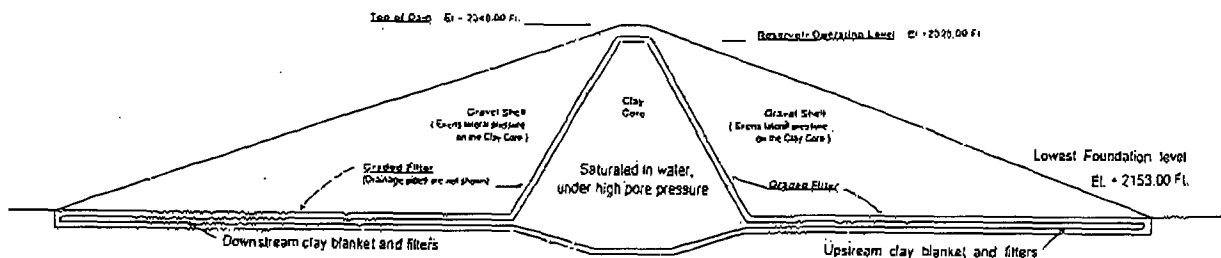
Thomas P. Guarino, County Counsel, County of Siskiyou
 Stephan Koshy on Klamath dams Removal
 Memo dated March 27, 2012.
 Page 2 of 3

Below are a few characteristics of clay.

- Individual clay particles are less than 2 microns in size, with microscopic space in between.
- Clay becomes weaker and softer with more water and its particles slide more easily over each other. With more water clay gradually becomes "plastic-like", then "liquid-like." The Swedish scientist Atterberg defined the "plastic" and "liquid" limits that are universally accepted.
- Clay has more strength if it is "confined" (restrained on all sides and prevented from yielding to pressure) than if it is "unconfined" (not restrained on all sides.) Its strength decreases when it is "unconfined" so that it will yield to external pressure and be squeezed out).

The "clay", after decades below water, develops high pore pressure (*pressure of water between its microscopic clay particles*). Any attempt to breach an earth dam, with its clay in such condition is unsafe. When the breach nears the clay's saturation level, the clay will yield to the Gravel's pressure, and the dam will collapse catastrophically. *It is a certainty, not a probable event.*

1.0. Scientific proof: Below is an earth dam's general cross section with the Iron Gate's elevations. This is from my enclosed letter to BOR dated November 2011.



The earth dam's Cross Section - Iron Gate's Elevations are shown.

1.1. During dam's construction, clay is "unconfined", but compacted "stone hard" with low moisture content. Clay attains high strength by expelling the voids and interlocking its particles. Its strength makes it possible to design the dam so that the "unconfined" clay could resist the Gravel's pressure during dam's construction. It is safe to fill the reservoir, only after "confining" the clay under the weight of the dry earth on top.

1.2. During the dams' operation, water under pressure enters the microscopic space in between the clay particles, saturates the clay and creates 'high pore pressure' (*the pressure of water between the microscopic clay particles*). This pore pressure is eventually in hydrostatic equilibrium with the outside water pressure. This is a high 174 ft water pressure for the Iron gate dam.

Clay's strength indeed decreases with more water, but the clay is "confined" and will not yield to Gravel's pressure because it is "confined." The dam is safe; the clay will not yield as long as the clay is "confined."

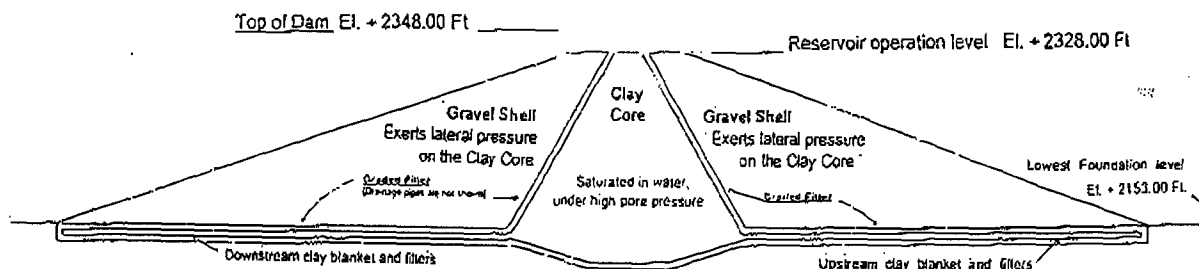
1.3. After reservoir draw down, clay will take years to dissipate its pore pressure and to dry, due to its low permeability. If permeability is of the order of 10^{-8} (i.e., 10^{-8}) the pore pressure dissipates only @ a few inches per year). This is due to the "viscosity" of water and the *microscopic* pore space in between the *microscopic* clay particles.

County Counsel, County of Siskiyou
 Stephen Koshy on Klamath dams Removal
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 Page 3 of 3

1.4. Prior to breaching, clay core is "confined" (i.e., restrained on all sides, so that it will not yield to external pressure or be squeezed out). It is designed to resist the Gravel shell's pressure and the dam is safe.

1.5. During the "proposed action" the wet clay core will become "unconfined", it will yield to external pressure and be squeezed out. The dam will collapse catastrophically.

A general cross section of an earth dam, during breaching, with the Iron Gate's Elevations is reproduced below, from my enclosed letter to the BOR, dated November 18, 2011..



The earth dam's Cross Section during breaching.

2.0. My enclosed letters to the BOR and to the Honorable Board of Supervisors had my brief conclusions, recommendations, etc. The dams' catastrophic collapse, makes other issues moot. However, I mentioned a few, such as Stability of slopes, sediment behind dams, rate of draw down and preparation and review. *For the sake of brevity, I muted further comments.*

This is an engineering issue; not a political issue. The consultants made an error and BOR engineers misinformed the rest. You could demand from the BOR a response to my observations. A soul search, a departmental enquiry and a Congressional enquiry will be in order.

The decision makers will never determine to remove the dams if they are otherwise correctly informed. It is critical to inform the Honorable Governors of California and Oregon, the Honorable Secretary DOI, the Honorable Secretary DOE, the Honorable Senators of California and Oregon, the Honorable Congressmen and the Honorable elected officials from the area, and the public. As a Civil servant all my life, I feel compelled to intercede and correct a catastrophic error of epic dimensions.

I would repeat; it is possible to comply with the Endangered Species Act, with dams in place. BOR engineers could innovate a safe passage for the endangered Species of salmon with all the dams in place. Please contact me, if you need any more comments or assistance on this issue.

Respectfully submitted,

Stephen Koshy
 3.28.2012
 Stephen Koshy

Enclosure: My submission to the Honorable Board of Supervisors.
 My letters to BOR.

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To: The Honorable Grace Bennett
Chair, County of Siskiyou Board of Supervisors
201 Fourth Street, Yreka, CA - 96097

The Honorable Jim Cook
Supervisor, County of Siskiyou Board of Supervisors
201 Fourth Street, Yreka, CA - 96097

The Honorable Ed Valenzuela
Supervisor, County of Siskiyou Board of Supervisors
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The Honorable Michael Kobseff
Supervisor, County of Siskiyou Board of Supervisors
201 Fourth Street, Yreka, CA - 96097

The Honorable Marcia H. Armstrong
Supervisor, County of Siskiyou Board of Supervisors
201 Fourth Street, Yreka, CA - 96097

Subject: Klamath Facilities Removal - Final Environmental Impact Statement / Environmental Impact Report, Sept 2011 (EIS/EIR) - Comments.

I respectfully submit this jointly to your Honors. Removing the Iron Gate and J.C. Boyle earth dams, as suggested by the "proposed action" is technologically not doable or safe. It will be disastrous. It is not merely an economic issue, it is an 'engineering' safety issue as well.

Engineering science provides this proof. These earth dams have "clay" in the middle, soaked in water for decades, with high pore pressure (*pressure of water between its microscopic clay particles, which I will explain later on also*). Any attempt to breach an earth dam, with its clay in such condition will cause the dam to collapse catastrophically.

I will justify my assertion, provide its scientific proof further and also explain a few technical terms to assist non technical people.

1.0. The Scientific Proof: A general cross section of an earth dam, with the Iron Gate's elevations, is on page 1 of my enclosed letter to the Bureau of Reclamation, dated November 18, 2011. An earth dam has three sections.

- An inner "Clay Core" to prevent reservoir water from leaking through.
- "Filters" on both sides of "Clay Core" to prevent clay particles from escaping. The "Filters" act along with the weight of dry earth on top to safely "confine" the clay (i.e., restrain it on all sides, so that it will not yield to external pressure or be squeezed out).
- An outer "Gravel shell" that exerts lateral pressure on (*in other words, squeezes*) the wet "Clay Core." The "Gravel shell" gives stability to the dam.

Honorable Board of Supervisors, County of Siskiyou
Stephen Koshy on Klamath dams Removal
Memo dated March 23, 2012.
Page 2 of 4

1.1. During dam construction, the clay is compacted "stone hard" with low moisture content, to resist the Gravel shell's pressure. Clay attains high strength on compaction with low moisture content, by expelling the voids and interlocking its particles. Clay's strength decreases with more water.

1.2. During dams' operation, water under pressure enters the microscopic space in between clay particles, saturating the clay and causing pore pressure (*pressure of water between its microscopic clay particles*). This pore pressure is eventually in hydrostatic equilibrium with the outside water pressure. This is a high 174 ft of water pressure for the Iron gate dam.

Below are a few more characteristics of clay.

- Individual clay particles are less than 2 microns in size, with microscopic space in between.
- Clay becomes weaker and softer with more water and its particles slide more easily over each other. Clay gradually becomes "plastic-like", then "liquid - like." The Swedish scientist Atterberg defined the "plastic" and "liquid" limits that are universally accepted.
- Clay's strength decreases when it changes from a "confined" state (i.e., restrained on all sides, so that it will not yield to external pressure or be squeezed out) to an "unconfined" state (i.e., not restrained on all sides so that it will yield to external pressure and be squeezed out).

The clay's pore pressure is kept low during construction, by optimizing its moisture content, by limiting the compacting rollers' weight and by constant monitoring. It is safe to fill the reservoir, only after "confining" the clay under the weight of the dry earth on top.

1.3. After reservoir draw down, clay will take years to dissipate its pore pressure and to dry, consistent with its low permeability. If the clay's permeability is of the order of 10^{-8} (i.e., 10^{-8}) the pore pressure dissipates only at the rate of a few inches per year). This is due to the "viscosity" of water and the *microscopic* pore space in between the *microscopic* clay particles.

1.4. Prior to breaching, clay core is "confined" (i.e., restrained on all sides, so that it will not yield to external pressure or be squeezed out). It is designed to resist the Gravel shell's pressure and the dam is safe.

1.5. During the "proposed action" the wet clay core will become "unconfined" (i.e., not restrained on all sides so that it will yield to external pressure and be squeezed out). It will yield to the Gravel shell's pressure and the dam will collapse catastrophically.

A general cross section of an earth dam, during breaching, (with the Iron Gate's Elevations) is on page 2 of my enclosed letter dated November 18, 2011 to the Bureau of Reclamation.

1.6. Consequences of catastrophic collapse. The dam will collapse catastrophically. It will be a disaster of epic proportions. The lives of machinery operators on the dams' top and of people below, will be in peril.

Expensive models could predict the debris' specific shape after the dams' collapse. The debris will certainly envelope the diversion tunnel's "inlet" and "outlet". The reservoir levels will rebuild. Water will pressure its way through and over the collapsed debris. Expensive overhead cable ways will be hastily required to remove the debris, bucket by bucket. The future of Salmon will be adversely impacted.

2.0. Other issues: The earth dams' catastrophic collapse is the main issue. It makes other issues moot. However, I mentioned a few more errors and omissions to the BOR, both technological and administrative:

Honorable Board of Supervisors, County of Siskiyou
Stephen Koshy on Klamath dams Removal
Memo dated March 23, 2012.
Page 3 of 4

2.1. Stability of slopes. The earth dam's carefully graded "Gravel shell" is designed to withstand draw down, but the slopes aren't. Ground water levels have risen and will take years to come down to original levels. The side slopes are saturated with high pore pressure. The 174 ft deep reservoir will draw down in 58 days. The clays within the slopes could be similar to the fine sediment load, with low resistance and fail. The EIS/EIR failed to investigate slope stability during draw down.

World renowned Prof. A.W. Skempton's 4th Rankine Memorial lecture, in 1964 (Long term Stability of Slopes, *Geotechnique* 14, 75-102) and State of the Art Report 1969 (7th Int. Conf. Soil Mech. Found. Eng., Mexico,) are classics on the subject.

2.2. The sediment behind the dams. The EIS/EIR considers the sediment till Year 2002. It omits 18 years of sediment till 2020, when it proposes dam removal.

2.3. The rate of draw down. The EIS/EIR proposes an arbitrary draw down rate of 3 ft per day, It is not supported by any calculations or any experimental draw down.

2.4. Preparation and review. The management assigned a concrete specialist to prepare the Chapter on earth dam removal and a hydrology specialist to review it. The earth dam design and geo-technical sections have not applied their insight to avoid this costly error.

For the sake of brevity, I mute further comments.

3.0. Conclusion: The "proposed action" is certain to cause the dam's catastrophic collapse. It is a certainty since the earth dams' wet clay core will yield to outer Gravel shell's pressure. *It is not just a probability.*

The fatal error of catastrophic collapse, invalidates *all those Alternatives* that involve earth dam removal. The *Alternative Four* involving cutting a fish passage through the Iron Gate dams' saturated clay core is also not safe or doable for the same reason.

The EIS/EIR would contravene the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the Klamath Hydroelectric Settlement Agreement (KHSA), the Klamath Basin Restoration Agreement (KBRA) as well as many more statutes under the Oregon Department of Environmental Quality, the California Department of Fish and Game (CDFG), the US Environmental Protection Agency (EPA), etc.

The significant impact of the earth dams' catastrophic collapse, can not be avoided or mitigated. The Facilities Removal would not be completed within the State Cost Cap, since the collapsed debris cannot be left below running water in the river bed. Expensive overhead cable ways or other contrivances will be hastily required to remove the debris. The entire expense would be counter productive.

It is critical to inform Honorable Jerry Brown, Honorable Kitzhaber, Honorable Ken Salazar and concerned others in a timely manner, since a determination is due by March 31, 2012. Their Honors may please review my analysis, if necessary, with help from those without any conflict of interest and also enquire as to how the EIS/EIR's fatal error was allowed to happen.

4.0 Recommendation. My purpose is not merely to say that something has been wrong, but that something can be done about it. The DOI/BOR engineers can review the topography of the 4 dams and reservoirs, consider the data and innovate a new hydro-system passage.

The new hydro-system passage should provide the bulk of the Juveniles and the adult spawners a safe passage. This is an engineering problem and demands an engineering solution. The dams are to stay, the farmers to get irrigation water, hydro power to be retained and the Salmon to recover. I think, it is possible.

Honorable Board of Supervisors, County of Siskiyou
Stephen Koshy on Klamath Dams Removal
Memo dated March 23, 2012.
Page 4 of 4

5.0 My experience in the subject: As Deputy Director, Earth Dams Directorate, Central Water Commission in India in 1963-64, I coordinated the designs and specification drawings for four major earth dams, later constructed in India: the Tawa, Bargi, Barna and Hsdeo. I've investigated major earth dams in the Indian Himalayas that were later constructed. This background has helped this effort.

The United Nations later trained me on "Stability of Slopes and Earth dam design." in the University of Queensland, Brisbane, Australia during 16 months in 1971-73. Dr. Peter James, an authority on the subject was my Mentor. Dr. James had researched under (Late) world renowned Prof. Sir, A.W. Skempton, of the Imperial College of London.

The Commonwealth of Education and Science, Australia arranged extensive training visits to major projects in Australia for several months. I had the rare privilege to obtain valuable insights from their senior engineers.

My information about the Klamath Removal project is very recent, initially from newspaper reports. The DOI sent me the Executive Summary in early October and the full Report on 28th October. I am a late comer to this issue. However, I have analyzed the data and information in the EIS/EIR.

I find from the EIS/EIR that the DOI held seven public scoping meetings, and received written, verbal and electronic inputs, but no one alerted the DOI of the danger of even trying to remove the earth dam. My analysis is purely technical. I have consulted no one. I have no political affiliation or membership in any environmental organization. Thanks for the opportunity to send some of my comments.

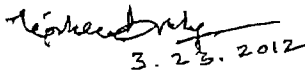
I enclose copies of my two formal letters dated November 18, 2011 and December 21, 2011 to the lead engineer, Bureau of Reclamation who authored the EIS/EIR. These letters remain unanswered. I request the Honorable Board of Supervisors, County of Siskiyou to kindly review my comments or refer to independent University professors of Civil engineering, who do not have a conflict of interest.

6.0. Acknowledgments I acknowledge the United Nations Development Program, the University of Queensland, Brisbane, Australia, Dr. Peter James, my Mentor, and the Commonwealth of Education and Science, Australia, whose far sight is now helping the United States on this issue.

I acknowledge my professors at the School of Public Administration, University of Southern California, Los Angeles, who taught me Public Policy and placed high expectations on me with their long past testimonials. I acknowledge my extensive experience in India and the patience, love and faith that my four children in the United States have put in me. All of them have made this effort possible. I give them thanks.

Please contact me, if you need any more comments or assistance on this issue.

Respectfully submitted,



3.23.2012

Stephen Koshy

Copy to The Honorable Thomas P. Guarino, County Counsel, County of Siskiyou.

Enclosure: as above, my letters to BOR dated November 18, 2011 and December 21, 2011

Stephen Koshy

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December 21, 2011

To: Thomas Hepler, P.E.
Team Leader, Waterways and Concrete Dam Group
Bureau of Reclamation
Denver, Colorado.

Subject: Klamath Facilities Removal - Final Environmental Impact Statement /
Environmental Impact Report, Sept 2011 (EIS/EIR) - Additional Comments.

My earlier comments on Nov 18th provided scientific proof that the proposed action to remove the Iron Gate dam and J.C. Boyle earth dam, is not safe or doable. The dams would collapse catastrophically.

The dams' catastrophic collapse made other issues moot. However, I raised a few more errors and omissions in the EIS/EIR; such as the slopes' stability, sediment release, draw down rate and technical specializations of preparer and reviewer. I am informed that geo-technical specialists were involved in creating the EIS/EIR. My additional comments reinforce my earlier comments (attached.)

1.0. The dam's catastrophic collapse. This event is certain to happen, not just a probability. The dam's clay core is saturated in water under pressure for 58 years and has high pore pressure (*pressure of water between the microscopic clay particles.*) The dam's instrumentation would reveal the pore pressures at different elevations.

The outer gravel shells exert lateral pressure on the clay core. Prior to "proposed action" to remove the dam, the clay is safely "confined" between filters and the weight of earth from top. The "confined" clay will not yield to the gravel shells' lateral pressure, and the dam is safe.

The "proposed action" to remove the dam, will remove the confining earth on top and will "un-confine" the clay, which will certainly yield to the gravel shells' pressure, and the dam will certainly collapse catastrophically.

2.0 Other issues.

2.1. Stability of slopes. EIS/EIR has meager information about the engineering geology of reservoir areas. The PanGeo (2008) study is "preliminary" about "current" conditions. There is no evaluation of the effect of 174 ft draw down on slope stability.

Chapter 3, para 3.11.3.5 mentions potential landslides: "relatively steep slopes, underlain by tuff. wave action at the shoreline of the reservoir has eroded sand and volcanoclastic tuff beneath diatomite beds and has resulted in the calving of diatomite into reservoir creating vertical exposures as high as 20 ft in the diatomite." "the (fine grained) red volcanoclastic material underlying the hill slopes may be vulnerable to rapid erosion if subjected to concentrated water flows."

Klamath Facilities Removal
Stephen Koshy's additional Comments
dated Dec 21, 2011.
Page 2 of 2

Chapter 3, Figure 3.11-2 identifies existing potential landslide areas in the Iron Gate and in the Copco 1 Reservoir areas. EIS/EIR has enough information to suggest the certainty of slope failures on draw down, but failed to investigate them. The slope failures will add to the sediment release'

2.2. The sediment behind dams. EIS/EIR must rectify its omission of 18 years' sediment from 2002 to 2020, and also add the estimated sediment from slope failures. It will change Appendix E.

2.3. Administrative issues. Honorable Jerry Brown, Honorable Kitzhaber, and Honorable Ken Salazar need to make legislation and a determination by March 31, 2012. Time is therefore of essence. It is critical to inform their Honors and concerned others in a timely manner.

The BOR Deputy Commissioner Operations; the Directors for Operations, Technical Resources and Technical Services Center, the Regional Director, the Engineering and Geo-technical Services Divisions and Group leader, may please concurrently review my analytical comments to assist the Special Advisor to Chief of Staff, the Honorable Commissioner and the Honorable Secretary.

3.0. Social and Public information issues. It is critical to inform the stake holders, the public and concerned others in a timely manner, since many are eagerly expecting a positive determination by March 31, 2012. Our President's declared policy demands transparency, responsibility and adherence to scientific evidence.


4.0. Conclusion: My earlier comments are attached with its Conclusions, Recommendations, My experience in the subject and Acknowledgments. These continue to apply.

As my earlier comments said, the dams are to stay and the Salmon to recover. BOR engineers can review the topography of the 4 dams and reservoirs, consider the data and innovate a new hydro-system passage to provide the bulk of the Juveniles and the adult spawners a safe passage. This is an engineering problem and demands an engineering solution. I think it is possible.

Again, my analysis is purely technical. I have consulted no one. I have no political affiliation or membership in any organization. Thank you for the opportunity to send my additional comments.

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(12.21.11)

Attached: My earlier comments dated Nov 18.

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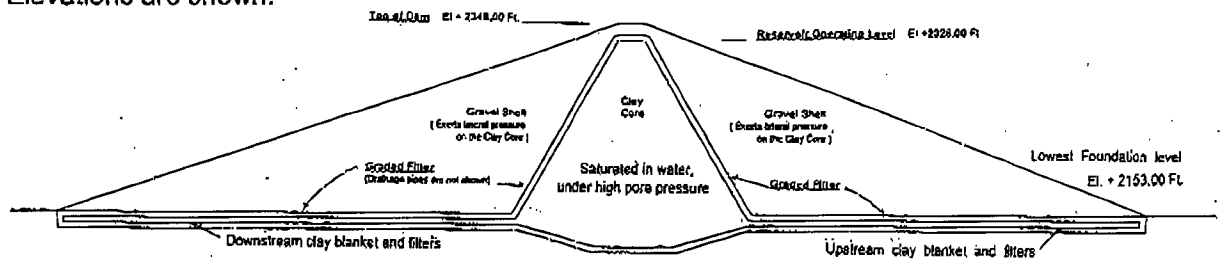
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1.0. The Scientific Proof: Below is an earth dam's general cross section. Iron Gate's Elevations are shown.



The earth dam's Cross Section - Iron Gate's Elevations are shown.

The earth dams have three sections.

- An inner "Clay Core" to prevent reservoir water from leaking through.
- "Filters" on both sides of the "Clay Core." They prevent clay particles from escaping. They also safely confine the clay below the weight of the dry earth on top.
- An outer "Gravel shell" that exerts lateral pressure on (*in other words, squeezes*) the wet "Clay Core." The "Gravel shell" gives stability to the dam.

1.1. During dam construction, the clay is compacted "stone hard" with low moisture content, to resist the Gravel shell's pressure. Below are a few characteristics of clay.

- Individual clay particles are less than 2 microns in size, with microscopic space in between. Clay attains high strength on compaction with low moisture content, by expelling voids and interlocking its particles. Clay's strength decreases with water.
- Clay becomes weaker and softer with more water and its particles slide more easily over each other. Clay gradually becomes "plastic-like", then "liquid-like." The Swedish scientist Atterberg defined the "plastic" and "liquid" limits that are universally accepted.
- Clay's strength decreases when it changes from a "confined" to an "unconfined" state.

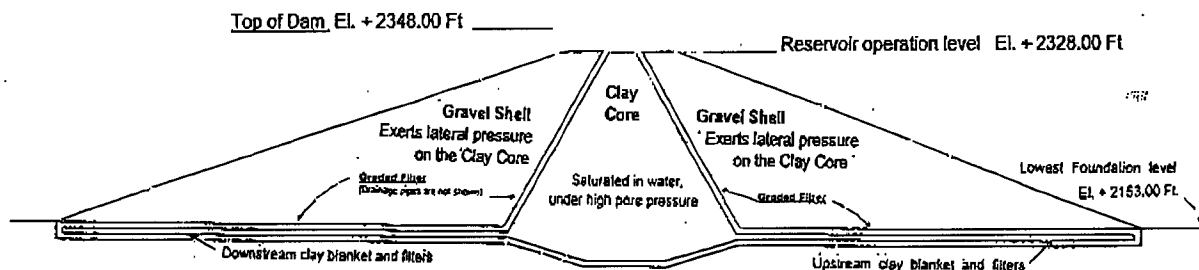
Klamath Facilities Removal
 Stephen Koshy's Comments
 dated Nov 18, 2011:
 Page 2 of 4

The clay's pore pressure is kept low during construction, by optimizing its moisture content, by limiting the compacting rollers' weight and by constant monitoring. It is safe to fill the reservoir, only after confining the clay under the weight of the dry earth on top.

1.2. During dams' operation, water enters under pressure into the microscopic space between clay particles, saturating the clay and causing pore pressure (*pressure of water between its microscopic clay particles*). This pore pressure is eventually in hydrostatic equilibrium with the outside water pressure. This is a high 174 ft of water pressure for the Iron gate dam.

1.3. After reservoir draw down, clay will take years to dissipate its pore pressure and to dry, consistent with its low permeability. This is due to the "viscosity" of water and the *microscopic* pore space in between the *microscopic* clay particles. It will be dangerous to try to remove the dam, with its clay in such condition. The dam will collapse catastrophically.

1.4. Prior to breaching, the wet clay core is "confined". It is designed to resist the Gravel shell's pressure and the dam is safe.



The earth dam's Cross Section during breaching.

1.5. During the "proposed action" to remove the Iron Gate and J.C. Boyle earth dams, the wet clay core will become "unconfined." It will yield to the Gravel shell's pressure and the dam will collapse catastrophically.

1.6. Consequences of catastrophic collapse. The lives of machinery operators on the dams' top and of people below, will be in peril. Expensive models could predict the debris' shape after the collapse. The debris will envelope the diversion tunnel's "inlet" and "outlet". The reservoir levels will rebuild. Water will pressure its way through and over the collapsed debris. Expensive overhead cable ways will be hastily required to remove the debris, bucket by bucket. The future of Salmon will be adversely impacted.

2.0. Other issues: The earth dams' catastrophic collapse is the main issue. It makes other issues moot. However, I may mention a few more errors and omissions, both technological and administrative:

2.1. Stability of slopes. The earth dam's carefully graded "Gravel shell" is designed to withstand draw down, but the slopes aren't. Ground water levels have risen and will take years to come down to original levels. The side slopes are saturated with high pore pressure. The 174 ft deep reservoir will draw down in 58 days. The clays within the slopes could be similar to the fine sediment load, with low resistance and fail. The EIS/EIR failed to investigate slope stability during draw down.

World renowned Prof. A.W. Skempton's 4th Rankine Memorial lecture, in 1964 (Long term Stability of Slopes, *Geotechnique* 14, 75-102) and State of the Art Report 1969 (7th Int. Conf. Soil Mech. Found. Eng., Mexico,) are classics on the subject.

Klamath Facilities Removal
Stephen Koshy's Comments
dated Nov 18, 2011.
Page 3 of 4

2.2. The sediment behind the dams. The EIS/EIR considers the sediment till Year 2002. It omits 18 years of sediment till 2020, when it proposes dam removal.

2.3. The rate of draw down. The EIS/EIR proposes an arbitrary draw down rate of 3 ft per day, It is not supported by any calculations or any experimental draw down.

2.4. Preparation and review. The management assigned a concrete specialist to prepare the Chapter on earth dam removal and a hydrology specialist to review it. The earth dam design and geo-technical sections have not applied their insight to avoid this costly error.

3.0. Conclusion: The "proposed action" to remove the Iron Gate and J.C. Boyle earth dams, is not safe or doable. While trying to remove these earth dams, their wet clay core will become "unconfined", they will yield to their outer Gravel shell's pressure and the dams will collapse catastrophically. *For the sake of brevity, I mute further comments.*

The fatal error of catastrophic collapse, invalidates *all those Alternatives* that involve earth dam removal. The *Alternative Four* involving cutting a fish passage through the Iron Gate dams' saturated clay core is also not safe or doable for the same reason.

The EIS/EIR would contravene the requirements of the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the Klamath Hydroelectric Settlement Agreement (KHSA), the Klamath Basin Restoration Agreement (KBRA) as well as many more statutes under the Oregon Department of Environmental Quality, the California Department of Fish and Game (CDFG), the US Environmental Protection Agency (EPA), etc.

The significant impact of the earth dams' catastrophic collapse, can not be avoided or mitigated. The Facilities Removal would not be completed within the State Cost Cap, since the collapsed debris cannot be left below running water in the river bed. Expensive overhead cable ways or other contrivances will be hastily required to remove the debris. The entire expense would be counter productive.

It is critical to inform Honorable Jerry Brown, Honorable Kitzhaber, Honorable Ken Salazar and concerned others in a timely manner, since a determination is due by March 31, 2012. Their Honors may please review my analysis, if necessary, with help from those without any conflict of interest and also enquire as to how the EIS/EIR's fatal error was allowed to happen.

4.0 Recommendation. My purpose is not merely to say that something has been wrong, but that something can be done about it. The DOI/BOR engineers can review the topography of the 4 dams and reservoirs, consider the data and innovate a new hydro-system passage.

The new hydro-system passage should provide the bulk of the Juveniles and the adult spawners a safe passage. This is an engineering problem and demands an engineering solution. The dams are to stay, the farmers to get irrigation water, hydro power to be retained and the Salmon to recover. I believe it is possible.

5.0 My experience in the subject: The United Nations trained me in the University of Queensland, Brisbane, Australia during 16 months in 1971-73 on "Stability of Slopes and Earth dam design." Dr. Peter James, an authority on the subject was my Mentor. Dr. James had researched under (Late) world renowned Prof. Sir, A.W. Skempton, of the Imperial College of London. The Commonwealth of Education and Science, Australia arranged extensive training visits to major projects in Australia for several months. I had the rare privilege to obtain valuable insights from their senior engineers.

Klamath Facilities Removal
Stephen Koshy's Comments
dated Nov 18, 2011.
Page 4 of 4

As Deputy Director, Earth Dams Directorate, Central Water Commission in India in 1963-64, I coordinated the designs and specification drawings for four major earth dams, later constructed in India: the Tawa, Bargi, Barna and Hsdeo. I've investigated major earth dams in the Indian Himalayas that were later constructed. This background has helped this effort.

My information about the Klamath Removal project is very recent, initially from newspaper reports. The DOI sent me the Executive Summary in early October and the full Report on 28th October. I am a late comer to this issue. However, I have analyzed the data and information in the EIS/EIR.

I find from the EIS/EIR that the DOI held seven public scoping meetings, and received written, verbal and electronic inputs to identify the alternatives. It is evident that no one alerted the DOI of the danger of even trying to remove the earth dam, with its clay core saturated in water and under high pore pressure. My analysis is purely technical. I have consulted no one. I have no political affiliation or membership in any environmental organization. Thanks for the opportunity to send some of my comments.

I again request to convey the result of my analysis to Honorable Jerry Brown, Honorable Kitzhaber, Honorable Ken Salazar and concerned others in a timely manner, since their determination and concurrence is due by March 31, 2012.

6.0. Acknowledgments I acknowledge the United Nations Development Program, the University of Queensland, Brisbane, Australia, Dr. Peter James, my Mentor, and the Commonwealth of Education and Science, Australia, whose far sight is now helping the United States on this issue.

I acknowledge my professors at the School of Public Administration, University of Southern California, Los Angeles, who taught me Public Policy and placed high expectations on me with their long past testimonials. I acknowledge my extensive experience in India and the patience, love and faith that my four children in the United States have put in me. All of them have made this effort possible. I give them thanks.

Please contact me, if you need any more comments or assistance on this issue.

Respectfully submitted,



11.18.2011

Stephen Koshy