JAN 29 1976

50-133

Mr. Robert H. Morris
U. S. Geological Survey
Box 25046 - Mail Stop 903
Denver Federal Center
Denver, Colorado 80225

Dear Bob:

Enclosed for your information is a preliminary evaluation of the July 1975 geology report on Humboldt Bay received from geologists and seismologists with the California Division of Mines and Geology, a report entitled "Seismic Hazards at the Humboldt Bay Nuclear Plant," by Thomas Collins, and some notes written by Don Caldwell which primarily address the Humboldt Bay geology reports prepared by Earth Sciences Associates.

I am happy to hear that you have a paleontologist reviewing the paleo data which will contribute significantly to a geologic evaluation of the site.

I would appreciate receiving from you any early information that you may be able to pass on unofficially which may assist or expedite our review of the site. With best regards.

Sincerely,

A. T. Cardone
Seismology and Geology Branch
Division of Site Safety and
Environmental Analysis

Enclosures:
As stated

cc w/o encl:
W. Gammill
C. Stepp
D. Caldwell
A. Cardone

DISTRIBUTION:
DOCKET FILE (50-133)
NRR RDG
SGB RDG

OFFICE ➤	SSEA:SGB	SSEA:SGB				
SURNAME ➤	ATCardone:ms	JCStepp				
DATE ➤	1/28/76	1/28/76				

Harris
DRAFT
Caldwell/rw
1/23/76

NOTES ON HUMBOLDT

I. Tectonic Setting

The site is located near the southern margin of the Eel River Basin. The Eel River basin is a triangular down-faulted continental block bounded on the south by the Mendocino fracture zone (which is presumed to be the offshore extension of the San Andreas) on the west by the continental slope and the northeast by the strike-slip faults along the northeastern boundary of the Coast Ranges. The portion of the continental margin which is occupied by the Eel River Basin is being underthrust by a small oceanic plate due to spreading at the Gorda Ridge.

The Eel River Basin block is thus subjected to stresses resulting from shear along the San Andreas Mendocino System and under thrusting taking place at the base of the continental slope (Silver, 1971). It is not clear to ~~us~~ me whether the results of the interaction of these two stress systems is sufficiently well known to predict the type of deformation that will result. I do not know if a unifying picture has been or can be developed based on historic seismicity. I suspect geologic mapping of the region is neither good enough nor complete enough to form any defensible conclusions regarding contemporary tectonism.

II. Site Vicinity (25 mi radius)

The most northerly of the structures associated with the Mendocino San Andreas system which have been mapped are ~~15 mi~~ 15 mi from the site.

These are the False Cape shear zone and the Russ fault (Ogle, 1953). "It seems conceivable that more such shear zones exist in the basement rock buried under the Eel River Valley and microseismicity seems to suggest this is a likely possibility" (ESA, 1975). The Russ fault is though to be the source of the June 7, 1975 ~~MS.6~~ and 1923 M7.2 earthquakes although no surface displacement occurred on it. Although a reference to same magnetic and gravity work (Griscom. 1973, I have not seen it) is cited as evidence that the "San Andreas cannot have extended north of Cape Mendocino," I find it difficult to accept the idea that the site is beyond the influence of the Mendocino/San Andreas stress field. That the influence is felt in the site vicinity may be supported by the fact that some earthquakes in the vicinity (Bolt, 1968, Fig. 3) and microearthquakes (Smith, 1973) have been interpreted to show right-lateral movement on northwest trending faults.

The focus of work up to the present seems to have been to show that the main trace of the San Andreas or a major branch of it doesn't go through the Eel River Basin. It would seem that the real problem is movement of some unknown magnitude on any one of several identified faults in the site vicinity resulting from activity or strain accumulation on the San Andreas.

On the northeast the site is bounded by the Mad River fault zone. The most southeasterly features associated with the Mad River zone are 10 miles from the site. The Mad River zone may have an onshore length of 75 miles (Rich and Steeele 1974). It trends out to sea

through a prominent offset in coast south of Trinidad and aligns with faults mapped offshore by Silver (1971) and Hoskins and Giffiths (1971). The 600 fatham contour is also offset on the trend of the fault zone. An event near Trinidad of M4.9 on September 4, 1962 may have taken place on this fault zone and has been interpreted to show right-lateral motion (Bolt, 1968). The site is thus located on a small block only about 25 miles in width at its widest point which bounded by two major, active shear zones.

Several faults have been identified within this block. The largest of these are the Little Salmon-Yager, Freshwater and Table Bluff faults. Smaller, but probably equally significant faults for the safety of the site are the Bay Entrance, North Spit and Ryan Creek faults. Of the large faults, the Freshwater and the Little Salmon-Yager are the most critical. In the 1972 report, it was assumed that the ~~M5~~ M6.5 of December 21, 1954 occurred an the Freshwater. However, it appears that the Freshwater is offset about two miles by the Little Salmon-Yager, which is stated to be inactive. It is essential to have a very clear understanding of the relationship and activity of these faults because the Little Salmon-Yager passes beneath and close to the site. The 1975 report states that the 1954 earthquake should be relocated to the Mad River zone. An evaluation of this relocation seems most critical, but I have not had a chance to discuss it with Renner (I do not think we even have the reference which describes the relocation work.) Tousson Toppozada has suggested that a

a fissure .5mi ~~[illegible]~~ long at the time of an August 18, 1908 event may be related to activity on the Freshwater fault. The statements regarding the age of the Freshwater on p. 30 of 1975 report are not clear and the details of the mapping (outcrops locations, lithologies, orientation of the fault plane and other contacts) are not given. I do not believe it has been shown that the Freshwater is inactive. If the Freshwater is active, we must consider the Little-Salmon Yager, which offsets it, to be active.

The Little Salmon-Yager fault system is mapped as a northeast to east dipping thrust with a probable extent of greater than 30 miles. As in the case of the Freshwater, the description (ESA, 1975, p. 25) of mapping is sketchy. It seems that the exposures of the fault which were used to map it are few and far between and that stratigraphic units in fault contact did not have distinctive litnologies.

A problem that may be critical to the structural interpretations in the site vicinity is that of correctly identifing and correlating the various post-Miocene stratigraphic units. This particularly true for the Little Salmon-Yager. The lithology of most units is indistinct and likely to be complicated by facies changes. Much of the correlation is based on microfossils. We are looking into the adequacy of the micropaleantological dating work. It is possible that the dating may not be as definitive as it appears. This thought

is based on a report by Silver,(1971) that samples of Miocene rock dredged from the shelf yielded no forams which were not living in the present environment. I have also sent the report to a micropaleontologist friend of mine who has looked at it briefly. He thought that many of the forams used appeared to be ventuics, which are more facies-dependent than time-dependent.

It is reported that the Little Salmon-Yager is capped by the "Upper" Carlotta Formation of early Pleistocene or Plio-Pleistocene age. The designation "Upper" Carlotta is introduced for the first time in this 1975 report and supported by little more than a reference to a personal communication (Ogle, 1974). This unit deserves particular attention because the lower part of the "Upper" Carlotta (Plio-Pleist) is easily confused with the late Pleistocene Houktan. Thus it is vital to have a strong basis for defining and correlating "Upper" Carlotta because it determines whether faulting is capable or noncapable. The "Upper" Carlotta is reported to have a unique assemblage of forams among the Wildcat Group of which it is a member. No mention is made if any of these forams are found in the Hookton. Some samples appear to be dated as upper Carlotta on the basis of only one individual and others are based only on rare or few individuals. The possibility for reworking may also exist. It is reported that the "Upper" Carlotta is shallow marine (p. 20). The Hookton also has shallow marine phases (p. 21 and 22). This poses definite problems if most of the "index" fossils are benthics.

III Site Area (Smi. radius)

Within the five mile radius, the two most important structures which have been identified are the Little Salmon and Bay Entrance faults. It is claimed that the recent work (boreholes and reflection profiling) accurately locates these faults. I do not think we can accept this claim based on the data presented for reasons outlined below.

Because of the difficulty in correlation based on lithology or paleontology some use has been made of geophysical logging in the most recent set of borings. This technique has been used extensively to define the two near-site faults. The figure (20) which summarizes the results of the logging is quite misleading. It shows a marker horizon (indicated by a distinctive kick on the natural gamma log which represents a clay bed in the "Upper" Carlotta) as perfectly flat. An examination of the individual logs shows that it is not. On one north-south section, .6mi in length which passes through the site, the elevation of the marker changes 50 feet over .2 miles at each end of the line. A cross-section (C-D, Fig. 16) shows a syncline in this vicinity. This section is based on lithology and cannot readily be correlated with the gamma logs. The northwest projection of this zone of questionable structure coincides with discontinuities of indeterminate origin and location on the reduced xerox copies of the reflection profiles presently available. We have

requested full-sized copies of the profiles and an accurate shot point map. Another north-south section farther east is also shown with the marker horizon flat. Actually the marker displays a difference in elevation of 300 feet over less than .5 miles. Again this is interpreted as folding on a lithologic cross-section The implications of all this is that there may be unidentified faults or inaccurately mapped faults in the site area.

Also with reference to the location of the Little Salmon fault, it seems some of the data has not been provided. On p. 26 the text states that drilling information from Standard Oil confirms the location of one fault. No further indication of what this data shows is presented. Boring RD-19 is represented as penetrating the fault (Fig. 18) but there is no indication of that in the core description or the gamma log. It is not obvious that a refraction survey referred to on p. 26 shows that the Little Salmon is buried beneath 1000 feet of Hookton and "Upper"Carlotta north of Humboldt Hill. The only solid data on the fault in ~~the~~ the area is from the Standard Brauner well 2 miles south of the site which indicates the fault at 1780 feet. The Dinwiddie well is shown penetrating the fault on Fig. 17. This well was not logged but yet the age of the sediments below the fault is given as late Pliocene. The accuracy and completeness of the subsurface data in the site area is very important to a determination of the location of the Little Salmon because "no good exposures of the fault are found north of Newberg" (p.25) which is six miles to the south.

The location of the Bay Entrance fault also appears to be ill-defined. The best way to evaluate this structure will be to determine its displacement and orientation from the recently requested profiles and then look for such a structure in the onshore data. At present the onshore existence and displacement of this fault which is purported to cut the Little Salmon is based solely on apparent lithologic anomalies at two points. Interpretations based on lithology along are insufficient as a basis for defining the location of this structure when other methods (gamma logs) indicate possible displacements elsewhere which may be related to the Bay Entrance fault.

The structure contour maps which are presented to integrate the various sections in the site area are also very misleading. All of the boreholes in the area are shown on each of the three maps (Fig. 21) leading one to believe that these are data points. In fact only a very few borings contained information used in developing the maps. As a result, the maps seem quite speculative.

IV. Other areas of uncertainty

A. The terraces in the site area are reported to be too poorly preserved to be useful in defining the local defermation accompanying uplift; however, a reference cited by Waldron in 1971 (Wahrhaftig and Birman, 1965, p. 325) states that some defermation of the terraces has taken place in Holocene time. This reference has not been addressed in either the 1972 or 1975 reports. In 1973 Baltz stated that the Hookton on the terraces is warped and tectonic activity continues in the area. In light of the microseismic activity in the region, it would seem that not all of the stress is relieved by plastic defermation as the ESA report claims.

B. The relationship of small faults like Ryan Creek and North Spit to the local structural pattern is unclear.

C. I believe it will be important to find out if all the pertinent data from oil and gas wells in the vicinity have been used.

V. Problems cited by others which should be addressed

A. Toppozada, California Division of Mines and Geology, 12/19/75

1. Nature of offset in Freshwater caused by Little Salmon-Yager;
2. Age and attitude of the Table Bluff fault; and
3. Changes in the mapped distribution of Quaternary deposits between 1972 and 1975 reports.

B. Tomas Collins, Geologist for National Forest Service

1. Possible activity of the Bay Entrance fault indicated by epicenters of microseisms plotted by Tera Corporation and discontinuities Collins sees in the bay sediments over the fault.
2. An active fault zone at 15-40km based on plotted hypocenters of several authors.
3. The "multitude" of northwest trending late Quaternary faults in the area.
4. Possible recent activity on the Little Salmon fault.

Cardone

PRELIMINARY EVALUATIC)F

GEOLOGY OF THE HUMBOLDT BAY REGION WITH

SPECIAL REFERENCE TO THE HUMBOLDT BAY POWER PLANT SITE AND VICINITY,

EARTH SCIENCES ASSOCIATES REPORT PREPARED FOR PG&E, JULY 1975

Because this geologic investigation primarily addresses the problem of faults and fault activity, the major portion of this preliminary review will be limited to a discussion of these data.

1. A presentation is made of the letter from Dr. B.A. Ogle indicating his concurrence with the findings and interpretations as presented in the report (Appendix I). No such letter is presented indicating whether or not Dr. J.H. Curtis is in agreement with the report's conclusions even though he is a principal author of the earlier 1972 investigation of the same area and a consultant during the 1975 investigation.

2. Page 4.

All of the conclusions are presented in rather definite terminology. A review of the data support in the text for each of these conclusions indicates that there are far more questions particularly about the possible age of latest fault activity involved than the conclusions would indicate.

3. Page 6, paragraph 3.

A reference is made to Jennings' 1973 fault map. It is stated that he interpreted the onshore extension of the Mendocino fault zone as being the Mattole River fault. This is incorrect. His map does not show this connection.

4. Pages 8 and 9

A highly critical feature has received insufficient discussion. The Bay Side Cut Off fault which reportedly displaces the Hookton

Formation against Franciscan rock, is shown as an extension of the Freshwater fault on drawing number 4 of the 1972 Humboldt Bay Power Plant investigation. On drawing number 4 of the 1972 study, the Freshwater fault is shown as a solid line which indicates that it offsets the Hookton Formation, and can be readily located in the field. Figure 3 of the 1975 study shows the Freshwater fault as a dotted pattern indicating that it is concealed by the Hookton Formation. The mapped location of the fault has moved approximately two miles to the southwest. The Bay Side Cut Off fault is now no longer considered to be a continuation of the Freshwater fault and is considered as an entirely separate short fault. The detailed mapping mentioned on page 9 of the 1975 report which is used to support these changes in the position and activity of the Freshwater fault must be presented in order to determine the justification for these changes.

5. Page 10

The statement that the Yager branch of the Little Salmon fault offsets traces of the Freshwater fault by about one and one-half miles is questionable. Figure 4 of the 1975 report indicates that the data supporting this interpretation is open to interpretation considering the number of queries in the area of this supposed offset. Text indicates offset is an office interpretation and no field work was done to verify that a Yager fault extension even exists.

6. Page 10 paragraph 3 indicates that the outcrops of Wildcat Formation east of the Freshwater fault are supportive evidence for the Yager fault offsetting the Freshwater fault. Why have other outcrops of the Wildcat Formation in the area been eliminated from the regional map figure 4? A particularly large outcrop of Wildcat Formation shown

on the Redding sheet of the State Geologic map occurs northeast of the supposed Freshwater and Yager faults intersection and is not shown on maps of this report.

7. Page 12

Great emphasis is placed on the fact that no detectable ground movement occurred along the Russ fault, the Cape Fear Shear zone, or along the Little Salmon fault during the June 7, 1975 earthquake. No mention is made of any activity along the Table Bluff fault. There is some question as to whether the Russ fault even exists as a distinct fault. (Nason, 1968, personal communication, 1975.)

8. Page 13, paragraph 2

The statement is made that earthquakes up to a magnitude of 7.5 could occur on the Mendocino fault zone. Why could not earthquakes at least as large as those which could occur on the San Andreas be expected on the Mendocino fault zone? The Mendocino fault is of greater length than the San Andreas.

9. Page 14, paragraph 1

A very generalized statement referring to a number of other faults in the vicinity including the Table Bluff, North Spit and Ryan Creek is made. This statement also indicates that no specific geological data is currently available to support the opinion that they are not active. The Table Bluff and North Spit faults in particular are of critical importance to the plant site and require further investigation.

10. Page 14, paragraph 2

Reference is made to a fault on the Table Bluff highland which offsets the Hookton Formation. On figure 4 of the 1972 report,

the Table Bluff fault goes out to sea north of this fault. On figure 14 of the 1975 report, the Table Bluff fault is shown going out to sea south of this exposure. What is the justification for moving the position of a fault and why could it not go out to sea through the recently discovered Hookton offset?

11. Table A of the 1975 report indicates that the Table Bluff fault possibly intersects with the Little Salmon, Yager faults. Page 27 of the same report states that the Little Salmon fault overrides the Table Bluff fault. This relationship mentioned on page 27 would suggest that the Little Salmon fault is younger than the Table Bluff fault.

12. Page 25, paragraph 4.

A statement is made that there are no good exposures of the Little Salmon fault north of Newberg. This appears to be in conflict with the statement made on page 24 of the 1972 report that the fault traces could be located within a few hundred feet in this region.

13. Page 25, paragraph 4

This statement is made that the faults have not caused any casing problems or well deformation in the Tompkin's gas field. What is the source of this statement?

14. Page 26, paragraph 1

Exploratory boring RD-19 which presumably passes through the upper plate, through the fault, and bottoms in the lower plate is offered as evidence for the position of the Little Salmon fault. The well log as presented in Appendix 2 does not seem to support this relationship. The micropalentological data presented in Appendix 2 does not appear to correlate well with the cross section ~~J-K~~ G-H for RD-19.

15. Page 27, paragraph 2

In the discussion of the Table Bluff fault, statements in the 1975 report indicate that the fault plane dips to the north at about 80 degrees. In the 1972 report, page 28, this same fault is said to dip to the southwest at about 50 degrees.

16. Page 30, under the discussion of the evidence regarding the activity of Freshwater faults, item 2

The statement is made that the fault is overlain by Wildcat strata. This differs from the conclusion arrived at by the Curtis and Hamilton study of 1972. Detailed mapping must be presented to justify this statement.

Item number 3, 1975 report, states that all the basement rock exposed in the Freshwater Creek area is Franciscan. Figure 5 of the 1975 study indicates that this is not the case. Therefore, the conclusion that the fault is overlain by alluvium and Wildcat Formation is questionable.

17. Pages 31 and 32

The fault at the south end of College Cove which offsets the Pleistocene Hookton Formation is considered in the 1975 report to be a cross fault of the Falor-Korbel fault system. There is no justification offered for this correlation nor is it shown that way on any of the maps of this report. It would seem more reasonable that the offshore extension of the NW-SE Falor-Korbel system fault would pass through this area.

18. Page 44, paragraph 2

Statements are made about the cracks which presumably form during landslides. On which map are these shown?

19. The discussion of the marine trace surfaces, while lengthy, contributes little data on the amount or distribution of post terrace deformation in the area.

20. Page 37, paragraph 3 states that the Bay Entrance fault passes within 1100 feet of the power plant site. Table A of the same report indicates that its closest position is three tenths of a mile, approximately 1600 feet.

21. Appendix II

Many of the logs for the sites shown on figure 14 cannot be located in the collection of log data (Appendix II).

22. While it is recognized that exposures are poor and that much of the area is highly vegetated, the number and significance of the changes in the distribution of the Quaternary units particularly the Hookton Formation as presented on the 1972 and 1975 maps needs considerable explanation. This is particularly true in the area of Hopkin's Hill, Table Bluff and the Freshwater Valley.

23. The positions of the Falor fault and its branches do not agree on figures 5 and 2 of the 1975 report.

References

Curtis, G.H. and Hamilton, D.H., 1972, Geology of the southern Humboldt Bay area and the Humboldt Bay Power plant site: a report prepared for Pacific Gas and Electric Company, 47 p.

Earth Science Associates, 1975, Geology of the Humboldt Bay region with special reference to the geology of the Humboldt Bay power plant site and vicinity: a report prepared for Pacific Gas and Electric Company, 50 p.

Jennings, C.W., 1973, Preliminary fault and geologic map: California Division of Mines and Geology, Preliminary Report 13, 2 plates.

Nason, R.D., 1968, San Andreas fault at Cape Mendocino in Dickinson, W.R. and Grantz, A. (eds.) Proceeding of Conference on geologic problems of San Andreas fault system, Stanford University Publications Geological Sciences, v. XI, p. 231-241.

Ogle, B.A., 1953, Geology of the Eel River valley area, Humboldt County, California: California Division of Mines and Geology Bulletin 164, 128 p.

Strand, R.G., 1962, Geologic map of California Redding Sheet: California Division of Mines and Geology.

Strand, R.G., 1963, Geologic map of California Weed Sheet: California Division of Mines and Geology.

COMMENTS BY TOUSSON R. TOPPOZADA ON THE SEISMICITY PORTION (MAINLY PAGE 13 and TABLE A) OF "GEOLOGY OF THE HUMBOLDT BAY REGION" PREPARED IN JULY 1975 BY EARTH SCIENCES ASSOCIATES FOR P.G. & E.

The 3 active fault zones identified in the report are the San Andreas, the Cape Mendocino and the Falor-Korbel. They are capable of magnitudes of from 7.0 to 8.3, and of generating accelerations of from 25%g to 33%g at the site. They could produce damaging shaking, exceeding 10%g, for durations of about 30 seconds at the site.

Three faults, the Bay Entrance which passes 1100' from the site, the Table Bluff and the Freshwater, should be considered active. The first 2 because of microearthquakes associated with them, and the third because of probable historical activity. The M=6.5 of 21 December 1954 was located only 9 miles from the Freshwater fault, which is within the location errors at that time. Also the 18 August 1908 event, which produced an intensity of VIII Rossi Forel at Eureka, was accompanied by a fissure half a mile long near Freshwater; this could be fault-related.

The Little Salmon-Yager fault, which lies 0.6 miles from the site, should be considered active if it offsets the Freshwater fault. The activity of the North Spit fault is apparently indeterminate at this time.

Detailed studies and monitoring of microearthquakes should resolve some of the above uncertainties. We would appreciate copies of the following unpublished P.G. & E reports to aid us in evaluating the seismic regime at the site:

P. Byerly (1969) Report on Earthquake Hazard at the Humboldt Bay Plant.

S. W. Smith (1974-1975) personal communications and Humboldt Bay microearthquake project progress report.

Also the reference of Simila, Peppin and McEvilly (1973) on page 50 does not exist. Please advise us of the correct reference.

State of California

The Resources Agenc

Memorandum

To : Thomas E. Gay, Jr.

Date : December 19, 1975

From : Tousson R. Toppozada
Division of Mines and Geology
Sacramento District Office
1416 Ninth Street, Room 118
Sacramento 95814

Subject: Humboldt Bay Nuclear Power Plant

At your suggestion I attended the P.G. & E. - N.C.E. meeting in Eureka on 11 December. The morning consisted of over 3 hours of geology presentation by a consultant to P.G.&E. This was followed by barely 15 minutes of seismology presentation by another P.G.&E. consultant. The afternoon was spent briefly visiting the seismic laboratory and several faults in the field. For the seismic presentation, which was my main concern, the meeting could have been in a more accessible place than Eureka. I have reviewed the seismic reports, and here are my comments.

The one year sample presented confirms that this is certainly one of the most highly seismic spots in North America. The proposed lack of correspondence between earthquakes and surface faults is not convincing. Contrary to the conclusion that the magnitude 5.7 Ferndale earthquake of 7 June 1975 is ".... oriented across the tectonic grain", I think that it conforms remarkably well to the tectonic grain. It occurs on a N70° E trending vertical fault at depth, and directly underlies the E-W trending Russ fault. Trends of faults can vary with depth. The Oroville, California earthquake occurred on a north trending fault at depth, and produced surface rupture trending N30°W (see CDMG Special Report 124, January 1976). The epicenters of shallow earthquakes falling on the Russ fault confirm it is active. The June 1975 earthquake produced an acceleration of 35% g at the power plant, which exceeds the 25% g assumed for the OBE. It also ruptured two water mains within 1/2 mile of the plant.

Two shallow epicenters within 4km of the Freshwater fault indicate it is active. The distance between the Freshwater and the Mad River faults is only 10km which is less than the uncertainty in location (even relocation) of earthquakes in 1954. Thus moving the M=6.5 earthquake of 21 December 1954 from the Freshwater fault to the Mad River zone appears unjustified. On 18 August 1908 an earthquake cracked houses and knocked down chimneys in Eureka and was accompanied by a fissure half a mile long near Freshwater (San Francisco Chronicle 19 August 1908) which could be fault-related.

Several epicenters, deep and shallow, fall close enough to the Table Bluff fault to suggest it is active. The largest is event 578 which is located 10km offshore and has a Berkeley magnitude of 3.9.

A cluster of shallow earthquakes occurs 2km from the power plant, near the intersection of the Little Salmon fault, the Bay Entrance fault, and an unnamed NE trending fault. The fault plane solutions in Figure 12, N12W or N65E are coherent with these faults. Caution must be excercised in extrapolating dips of faults, because these may change significantly with depth (see for example Sanford in G.S.A. Bull. 1959). Rodger Chapman and Gordon Chase, from a brief examination of the seismic profiles, indicate other possible faults in the bay near Buhne Point where the power plant is located.

In summary, there is ample evidence of high seismic activity at and surrounding the site. Microearthquake monitoring should be continued, but the data should be evaluated and interpreted by state and/or federal seismologists having no special interests. The seismic profiles should be studied carefully using better, larger scale copies than those in the reports. The historical seismicity should be exhaustively researched and evaluated because moderate and great earthquakes have been common in the area.

Tousson Toppozada

Tousson R. Toppozada
Seismologist

TRT:gt
cc: P. Arimoto
C. F. Bacon
C. Jennings
R. M. Sherburne