RAB Focus Group OU-3 Meeting

The Restoration Advisory Board (RAB) focus group met on Monday, January 20, 2003 to discuss the "Revised Draft Feasibility Study Report" for Operable Unit -3. The meeting was held at Bert Morgan's home at 6 pm. The RAB members in attendance were Bert Morgan, Lea Loizos, Dale Smith, Bill Smith, Kevin Reilly and George Humphreys. In addition, Professor Kent Udell from U. C. Berkeley had reviewed the report and was in attendance. Later, the Navy's Remedial Project Manager, Rick Weissenborn, arrived and joined the discussion.

Bill Smith and Dale Smith had reviewed the report and provided draft written comments. George Humphreys also provided written comments.

After the focus group had read over the written comments, a lively and productive discussion ensued. The consensus was that, in general, the report was well-written and clearly presented the Navy's recommendations. However, there appear to be many unanswered questions and potential problems that the group identified.

Professor Udell pointed that what is being proposed by the Navy is not a permanent solution. Long-term performance of the iron bed in the "funnel and gate" treatment system has not been demonstrated. Periodic replacement of the iron filings would be required. This means the City periodically would have to dig up a portion of the golf course to replace the iron filings. The replacement interval would be 7 years or more. Continued aeration of the biosparger for the removal of benzene, toluene, and dechlorinated solvents also would be necessary.

Professor Udell noted that the 7 % interest rate used in calculating the present value of future periodic replacement of the iron appears too high. A higher assumed interest results in a lower present value.

A major deficiency of the remedial investigation is that radioactive and chemical contaminants are not adequately characterized. Thus, the long-term health risks of these constituents can't be adequately addressed. Most of the sampling and borings were taken around the perimeter and on the surface, rather than within the body of the waste cells. It was noted that the Navy's reticence to sample within the wastes was probably engendered by misgivings about drilling into buried unexploded ordnance.

The study considered seven alternatives, ranging from "no action" to an "engineered cap". (These alternatives were discussed by Rick Weissenborn at the January 7, 2003 RAB meeting.The recommended Alternative 2B-1, consists of surface remediation of lead and radiological contamination, a 2-ft thick cap of silty clay, and a funnel and gate treatment system for the contaminated groundwater plume. It includes a 24-ft wide soil cement wall with rock columns to seismically strengthen the bayside dike. (see Figures 1 and 2). The recommended alternative has a present value of$25.2 million, compared to $59,800 for "no action" and $47.6 million for the "engineered cap".

Some of the RAB members have suggested that some form of excavation of the cells be considered. This has included excavating the material and laying it out on the runways to facilitate separating out contaminated materials. It was pointed out by George Humphreys that tension structures supporting coated fabric tents may also be used to minimize public exposure to vapors and dust during excavation activities. Some felt the Navy's reluctance to consider "excavation" is based on capping as the "presumptive" remedy for landfills. Rick Weissenborn said that the Navy's desktop evaluation indicated that an excavation remedy would cost several hundred million dollars. He also pointed out that because of the presence of volatiles and semi-volatiles plus radioactivity, workers doing the sorting probably would have to work in Class B protective gear, thereby limiting production rates. It was noted by the RAB members that this not an ordinary municipal waste landfill, but one containing industrial-type wastes. Professor Udell pointed thatthis is really a "mixed waste" landfill, containing both radioactive and chemical hazardous wastes.Lea Loizos asked what the chances are of getting excavation looked at as far as costs are concerned.

The draft comments prepared by Bill Smith and Dale Smith were presented as "not for citation". Their revised comments may be available at the February 4, 2003 RAB meeting. If so, they will be submitted separately. Some of their questioms are similar to questions raised in George Humphreys' comments (attached)

Professor Udell thought that the results of the hydraulic computer modelling were questionable. He asked whether flow through the bottom of the landfill had been taken into consideration. Rick Weissenborn said that it had not. Also, Professor Udell noted that one would expect flow through the cap to be inversely proportional to thickness. The model showed that increasing the cap from 24-in. to 48-in. only reduced the water inflow by 50,000 gal/yr out of a 11,753,000 gal/yr total. Bill Smith asked whether the "young bay mud" was a continuous, uninterrupted layer separating the waste cells from the underlying Merritt Sand water-bearing zone.

Another question is whether forced air injection in the biosparger zone, coupled with the back and forth tidal flow, would cause oxidation of the iron filings in the funnel and gate system?

Dale Smith asked whether a seismic event might cause liquefaction and "sand boils" such as those caused by the Loma Prieta earthquake on Treasure Island? this could bring radioactivity and hazardous chemicals to the surface. What are the associated health risks?

Bert Morgan noted that the report refers to a trench containing radioactivity. Where is the trench and what are its dimemsions? What are the radioactivity levels of the material contained in this trench? Has a cleanup standard been established for this material and is the Navy committed to removing radiological materials above a pre-determined level? This assumes that cross-trenching reveals the existence of such a trench.

ALAMEDA POINT
ALAMEDA, CALIFORNIA

Recommended Geotechnical Alternative

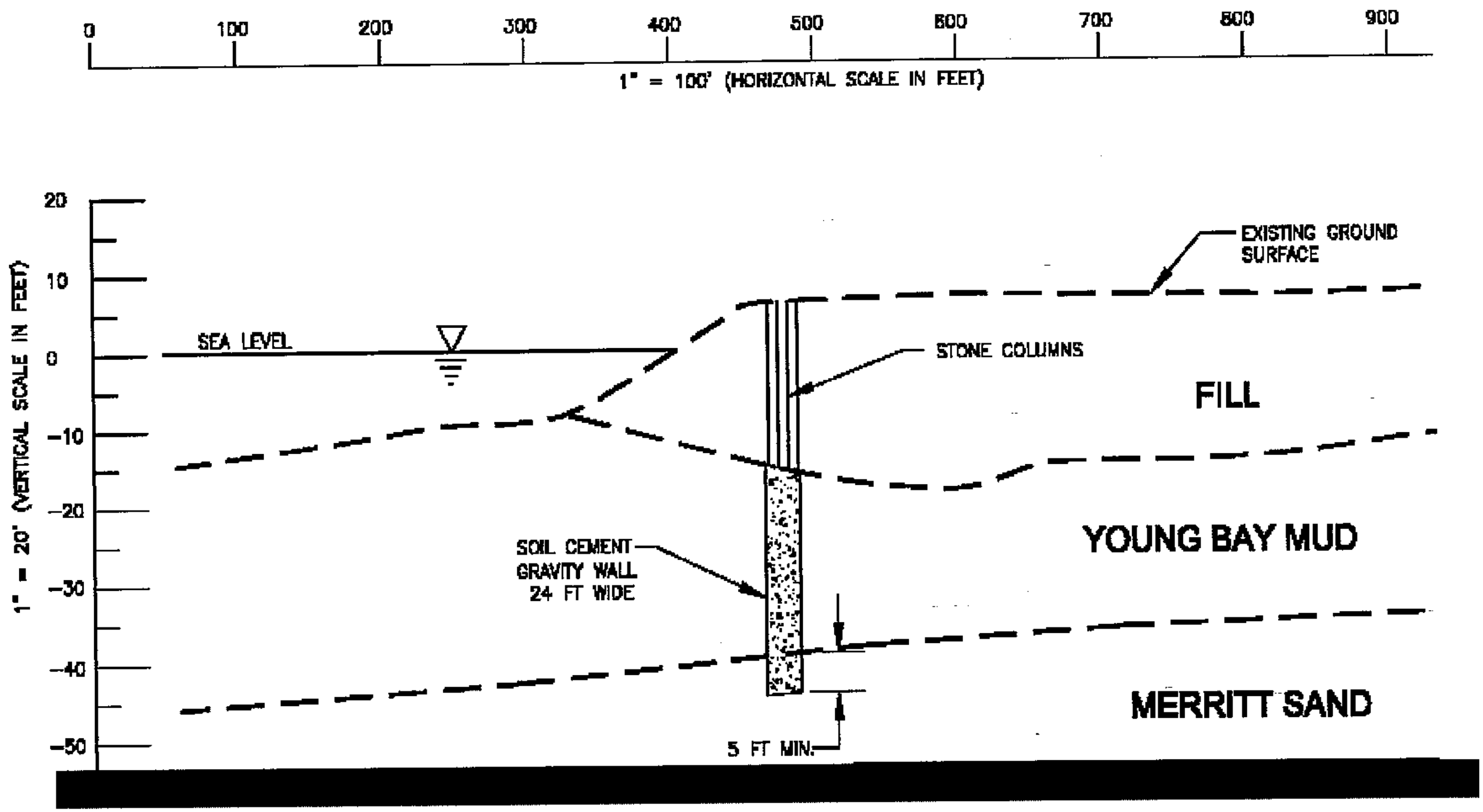

FIGURE-1

SCHEMATIC SKETCH OF OU-3 (SITE 1) AND PROPOSED GOLF COURSE

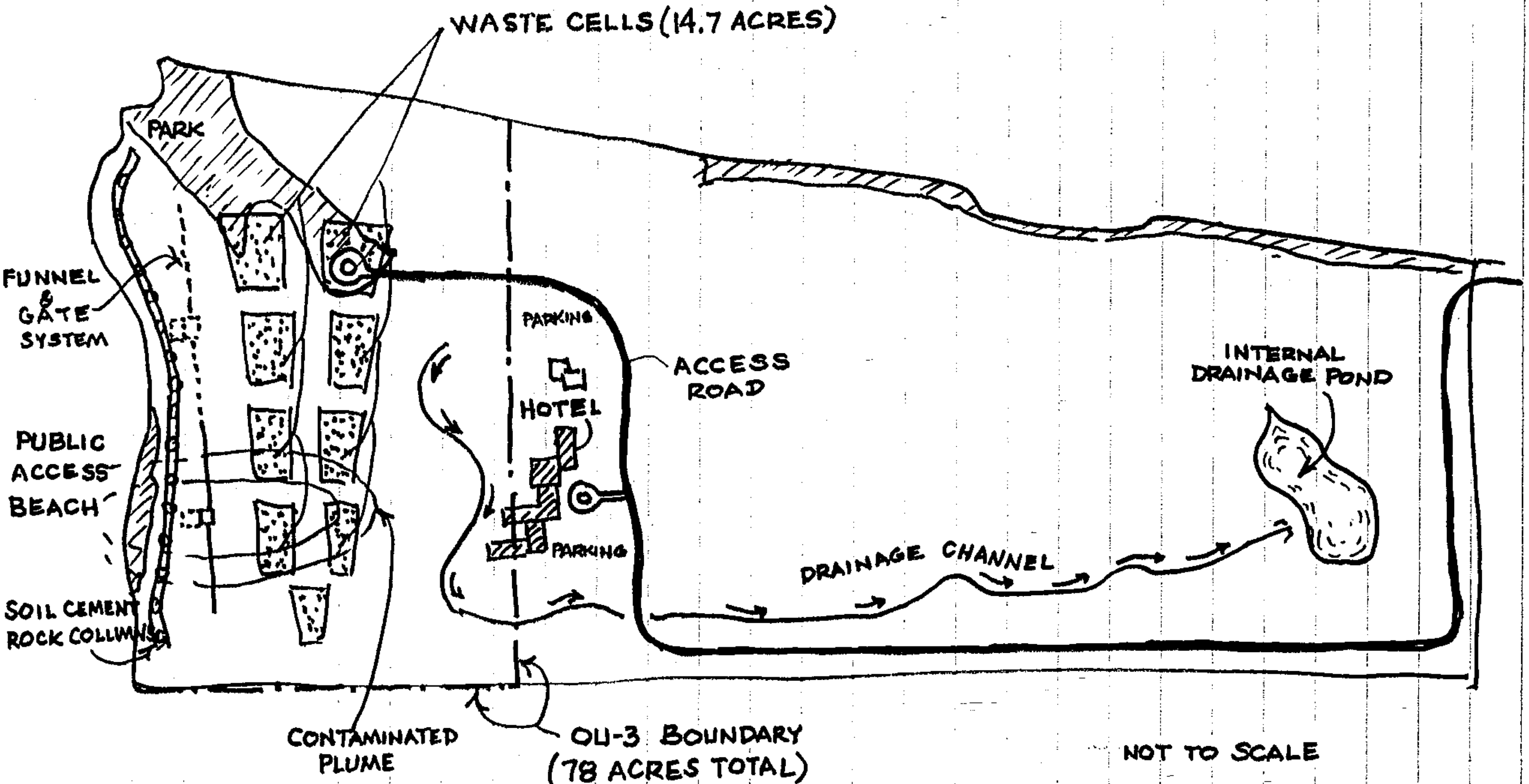

FIGURE - 2

From:
George Humphreys
February 3, 2003

Subject: Comments on "revised Draft Feasibility Study Report, Operable Unit-3. Site 1- 1943-1956 Disposal Area, Dec. 12, 2002, D. S. A 029.10145. Contract No. N68711-00-D-005, Delivery Order 29"

The following specific comments are offered:

1. The capital cost estimates in the Appendix allow only $60,000 for offsite transportation and disposal, presumably of lead-contaminated soil and low-level radioactive wastes. This appears grossly inadequate.

2. Although the recommended alternative speaks of "remediation of radiological contamination", closer perusal reveals that they are proposing only excavation of hot spots to a maximum depth of 20 inches (see pg. 4-10 of the report). Hot spots are locations exceeding 15,000 counts/min. The study identifies 1865 "radiological anomalies" in surface soils. Note that the present soil cover is 6 inches to 2.5 ft (see pg. 4-5), so the proposed maximum excavation depth does not address the bulk of the radioactive wastes which one would expect in the body of the wastes cells. Furthermore, the radioactive contamination is extensive and goes beyond the boundaries of the landfill cells (eg. M-002A is right next to the bay and M030 is east of the landfill cells). This suggests that radioactivity has been spread around by surface grading operations.

3. The criterion of 15,000 counts/min is meaningless because it doesn't say what the area of the source is. Furthermore, it confuses disintegrations per minute with counts per minute. Usually, the area is 100 cm^2 (Reference 1). The counts per minute has to be corrected for background, counting efficiency and geometric factors to obtain disintegrations. For example, if one had a surface source, half of the emissions would go down into the soil. If the detector subtended a solid angle comprising 20% of the remaining half-sphere, only 10% of the radiation would be directed toward the detector ($\frac{1}{2}$x 20% = 10%). Further, in the case of alpha and beta emissions, their short range means a lot of the radiation doesn't even reach the detector.Finally, not every emission entering

the the detector gets counted (the counting efficiency). Taking all these factors into account 15,000 counts/min/100cm^2 might correspond to 10 or 100 or more higher disintegrations/ min/ 100 cm^2.

4. The area of the contaminated groundwater plume appears to coincide with the planned location of the public access beach. (see Fig. ES-1 of the report and "Alameda" magazine pg. 34 and 35, Jan/Feb 2003 issue). In addition, to the concentration profiles for benzene and toluene shown on Figure 2-8, the highest measured radioactivity was at the M028 well cluster, near the public beach.

5. Residential risks were not evaluated because a "closed landfill" is not conducive to future residential use". Note, however, that radium -226 has a half-life of 1600 years. Who knows what use the land might have in that timeframe? One can contemplate that the proposed golf course might have a life of a hundred years. To illustrate the changes that occur over long periods, it is noteworthy that the level of water in the bay has risen an estimated 25 or 30 ft over the last 3500 years (ref. 2)One could reasonably expect the level of the bay to rise another 10-15 ft during the next 1600 years. Thus, reliance on administrative controls may not be effective to limit human and environmental exposure to radiation over the long periods required.

6. The proposed funnel and gate treatment system will do little or nothing to remove radioactivity from the contaminated plume flowing back and forth through the gate.

7. The report (pg. 4-10) proposes to screen and separate out radiological sources. However, the RAB has been told that there are radioactively contaminated paint brushes and rags present. These types of materials may have decomposed since the landfill closure and not be susceptible to separation by screening.

8. The highest radiation risk is stated on pg. 2-8 of the report to be due to external exposure (i.e. whole body direct radiation) from the radium isotopes. However, radium isotopes are alpha, beta and soft gamma emitters. Both alpha and beta particles have short ranges. Thus, it would be expected that direct radiation would not be much of a problem. However, if radium gets into the body the more energetic and damaging alphas can cause a lot of damage. The risk of bone and nasal tissue cancer due to ingestion and inhalation should be investigated. Also, the possible risk of these radium isotopes getting out of the body of the landfill into benthic (bottom-dwelling) organisms and concentrating in fish and diving ducks, and eventually entering the human food chain should be studied.

9. DOE Order 5400.5 (ref. 1), Chapter IV sets forth guidelines for the unrestricted release of facilities or equipment having residual radioactive material. The basic dose limit for exposure to residual radioactive material is 100 mrem per year above natural background exposure. For residual radionuclides in soil the generic guidelines for radium (Ra-226 and Ra-228) are:
   - 5 pCi/g, averaged over the first 15 cm of soil below the surface;and
   - 15 pCi/g, averaged over 15 cm soil layers more than 15 cm below the surface.

   The guidelines for surface contaminations of structure and equipment to be released for unrestricted use are presented in the attached table. Note that the values are given as disintegrations per minute per 100 cm^2.

10. Will the future golf course drainage system influence the groundwater flow within the landfill? Note that the proposed "internal drainage pond" for the golf course is east of the landfill. Water from the pond will have to be withdrawn and treated or discharged to prevent a buildup of salts in the irrigation water. Will water contaminated with chemicals, solvents and radioactivity be drawn eastward away from the "funnel and gate" treatment system?

11 No mention is made in the report about the proposed use of potentially contaminated sediment from the seaplane lagoon for contouring the golf course. Shouldn't the exposure risks from that material be added to that from the landfill?

References

1. U.S. Department of Energy Order 5400.5, "Radiation Protection of the Public and the Environment", February 8, 1990, change 2 January 7, 1993.

2. "Geologic History of the San Francisco Bay", Louderback, p. 87, in "Geologic Guidebook of the San Francisco Bay Counties", Bulletin 154, Division of Mines, (1951).

Surface Contamination Guidelines (1)

Radionuclides[2/]	Allowable Total Residual Surface Contamination (dpm/100 cm^2)[1/] Average[3/4/]	Maximum[4/5/]	Removable[4/6/]
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231.	RESERVED	RESERVED	RESERVED
Th-Natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232.	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters.	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.[7/]	5,000	15,000	1,000

1/ As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

2/ Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

3/ Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

4/ The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

5/ The maximum contamination level applies to an area of not more than 100 cm^2.

6/ The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

7/ This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.