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Comment Text :
-->Dr. Jacob D Paz

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Dr. Jane Summerson
November 21, 2006

EIS Document Manager

Regulatory Manager

Office of Civilian Radioactive waste Management

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Dear Dr. Summerson:

RE: Amendments

Next, The Department invites comments on the scope of the Supplemental YM Repository EIS to ensure that all relevant environmental issues are addressed. Since publication of the Yucca Mountain Final EIS, DOE has continued to develop the repository design and associated plans. As now planned, the proposed surface and subsurface facilities would allow DOE to operate the repository following a primarily considered approach in which most commercial spent nuclear fuel would be packaged at the commercial sites in multipurpose transport, aging and disposal canisters (TADs), and all DOE materials would be packaged in disposable canisters at the DOE sites. Waste packages would be arrayed in the repository underground to achieve what is referred to as a higher-thermal operating mode, and most spent nuclear fuel and high-level radioactive waste would arrive at the repository by rail. To evaluate the potential environmental impacts of the current repository design and operational plans, DOE has decided to prepare a Supplement to the Yucca Mountain Final EIS. Scoping will help define the scope of the Supplemental YM Repository EIS.

Enclose my comments to Priority list of research area for radiological threat countermeasures Supplement Environmental Impact Statement these comments will address the following: First Rail Road corridor constructions, and second underground drift tunneling operation and constructions as well as occupational health, impact of the human public health due to complex mixtures.

Tunneling operation

1. Why has the DOE-YMP ignored the presence of cancer causing zeolite fibers such as Eronite and Mordronite which are higly potent carninogen (4 to 100 times more the asbestos) in YMP tunnel and did not discussed it in the proposed EIS in the CFR?

2. How YMP is going to comply with OSAH Act of 1970 section 5(a)1 (shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his worker). Since there are no standards for these dangerous fibers, how YMP is going to protect the health and Safety of employees, especially against Eronite and Mordronite?

- What type of personal Protective Equipment does DOE-YMP plan to use during tunneling operation and Rail Road to prevent human exposure to these cancer coursing fibers?

- YMP did not discuss at all if they are going to conduct air monitoring for these fibers?

- What type of disposal methods is YMP planning to be used for disposal of these fibers?

Type of medical surveillance?

Education and training how to protect employees?

- It appears that an EPA permit is required to dispose of these fibers. Did the YMP-DOE receive an exemption? If yes? On what legal grounds and why? **This must be addressed both from Legal point of view and the** protection of the public and workers health and safety respectively. This issue must be spelling out very clearly and all documentation must be provided if any exemption was issued by the USEPA. YMP must justify their position; Theoretically, scientifically, and legally. YMP should become a Superfund site and placed on the national priority list. An inquiry has been sent to USEPA since a similar asbestos mining contamination in California has been put on the National priority list and will be subject for clean up this is the, the Atlas Asbestos Mine site covers 435 acres near Coalinga, California.

The mine operated from 1963 until 1979 and consists of the asbestos mine, a processing mill, support buildings, and extensive asbestos mine tailings. During operation, some milling and mining products from Atlas and the Coalinga Asbestos Mines were transported to the City of Coalinga. In addition, the Coalinga Asbestos Mine, also listed on the National Priorities List (NPL) and located about three miles away, deposited its milling and mining products in Coalinga. (For additional information, please see the separate listing for Coalinga Asbestos Mine). The 107-acre area in the City of Coalinga was operated as an asbestos milling, manufacturing, storage, and transportation center. It consists of four distinct areas: the warehouse, which once was a mining waste distribution center and now houses 1,600 cubic yards of mining waste; a storage yard containing asbestos-contaminated stacked pipes; a shipping yard used as an asbestos distribution center by the Atlas Asbestos Company; and the U.S. Asbestos Company, which currently stores piles of asbestos-contaminated mining waste. The Atlas facility drains directly into White Creek, which drains into Los Gatos Creek, a tributary of the Arroyo Pasejaro, a flood area along the California Aqueduct. A detention basin was built in the flood plain to store water during heavy runoff and to allow the asbestos-laden sediment to settle. Sediments carried by floodwaters silted up the detention basin and diminished its storage capacity, so that during heavy floods the waters could potentially be released into the canal through four drain inlets, carrying asbestos into the aqueduct. In the past, elevated levels of asbestos have been found in the aqueduct. However, most of the downstream users of the aqueduct water are protected by filtration and settling pond systems, which trap most of the asbestos fibers. In 2004, the Department of Water Resources enlarged the detention basin to increase its holding capacity during flooding.

- What quantities of hazardous Zeolite fibers are we talking about disposal?

- How are the Visitors and the public protected from exposure to these fibers?

3. Why in Health and Safety health hazard associated with radon and precaution to be taking by should be discussed?

4. Why the possibility or the/probability of employee exposure to silica dust and radon has been ignored? Since high silica dust exposure concentrations is a surrogate measure of exposure to radon progeny Cited in NIOSH HAZARD REVIEW Health Effects of Occupational Exposure to Desirable Crystalline.

5. Similar issues applied to the proposed constriction of 300 miles of Rail Road.

6. My question is dose DOE-YMP planning to develop a dispersion scenario model using SF6 in case of accidental relapses of radionuclide or fire form rail in "major cities" along the rail rout.

7. In a recent publication by [Pellmer et al, 2005] on "Priority list of research area for radiological threat countermeasures." Stated that Combine Injuries Should receive high priority:

1. To understand the mechanisms of the interactions of exposures to radiation in combination with chemical agents, pathogens and traumatic injury (burn and blast).

2. To develop medical interventions for radiation injury in combination with other chemical, biological or physical exposures.

How the DOE is going to address accidental release or terrorist activity of radioactive shipment a probable treat is both relapses of Pb and radionulides. Experimental data that define the interactions of threat agents and the implications of combined exposures for treatment and prophylaxis are needed. Existing data suggest that the interaction of radiation with other injuries could produce severe medical complications. Since exposure to radiation impairs immune responses, a radiation casualty would become more susceptible to infection. Interaction of radiation injuries with physical injuries such as burns and wounds also complicates therapy. Radiation impairs the healing process and predisposes to infectious complications. Other less well-understood interactions between radiation and other exposures could complicate the pathology and medical treatment. Because of these risks, understanding the mechanisms of interactions and developing countermeasures for combined exposures are important for full preparedness in the event of a radiological or nuclear attack. Is the DOE-YMO is going to stated that they would not support such research and why. How can they estimate the real danger to population at risk during shipment of radioactive waste?

B. Sorption and Kd of Heavy Metals and Radionuclide

In order to assess the public health risk associated with the behavior of radionuclide and heavy metals in the environment, knowledge of the partitioning of each radionuclide between different phases is required. This requires information on the basic physicochemical properties of the radionuclides, soil/mineral surfaces, and colloids/particulates and dissolved complexes. A distribution coefficient (KD) describes the partitioning of radionuclides between the solid and aqueous phases of a system and ultimately provides an estimate of each radionuclides transport interactions and movement via the groundwater pathway when modeling sorption. The YMP Performance Assessment did not consider competing effects of radionuclides and heavy metals why? While sorption properties of individual radionuclides and heavy metals may be known (mostly in the near field), variations in these properties when two or more radionuclides and heavy metals are present have not been not investigated.

Therefore, heavy metals such as Ni, Cd, Cr, Ti, and Mo will migrate from the site first and be partially adsorbed within the near field but some will ultimately it reach the far field. This limits the number of soil binding sites for subsequent radionuclide sorption. Furthermore, the EIS

states that sorption parameters measured for a single radionuclide are applicable to the case where more then one radionuclide is present. Competitive effects are assumed to be negligible. This requires confirmation defined near-field and far-field conditions. Can the DOE provide appropriate rage scale scientific data to prove to justify their assumptions?

A major concern at Yucca Mountain is what ultimately will be the health risk to human populations in the future due to canister failure and the subsequent migration of radionuclides and heavy metals into the groundwater. A potential scenario for groundwater contamination with chemicals and radionuclides from the repository is as follows. First, a plume of heavy metals including Cr, Co, Ni and Ti will be generated from the corrosion of the spent fuel canisters and the drip shields. Next, dissolution of the fuel waste form will result in the release of radionuclides. Finally, long half-lived radionuclides, such as 99Tc, 129I, 239Pu, and 237Np, are expected to migrate from the site into the accessible environment over time which will generate a mixed waste plum.

These events have not been discussed in the Final Environmental Impact Statement at all (1). The composition and the amount of various substances to be buried included 86,000 tons of alloy 22 containing 22.5% Cr, 14.5% Mo, 57.2% Ni and 0.35% V; along with 140,000 tons of stainless steel which is 17% Cr, 12% Ni, and 2.5% Mo. The health risks posed by the potential release of a fraction of this amount of heavy metals along with radionuclides must be further addressed (2). Recently new proposed Department of Energy canister design would double the thickens of canister from 1" to 2" this will double the amount of heavy metals to be deposited at YMP to about 300,000 to 400,000 tons. This raises several environmental serious concerns first such as what is carrying capacity of the zeolite, and the potential groundwater contamination by heavy metals this must be address scientifically. No large scale studies executed by DOE to verified their small laboratory experiments why?

Finally, the operation mode the proposed YMP high nuclear repository which will be operated at high temperature of about 150 0C for 1000 years this will increases the fracture rate of rocks due to expansion of rocks. Finally, during cooling off period this ultimately will increased the fractures due to constriction of rock lead to acceleration of corrosion off C-22 metal. This also must be addressed in the EIS.

II. ENVIRONMENTAL LAWS AND REGUALTIONS and YMP

The author also believe that the proposed level high nuclear waste repository at Yucca Mountain that will become a hazardous waste site due to the canisters' corrosion and the large amounts of toxic heavy metals in Alloy C-22 canisters. These materials potentially could migrate into the biosphere where and thus be hazardous wastes be subject to the Resource and Conservation Recovery Act (RCRA) of 1976 (1). Hazardous waste is defined as: "A solid waste exhibits the characteristic of toxicity when tested by the Toxicity Characteristic Leaching Procedure … "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by

reference in 40 CFR 260.11 (2) ... A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified below which corresponds to the toxic contaminant causing it to be hazardous" 40 CFR 261.24 (5). The USEPA should have take into consideration and account all the poetical mechanisms for of heavy metals and radionuclides into the environment in setting the new radiation standards at YMP for 100,000 years or more; as well as the conversion of actinides (239Pu, 237Np) into lead.

Upon closure the YMP site will become a superfund site which will be subject to the Comprehensive Environmental Response, Compensation, and Liability Act of 1986 (CERCLA) (3) because of substantial threat of release … "of any pollutant or contaminate which may present in an imminent and substantial danger to public health or welfare" as defined in (42 U.S.C. § 9604). In order for the U.S. EPA to take action under CERCLA it must be "a release or substantial threat of release. The discharge of a certain quantity of hazardous substances need not occur for a release or substantial threat of release to exist. Any quantities of releases, small, are adequate to tiger CERCLA." The term "environment" under CERCLA is an important one since a release "requires the freeing of a hazardous substance into the environment. Absent this, CERCLA's response and enforcement provision are not triggered. Like all other CERCLA the term environment is broadly defined to include water, groundwater, drinking water supply, land surface subsurface strata, and ambient air" Carwellet et al., (4).

Ultimately, the proposed high level nuclear waste repository is likely to become a mixed waste site due to the mixing of radionuclides and heavy metals from canister corrosion. USEPA (web site defined) Mixed waste is defined as a waste mixture that contains both radioactive materials subject to the Atomic Energy Act (AEA) and a hazardous waste component regulated under RCRA. The hazardous waste (i.e. the non-AEA material) can be either a listed hazardous waste in Subpart D of 40 CFR 261 or a waste that exhibits any of the hazardous waste characteristics identified in Subpart C of 40 CFR Part 261 (5). This raised several legal issues why the USDOE in the FEIS did not address this issue at all as a potential health hazard. Second, why the USEPA did approved the FEIS since there is a lack of adequate scientific data and no large scale scientific information is available to verified laboratory data. Next, Why the USEPA the Proposed EPA standard for YMP is solely based on radiation standard? It is my opinion that the standard should be based mixed radiation standard to be developed by the USEPA. If it is determined that YMP is a Mixed Waste Site therefore, under Dilution as Treatment Under the LDRs, dilution is prohibited as treatment for both listed and characteristic wastes see 40 CFR 268.3 (9). However, exceptions to the prohibition were made for:

Why has the DOE-YMP apparently not paid attention to recent scientific developments and reports on potential adverse effects of complex mixtures? Next, why have the issues of complex mixtures and the potential public health risks posed to humans not been addressed in the YMP Final Environmental Impact Statement (FEIS) at all 2002? This could raise a strong legal argument as to whether the USDOE-YMP should have to comply or not with all Federal Acts and Regulations already in existence; for example: The National Environmental Policy Acts 1969 Sections 102 (b)(1),(2) and (3) which stated the following " To attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences". Next, the Cumulative Effects as

noted in 40 CFR 1508.8 stated that "Cumulative Sec. 1508.8 Effects. "Effects" include:

(a) Direct effects, which are caused by the action and occur at the same time and place.

(b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial." Next, The Council of environmental Quality Regulations 1997 "Considering Cumulative effects and analysis 1997" stated that Cumulative effects may resells from accumulation of similar effects or synergistic interaction of different effects.

Finelly, the 1996 Amendments to Safe Drinking Water Act Public law 104-108 (5) clearly sated [Page 110 STAT. 1681] stated that "the EPA Administrator shall report to Congress results of studies (b) Biological Mechanisms.--The Administrator shall conduct biomedical studies to-1) understand the mechanisms by which chemical contaminants are absorbed, distributed, metabolized, and eliminated from the human body, so as to develop more accurate physiologically based models of the phenomena;" (2) understand the effects of contaminants and the mechanisms by which the contaminants cause adverse effects (especially noncancer and infectious effects) and the variations in the effects among humans, especially subpopulations at greater risk of adverse effects, and between test animals and humans; and(3) develop new approaches to the study of complex mixtures, such as mixtures found in drinking water, especially to determine the prospects for synergistic or antagonistic interactions that may affect the shape of the dose-response relationship of the individual chemicals and microbes, and to examine noncancer endpoints and infectious diseases, and susceptible individuals and subpopulations."

Another aspect of the EIS is the effects of low levels of radiation and the bystander effects Recently, (NAS, June 30, 2005) the National Academy of Science completed a comprehensive evaluation of the literature relevant to the risks of radiation exposure, BEIR VII. The committee concluded that since, in the low dose range of interest, the difference between risks predicted by different models is small relative to the 95% confidence intervals for risk extrapolated from data at higher doses; the linear, no-threshold dose-response relationship is consistent with the data. The consequences of this model include the concepts that that there is no safe level of exposure to radiation—that even very low doses can cause cancer.

Even exposure to background radiation causes some cancers. Additional

exposures cause additional risks. The committee also concluded that radiation can cause other health effects such as heart disease and stroke, and that further study is needed to predict the doses that result in these non-cancer health effects. The committee noted that it is possible that children born to parents that have been exposed to radiation could be affected by those exposures. The committee also concluded that risks from low dose radiation are equal to or greater than previously thought. However, it should be noted that in populations that receive several times the natural background dose or less, radiation is responsible for only a small fraction of the cases of cancer and other adverse health effects.

The National Academy of Science BEIR VII committee reviewed some additional ways that radiation causes responses in cells; processes which had not yet been recognized at the time of the last committee report. Among these responses are: The "bystander effect", a newly recognized method by which radiation produces changes in cells that were not directly hit but are in the vicinity of those that were. The changes include (but are not limited to) increased levels of repair proteins, increased apoptosis, and increased DNA damage. Some of these changes appear to constitute damage to the cell, while others probably reduce damage or cause damaged cells to disappear so that they can not grow to become a cancer. "Genomic instability" which can occur in cells which survive exposure to low doses of radiation. According to the report this "might contribute significantly to radiation cancer risk. "Adaptive response" which describes the change in cells which have been exposed to a low dose of radiation and as a result have modified their repair processes so they are much more resistant to the effects of subsequent doses."

Each of these effects is newly discovered, but has been operating in our cells since before we discovered radiation. Their recent discovery does not necessarily change the health risks due to radiation, but may eventually allow us to improve the model we use to estimate risk at low doses. It is not clear, at this time, whether an improved model would predict higher or lower risk at environmentally relevant doses. These newly described mechanisms for radiation damage were not included in the evaluation of the dose-response model used in the BEIR VII report, but were recommended for further study (pp 553-571).

The Dose and Dose-Rate Effectiveness Factor or (DDREF) which had been suggested in the 1990 BEIR V report to be applied at low doses, has been reduced from 2 to 1.5. That means the current estimate of the number of health effects at low doses is greater than the estimate used previously. This is extremely important since it may have an effect on the EPA radiation standard for YMP of 15mRem effective dose. Over the past 20 years previously unexpected responses to low levels of ionizing radiation exposure have been discovered. These new responses, the bystander effect, genomic instability, and adaptive response are most effective at low doses up to 20 cGy. The radiation bystander effect occurs when irradiated cells produce an effect in neighboring, unirradiated cells. These effects which occur at doses up to 20 cGy may result in changes which either increase or decrease the health risk at low doses, relative to the risks which are currently estimated on the basis of linear extrapolation from data obtained at much higher doses. The detailed mechanisms of these processes have not yet been discovered, but evidence points to the possibility that several different biochemical mechanisms lead to different (and sometimes the same) biological end points. It appears that both direct communication from cell to cell through gap junctions, and indirect communication through release of signaling compounds into the extra cellular

environment are important. It is known that reactive oxygen species (ROS) such as OH-, H2O2, are involved, but it is not clear if they are the signaling compounds or if they are produced by the cells in response to the signal.

In conclusion, all the above issue which I raised must be clearly spelled out in the new EIS and how DOE-YMP how they are going to protect the environment, public health, employees health, and comply with all Federal laws and regulations. Finally, was the DOE-YMP exempt from addressing the issue of complex mixtures (heavy metals and radionuclide)? Who issued this the exemption DOE-YMP, EPA or NRC and on what legal ground? Please provide necessary documentations in the EIS.

III. REFERANCES

1. The Resource and Conservation Recovery Act 1976,U.S.C. 42 §§ 6901

2 U.S. Code of Federal Regulations Reference: 40 CFR 260.11.

3. U.S. Code of Federal Regulations Toxicity: 40 CFR 261.246.

4. The Comprehensive Environmental Response, Compensation, and Liability Act 1986, 42 U.S.C. §§ 9601.

5. Carwell, E R., Comprehensive Environmental Response, Compensation, and Liability Act. In: Environmental Law Handbook, Chapter 9. pp. 417-480. Government Institutes a Division of ABC Group Inc. Rockville, Maryland, Sixteen Ed. 2001.

6. Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste 40 CFR 261.

7. Pellmar C.T, et al, Priority list of research area for radiological threat countermeasures. Radiation Research, 163: 115-123, 2005

Yours truly,

Dr. Jacob D Paz