RAS 11719

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	Docket No. 40-8838-MLA
U.S.ARMY	)	ASLBP No. 00-776-04-MLA
(Jefferson Proving Ground Site)	)	May 31, 2006

MOTION FOR LEAVE TO WITHDRAW, AMEND, AND SUPPLEMENT CONTENTIONS OF SAVE THE VALLEY, INC.

Pursuant to the Board's Memorandum and Order, issued May 1, 2006, and the Notice of Election of Save the Valley, Inc., filed May 4, 2006, Petitioner Save the Valley, Inc. ("STV") respectfully moves for leave to withdraw, amend and supplement its Contentions for hearing initially filed in this matter on November 23, 2005 ("Initial Contentions"), as follows:

1. Contention B-1, Basis l is withdrawn pursuant to STV's Reply, filed January 3, 2006, with the express understanding that the Army's representation in its Response that background sampling will take place in locations uncontaminated by DU replaces the basic assumption in the FSP that areas within JPG site boundaries but away from the hot spots could be considered sufficiently uncontaminated to use in a composite "background" determination. In particular, STV understands that the evidence from JJ Whicker, *et al.*, *From Dust to Dose: Effects of Forest Disturbance on Increased Inhalation Exposure*, Science of the Total Environment (2006), indicates that because of the controlled burns at the JPG site, probably no area within the JPG boundaries would be unaffected and uncontaminated by the DU that oxidized off the projectiles, as the air contamination during the burns is likely to have spread the U to the edges of the base and beyond.

2. Contention B-1, Basis m is supplemented to support STV's position that air sampling should be included in the FSP by reference to the results of a study performed at the Los Alamos

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National Laboratory which were published after STV submitted its Initial Contentions and were therefore unavailable to STV at that time. *See* JJ Whicker, *et al.*, from *Dust to Dose: Effects of Forest Disturbance on Increased Inhalation Exposure*, Science of the Total Environment (2006).

3. Contention B-1, Basis n is clarified by addition of a citation to the specific source for the standard field sampling practices STV asserted should be followed in the FSP in its Initial Contentions. *See* G.W. Suter II, *et al.*, Ecological Risk Assessment for Contaminated Sites, CRC Press [Lewis Publishers], Boca Raton, FL (2000).

4. Contention B-1, Basis o is clarified by addition of citations to the FSP and to the Suter treatise which were inadvertently omitted from STV's Initial Contentions. *See* Tables 2-1 and 2-2 on page 2-9 of the FSP and G.W. Suter II, *et al.*, Ecological Risk Assessment for Contaminated Sites, CRC Press [Lewis Publishers], Boca Raton, FL (2000).

5. Contention B-1, Basis p is withdrawn based on STV's January 3, 2006 Reply, in which STV accepted the representation of the Army and the reputation of its contractor to resolve the issue initially raised in this Basis regarding the use of GIS and other state-of-the art technologies in implementing the FSP.

6. Contention B-1, Basis q is partially withdrawn based on STV's January 3, 2006 Reply, in which STV accepted the representation in the Army in its Response that DU dissolution rates would be calculated in multiple soil types. However, the remainder of Basis q asserting STV's position that DU dissolution rates should also be calculated under different site-specific wetness and temperature regimes in order to measure accurately DU dissolution at JPG is supplemented to cite the recently published results of a study of DU samples taken at Aberdeen Proving Ground, which were not available to STV at the time it filed its Initial Contentions. *See* W. Dong, et al., *Sorption*

and Bioreduction of Hexavalent Uranium at a Military Facility by the Chesapeake Bay, Environmental Pollution (2006), 132-142, esp. at 142.

7. Contention E-1, with supporting Bases a through l, is added to address the Staff's Safety Evaluation Report ("SER"), issued April 28, 2006 and thus unavailable to STV when it filed its Initial Contentions, to the extent that the SER does not sufficiently address or resolve relevant and significant deficiencies in the Army's FSP which are identified and described in STV's Final Contentions and supporting Bases and which the SER should require to be corrected.

8. Contention E-2, with supporting Bases a through f, is added to address the Staff's SER, issued April 28, 2006 and thus unavailable to STV when it filed its Initial Contentions, to the extent that the SER does not sufficiently address or resolve relevant and significant deficiencies in the Army's HSP and their critical interrelationship to implementation of the Army's FSP which are identified and described in STV's Final Contentions and supporting Bases submitted by STV which and which the SER should require to be corrected.

9. Contention F-1, with supporting Bases a through q, is added to address the Staff's Environmental Assessment, issued March 6, 2006 and thus unavailable to STV when it filed its Initial Contentions, because the reasoning and assumptions of the EA are faulty in significant respects.

10. Contentions A through D and their remaining supporting Bases have all been reviewed and edited to correct typographical, spelling, word choice, grammatical and other technical writing errors, to the extent noted by STV.

STV's Final Contentions, reflecting these withdrawals, clarifications, supplements, and corrections are set forth in their entirety in a separate pleading filed concurrently with this Motion in

order to assure compliance with the Board's directive in its May 1, 2006 Memorandum and Order that "upon examination of the motion, it should be clear to the Board and the other parties precisely what contentions and what supporting bases Petitioner would now like to be included in the upcoming evidentiary hearing."

STV submits that the withdrawals, clarifications, supplements, and corrections of its Initial Contentions which are reflected in its Final Contentions comply with the requirements of 10 C.F.R. § 2.309(f), in that the changes are either purely technical in character or, where substantive, are based on information which was not available to STV at the time it filed its Initial Contentions on November 23, 2005.

STV also requests further leave to withdraw, amend, or supplement its Final Contentions on a timely basis and further hearing, if and when the Army submits subsequent modifications to its POLA request and/or its supporting FSP, HASP, and ERMP in the form of Addenda which are late-filed by the Army subsequent to the filing of STV's Final Contentions..

Finally, STV requests such other relief with respect to its Final Contentions as the Board may determine to be just and proper under the circumstances.

Respectfully submitted,

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	Docket No. 40-8838-MLA
U.S.ARMY	ASLPB No. 00-776-04-MLA
(Jefferson Proving Ground Site)	May 31, 2006

FINAL CONTENTIONS OF SAVE THE VALLEY, INC.

Pursuant to the Board's May 1, 2006 Memorandum and Order scheduling further proceedings and its own accompanying Motion for Leave to Withdraw, Amend and Supplement Contentions, Petitioner Save the Valley ("STV") hereby submits its Final Contentions for the hearing it has previously requested and the Board has previously ordered with respect to the Army's most recent Possession Only License Amendment (POLA) request[1] for its Jefferson Proving Ground ("JPG") Depleted Uranium ("DU") Site.

In its May 25, 2005 letter requesting its most recent POLA, the Army stated:

> [T]he Army is proposing a plan and strategy for site characterization, as outlined in the attachments hereto, to be conducted within 5 years of approval and commencement of plan execution. The intention of the Army is then at the end of the 5 year period to present the Nuclear Regulatory Commission (NRC) a Decommissioning Plan. Under the current proposal, the Decommissioning Plan to be presented at that time will propose license termination under restricted release, as authorized by the NRC regulations. Therefore, the Army is requesting only an alternative schedule for submittal of a Decommissioning Plan for the JPG license SUB-1435 in accordance with 10 CFR 40.42(g)(2) as supported by the details in the enclosed plans ("Field Sampling Plan for Depleted Uranium (DU) Impact Area Site

[1] See Letter from the Army Requesting an Alternate Decommissioning Schedule for the Decommissioning of Jefferson Proving Ground and Transmitting a Technical Memorandum, Field Sampling Plan, and Health and Safety Plan, dated May 25, 2005 (available for inspection and copying at www.nrc.gov from the Publicly Available Records (PARS) component of NRC's document system (ADAMS) under accession number ML051520319).

Characterization, Jefferson Proving Ground, Indiana" and the "Health and Safety Plan for DU Impact Area Site Characterization, Jefferson Proving Ground, Indiana").[2]

NRC regulations state that an alternate schedule for the filing of a decommissioning plan may be approved only if it meets three general requirements:

1. It is necessary to the effective conduct of decommissioning operations;

2. It presents no undue risk from radiation to the public health and safety; and

3. It is otherwise in the public interest.

10 CFR § 40.42(g)(2). In other regulations and guidance documents, the Commission has explained the specific requirements which a licensee must meet in order to satisfy these three general requirements. In making its specific contentions below, STV explains in detail the specific bases for its position that the Environmental Radiation Monitoring Plan, Field Sampling Plan, Health and Safety Plan, and timetable and budget submitted by the Army in support of its requested POLA are inadequate and deficient in meeting the general requirements of 10 CFR § 40.42(g)(2) as explained in more detail in other Commission regulations and guidance documents.

In submitting its Final Contentions, STV recognizes and appreciates that the Army's most recent POLA request has the potential to differ materially from its prior requests for which STV has sought hearings. In particular, the current request purports to address some of the serious deficiencies in site characterization identified by the Staff and STV which have heretofore precluded development of an appropriate decommissioning plan for JPG. In STV's view, this is potentially a

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[2]Inasmuch as the Army has not submitted a new Decommissioning Plan (or reinstated its prior Decommissioning Plan) as part of its current POLA request, STV expressly reserved in its November 23, 2005 Request for Hearing its right to request a separate and subsequent hearing with respect to the new Decommissioning Plan when, and if, it is submitted by the Army. *See* Petition and Request, p. 12 n. 3.

major step forward in the Army's approach to JPG decommissioning. Additionally, in SAIC the Army has hired a contractor with the experience and expertise to design and conduct the necessary site characterization activities and analyses if so directed. Finally, in proposing a Health and Safety Plan, the Army is recognizing the reality that the necessary site characterization activities may be safely performed notwithstanding the presence of UXO at the JPG DU site.

Nonetheless, STV believes that there are four general areas in which the Army's most recent request does not meet the relevant regulatory requirements:

1. The Environmental Radiation Monitoring Plan ("ERMP") previously submitted by the Army in 2003 has several serious and glaring deficiencies which, if not corrected, would result in the Plan failing to assure that there would be no undue risk from radiation during the lengthy time period contemplated by the Army's requested alternate schedule for decommissioning, as required by 10 CFR § 40.42(g)(2).

2. The Field Sampling Plan ("FSP") has a number of serious and glaring deficiencies which, if not corrected, will prevent the FSP from providing the data necessary for proper site characterization pursuant to 10 CFR § 40.42(g)(2);

3. The Health and Safety Plan ("HASP") has a number of serious and glaring deficiencies which, if not corrected, will impede the Army in conducting the field sampling activities necessary for proper site characterization pursuant to10 CFR § 40.42(g)(2); and

4. The timeliness and financial assurance commitments for implementing the FSP and HSP and then finally preparing and submitting a decommissioning plan for JPG are too vague and indefinite to truly represent an alternate schedule for decommissioning as contemplated by 10 CFR § 40.42(g)(2).

As a consequence of these deficiencies in the Army's POLA request, STV believes that the NRC Staff erred in approving the request without further modifications and clarifications than those provided in the one Addendum and the responses to the Staff's Requests for Additional Information submitted by the Army. Additionally, STV believes that the Safety Evaluation Report ("SER") and/or Environmental Assessment ("EA") performed by the Staff are inadequate to the extent that they do not identify and address these deficiencies as reasons for requiring further modifications and clarifications in the Army's POLA request. Finally, STV believes that the EA errs in its statement that "no DU has been detected in the samples collected" to date at the JPG DU Site.

Specific contentions regarding each of these general concerns are alleged as follows:

A. ERMP Contentions

The Army proposed an Environmental Radiation Monitoring Plan ("ERMP") in conjunction with its superseded 2003 request for an alternate decommissioning schedule. *See* ADAMS Document ML032731017. This ERMP has not been further updated or modified by the Army in conjunction with its current request for an alternate schedule to correct deficiencies previously identified by STV. *See* STV Comments and Request for Hearing, ADAMS Document ML040360299. Instead, the Army proposes to update and modify its 2003 ERMP in Year Four of the FSP it submitted as part of its current POLA request.[3] Consequently, STV submits the

[3]The Staff Response to the STV Hearing Request contends that the Army's 2003 ERMP proposal is not part of its current alternate schedule request because it was withdrawn along with the Army's 2003 POLA request. As a result, the Staff says that the ERMP approved in 1999 is currently in effect at the JPG DU site. (Staff Response, at 11). The Army's Response describes the situation differently: According to the Army, its 2003 ERMP proposal has not been withdrawn but has not been approved, either. Instead, the proposal has undergone revision in response to a November, 2004 Staff request for additional information and will undergo further revision in response to the result of the site characterization activities being proposed in conjunction with the current alternate schedule request. As a result, as explained in detail in its January 3, 2006 Reply, STV asserts that the Army's 2003 ERMP proposal is both logically and

following contention:

1. Contention A-1: The Army's most recent Environmental Radiation Monitoring Plan (2003) is still inadequate in several material respects to meet the requirements of 10 C.F.R. § 10.42(g)(2).

a. Basis. The 2003 ERMP states with respect to the monitoring results for the various environmental media that, at 50% of Action Level, SBCCOM will conduct an "independent assessment" of the results and any trends. See ERMP, Table 3-1. Yet, there is no specification of the assessment which will be performed and no satisfactory explanation offered as to how an assessment, however specified, will be "independent" if it is performed by the Army. The ERMP should further define and explain the "independent assessment."

b. Basis. The ERMP also states with respect to the monitoring results for the various environmental media that, if an Action Level is reached and that result is confirmed by additional sampling, specific remedial actions and timetables "may" be defined. *See* ERMP, Table 3-1. But, the whole point of an "Action Level" is to establish a monitoring result at which defined remedial action "shall" occur. Otherwise, the concept becomes meaningless. The ERMP should define and commit to perform remedial actions at specified "action levels."

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practically intertwined with the JPG Site Characterization Project contemplated in the Army's pending POLA request, especially but not exclusively its FSP component. As STV views the situation, the deficiencies in the 2003 ERMP to be corrected during the implementation of the FSP are thus within the scope of the current hearing opportunity on the Army's 2005 POLA request.

Alternatively, if the ALSB finds that the 2003 ERMP proposal has actually been withdrawn along with rest of the Army's 2003 POLA request as asserted by the Staff, then STV expressly reserves any right it may subsequently have to request a hearing on any replacement ERMP subsequently submitted by the Army, much as it did in its November 23, 2005 Petition and Request with respect to any revised Decommissioning Plan subsequently submitted by the Army. *See* Petition and Request, p. 12 n. 3.

c. Basis. The ERMP incorrectly denies the existence of neighbors who use private wells for drinking water:

> Onsite and offsite human and ecological receptors could be impacted by DU leaching through soil to the underlying aquifer. Contaminated groundwater can enter the human or ecological food chain indirectly (e.g., livestock drinking water) or directly (e.g., drinking water supply). Direct exposure of humans to drinking water is unlikely given that the aquifer is not a drinking water source and is of poor quality (Rust 1998).

See ERMP, at 3-4. However, it has previously been established that two of the original STV affiants who live directly west of JPG get their drinking water from a private well, as do some other nearby residents. The Training Range Site Characterization and Risk Screening, Regional Range Study, JPG Madison, IN, Final (CHPPM, August 2003) (hereafter "Regional Range Study) also acknowledges that "[t]here are limited numbers of private wells in the area surrounding JPG (Ebasco, 1990)." *See* Regional Range Study, Section 6, at 4. The ERMP should acknowledge and address this fact.

d. Basis. The aquifer underlying the JPG site is not sufficiently characterized to demonstrate its extent and gradient – as the Army itself has previously conceded. *See* Regional Range Study, Section 6.5.2.3.2, Hydrogeology, at 35 ("Monitoring wells near and within the Delta Impact Area south of Big Creek are too widely spaced to construct a meaningful ground-water elevation contour map.") The ERMP should acknowledge and address this critical fact.

e. Basis. The entire monitoring data history for the JPG site is not used in the ERMP's trend analyses. Most of the trending analyses begin in 1994 or 1996, with some beginning as late as 1998. The absence of discernable trends over the selected time period is then cited as the justification for not performing expanded sampling. *See, e.g.* ERMP, at 3-6. Examination of the entire data history, i.e. 1984/85 to present, would provide a more complete picture for analysis

purposes. Moreover, the ERMP characterizes historic data trends (or the absence thereof) in narrative terms, but the actual data are not included for review and confirmation of the Army's conclusions. The ERMP should acknowledge and address the entire monitoring history of the JPG site.

f. Basis. The ERMP dismisses the need for air monitoring during future prescribed burns. *See* ERMP, at 3-10 to 11. It also denies the need for future biota sampling. *See* ERMP, at 3-12. However, these conclusions are based on insufficient site-specific information and general references to other studies at other sites which are not representative of JPG. The ERMP should either provide for air monitoring during future prescribed burns or support its absence with site-specific information. The ERMP should also be updated to reference the future biota sampling included in the Army's Field Sampling Plan ("FSP") filed May 25, 2005, as it may be modified in response to NRC Staff comments and/or STV's contentions below regarding the FSP.

2. Support for ERMP Contention. ERMP Contention A-1 and its bases are technical in character. STV will support them at the requested hearing with the expert testimony of Charles Norris, President, GeoHydro, Inc., regarding Contention A-1, Bases a - d, and Diane Henshel, Associate Professor, School of Public and Environmental Affairs, Indiana University, regarding Contention A-1, Bases e-f. The professional resumes of Mr. Norris and Dr. Henshel are attached.

With respect to the air sampling need asserted in ERMP Contention A-1, Basis f, Professor Henshel will rely on a study whose results were released since STV submitted its initial Contentions. *See* J.J. Whicker, *et al.*, *From Dust to Dose: Effects of Forest Disturbance on Increased Inhalation Exposure*, Science of the Total Environment (2006).

B. FSP Contentions.

In its requests for hearings on prior Army POLA requests, STV has repeatedly identified two primary concerns regarding JPG site characterization. First, without adequate site characterization, the Army cannot properly estimate the immediate and long-term risks to public health and safety from radiation resulting from an indefinite delay in decommissioning and decontamination. Second, without expanded and improved ground and surface water monitoring, the Army will not be able to detect the current level of risk and whether that risk is increasing over time as decommissioning and decontamination are delayed.

To construct an adequate exposure scenario for a site, the licensee must utilize accurate and complete information about the site and the surrounding area. Site characterization plays a foundational role in making calculations and determinations about radioactive dose, environmental remediation, and institutional controls at a site. If the site characterization is inaccurate or invalid, the calculations and determinations required to predict future effects on public health and safety will be correspondingly erroneous and the source term model will be invalid.

As previously noted by both STV and the Staff during the review of prior POLA requests, the JPG Conceptual Site Model (CSM), is generic, flawed, inaccurate and incomplete. Specifically, the Army has failed to present verifiable data regarding dose modeling or the effects on exposure pathways of meteorological, geological, hydrological, animal, and human features specific to JPG and the surrounding area. This failure results in an inability by the Army to predict with accuracy the effects from radiation on public health and safety of an indefinite delay in decommissioning and decontamination. While it should and could correct this failure, the FSP proposed in conjunction with the current POLA does not do so.

1. Contention B-1: As filed, the FSP is not properly designed to obtain all of the

verifiable data required for reliable dose modeling and accurate assessment of the effects on exposure pathways of meteorological, geological, hydrological, animal, and human features specific to the JPG site and its surrounding area.

a. Basis. The EI geophysical study which will follow the fracture analysis study, as described in section 6.1 of the FSP, is supposed to find all significant karst features and location of the water table. From these studies, 10 to 20 pairs of monitoring wells are proposed to attempt to tie into "conduits" of ground water flow. This study may help to site monitoring wells, but stream gauging studies should be an early and integral part of the search for likely conduits. The stream reaches of strong gain would be a very strong direct indicator of the discharge points of ground water "conduits." EI is an indirect technique and can miss conduits or identify features that are not conduits. The FSP alludes to doing stream gauging in its discussion of well location criteria, but the time table shown indicates stream studies will follow the ground water studies by a year.

b. Basis. The discussion in section 6.2.1 is disturbing in its failure to set out the chemistry of the monitoring system at this stage and its cavalier dismissal of ground water as a direct exposure route to humans due to its supposedly "poor quality." The "poor quality" that is being cited is, in part, a function of existing data being sampled from wells that are definitely not in "conduits" that would presumably flush frequently and carry good water. Instead, the "poor quality" data are drawn often from tight, clayey wells and wells that may well have had multiple types of contaminating material falling into them due to poor maintenance.

c. Basis. The wells to be used for staging should not be limited *by assumption* to six wells, as proposed in section 6.2.2. Six may be enough, but it also may not be. The actual number should be a function of results achieved, not assumptions made. (It is hoped that the last sentence in this

section mistakenly left an "s" off the word "well."

d. Basis. The FSP specifies in section 6.2.4 that the "conduit" wells will be paired, but does not describe or explain the reason(s) for the relative positions of the two wells at each well site. Presumably, the objective is to provide a means of measuring vertical gradients at each site, but that is not explained or discussed. Nor is there an indication of whether the "paired" well will be above or below the "conduit" well or whether that relative position would change depending upon unspecified geologic or hydrogeologic conditions.

e. Basis. The FSP also specifies in section 6.2.4.3 that a boring that does not produce enough water for a well will be abandoned. If lack of production occurs because the system is "tight" (i.e., impermeable), that makes some sense. However, the nature of karst terrain is such that conduits may not produce water because the flow is highly transient and, unless there is a new flow event at the time of drilling and/or testing, a well may be dry even though it has been placed in an appropriate and important location. To ensure the problem is a temporary lack of water, rather than a permanent lack of permeability, it is necessary to monitor the boring for enough time to be sure it never produces before abandoning it.

f. Basis. The FSP states in section 6.2 that all new wells to be completed will be in "conduit" settings in bedrock. This placement is too limited. Certainly, most off-site transport is likely to occur through bedrock karst features. But, the projectiles and the DU reside in the till and/or the weathered bedrock/colluvium. Simply because good, shallow wells were not completed in the original set of JPG wells does not mean that properly located and completed shallow wells are unnecessary to characterize properly the hydrogeology of the site. Such wells should be included in the FSP.

g. Basis The FSP states in section 6.2.4.4 that the new wells will not be tested for permeability. Granted, if a particular well is sunk into a well-developed conduit, it will not be feasible to measure permeability. But, the nature of karst features is to be hard to locate precisely, so it is likely that at least some of the wells will simply be in bedrock with some enhanced permeability, which should be measured if it can be. Moreover, the conductivity of the rock adjacent to and feeding the conduit is a major determinant of flow through the system. The same holds true for aquifer testing. If pumping the aquifer shows interconnection among two or more of these conduit pairs, that result will provide very valuable information about the system transporting DU from the site, so it should be determined and reported when it occurs.

h. Basis. Contrary to section 6.2.4.3, geophysical testing and video taping of all of the well drilling should be required in intervals where it is physically possible. The understanding obtained from cuttings, particularly air-drilled cuttings, what material has been drilled through and in which a well is being completed is extremely limited. Logging and videoing the borings as they are being drilled actually records what the boring encountered and provides much valuable information for reasonably interpreting the water data that is later collected over time. If turbidity precludes video taping of a boring, teleview logging is a valuable alternative. Where boring logs cannot safely be run, logging through the casing can and should be done.

i. Basis. Specifying the exact number and precise locations of the surface water sampling and gauging points at the outset of FSP implementation, as proposed in section 6.4.1, is not acceptable practice. Until the analysis of ground water data shows where to look for discharges and the discharges confirmed by inspection, such points cannot be reasonably selected. There is no scientific reason why the locations for surface water sampling and sediment sampling need to be the

same locations. Each medium should be sampled at locations that are appropriate for that medium. Sediment buildup has nothing to do with the location of base flow connections between ground and surface water. Similarly, the FSP concept in section 6.4.2 of installing only five gauging stations, which are all sited before the ground water system is better understood, is both too limited in the number and may well be counter productive in the locations of the stations.

j. Basis. The entire Kd exercise described in section 2.3.4.3 is inaccurate, unreliable, and, particularly when it forms such a key element of the modeling, rife with opportunities for abuse. It is described in the FSP text as "an important input parameter" for the results of exposure calculations. But, the exercise does not yield a real number and its functionality is based upon assumptions that are known to be invalid. The biggest erroneous assumption is the one spelled out in the text: "the underlying assumption is that rapid equilibrium is reached between the dissolved and sorbed concentrations of a chemical species, and that these two concentrations are linearly related through the Kd factor." At best, there are an infinite number of Kd values based upon the infinite number of combinations of soil types, sorbent contents, ground water compositions and oxidation states that may exist along the flow path from any individual DU projectile. USEPA tried to use the Kd approach in its modeling for solid wastes, and only recently completed spending almost five years to find an alternative way because Kds just do not work. They do not even work for such simple, monovalent contaminants as lead or cadmium; it is preposterous to rely on the Kd approach for something that is so pH-Eh dependent as the uranium system. Field observations should be used to calibrate geochemical modeling with a program on a par with Geochemist's Workbench, with a lot of soil analyses to identify the abundances of sorbents in the soil that will control the mobility of the uranium. And, if the exposure program that SAIC is using requires the

Kd approach, it should also be replaced with one that has more sophistication.

k. Basis. The FSP lacks any plan for analysis of penetrators for transuranics such as plutonium, americium, technetium and neptunium or other impurities such as uranium-236. Table 4-1, p. 4-3 of the FSP indicates that 24 penetrators will be collected to establish a "corrosion/dissolution rate." However, there is no mention in the plan to assay the rounds for these other elements. This failure was challenged in previous Army plans by the NRC Staff (Sept. 27, 2001) and ATSDR (Oct. 30, 2002), but has not been corrected in the FSP.

l. Basis [WITHDRAWN, BUT WITH WITHDRAWAL CLARIFIED AND SUPPLEMENTED].

In its January 3, 2006 Reply, STV accepted the Army's representation in its Response that background determinations will be made in areas (and, of course, from biota) "that have not been impacted by DU activities at JPG" and that background determinations will preferably include samples from off-site locations and time periods preceding DU use at JPG. Accordingly, the specific issues underlying this basis have been resolved by the additional information provided by the Army and it has been withdrawn.

Nonetheless, since background determination affects so many other decisions to be made, and since the decisions have such long lasting implications (millions of years), STV's environmental risk modeling expert maintains that the selection of background data should be very conservative and the Army should not include *any* data that might have been affected by site DU activity. In particular, the evidence from J.J. Whicker, *et al.*, *From Dust to Dose: Effects of Forest Disturbance on Increased Inhalation Exposure*, Science of the Total Environment (2006), indicates that because of the controlled burns at the JPG site, probably no area within the JPG boundaries

would be unaffected and uncontaminated by the DU that oxidized off the projectiles, as the air contamination during the burns is likely to have spread the U to the edges of the base and beyond. Thus, STV interprets the Army's representation in its Response to replace the basic assumption in the FSP that areas within JPG site boundaries but away from the hot spots could be considered sufficiently uncontaminated to use in a composite "background" determination.

m. Basis [SUPPLEMENTED]. Air remains a potential exposure pathway as evidenced by the air sampling requirements to be implemented for the field workers (Health and Safety Plan, Section 4.2.2.1). If short-term air exposure is a concern for the workers, long-term air exposure is a concern for residents in surrounding communities, as well as for the animals living in the JPG ecosystem. Given the frequent burns that are used to clear brush at JPG, including in the DU Impact Area, conditions are prime for enhancing migration of soil-bound DU into the air. A recently published study provided solid evidence that fire does indeed increase the air migration pathway of soil uranium. Whicker et al studied air concentrations of uranium at the perimeter of the Los Alamos National Laboratory that were measured seasonally over a 10 year time period, including before and after fires, both wildfire and fires that were intentionally set (the equivalent of the JPG controlled burns). They found that the estimated dose due to U attached to particulate in the air at the perimeter of Los Alamos National Laboratory property increased by approximately 15% after even a "moderate" controlled burn, and this increase was greater (38%) after a more intensive wildfire. Further, the contaminated particulate matter increased seasonally, being highest during the spring months when the snow has melted, the ground is bare, winds tend to be gusty (as is true in southern Indiana), and there is little vegetation covering the ground. *See* JJ Whicker, *et al.*, from *Dust to Dose: Effects of Forest Disturbance on Increased Inhalation Exposure*, Science of the Total

Environment (2006).

Thus, the air pathway is a matter of "significant public interest" (making it an "important pathway" under NUREG-0475), and the human populations and wildlife in and around Jefferson Proving Ground are likely being exposed to and inhaling U-contaminated dust and to develop any truly "realistic [exposure] scenario" for JPG, air data needs to be collected to assess the air-borne dust-inhalation exposure pathway. As a result, the FSP is clearly deficient for purposes of adequate site characterization in providing for no air sampling whatsoever.

n. Basis [CLARIFIED]. In order to really do a site-specific environmental and human health risk assessment, understanding the fate and transport (F&T) of DU within the JPG ecosystem is critical. In order to develop such a model, standard eco-risk-associated field sampling practices specify samples from different parts of the ecosystem within the same approximate period of time and definitely within the same field season in order to identify the distribution of the contaminant (DU) at that time. Further it is best to take multiple samples from these different locations over time. Thus, to truly model F&T within the JPG ecosystem (which is NOT the Yuma or Aberdeen Proving Ground ecosystem), a particular sample taken at a particular time should include all media and relevant biota and each of these media and biota should be sampled on multiple occasions. Ideally, samples should also be taken under different types of field conditions, as appropriate for the changes that occur at the site of concern. For example, at a site that floods, as JPG does, samples should be taken from all media and biota at high flow (flood season) and low flow. Similarly, in a seasonal environment like JPG, samples should be taken from all media and biota in different seasons. When reproduction is seasonal for the biota of potential concern, seasonal sampling is of special concern. *See, e.g.*, , G.W. Suter II, *et al.*, Ecological Risk Assessment for Contaminated

Sites, CRC Press [Lewis Publishers], Boca Raton, FL (2000), esp. at 77. Thus, the much more limited sampling described in section 6.3 of the FSP is deficient for purposes of adequate site characterization.

o. Basis [CLARIFIED]. Although deer are not the most representative biota to sample, they are the only biota proposed for sampling by section 6.3 of the FSP. Nonetheless, when data from samples early and late in DU testing are not combined, it is evident that DU levels in even the deer are increasing. This result in deer clearly mandates sampling other, more representative biota as well. Based on what little data is available, the bioaccumulation factors (BAFs) for vegetation and the aquatic filter feeders such as crayfish (both of which are eaten by higher animals and humans) are relatively high, on the order of 10^2 to 10^3 times as high as the BAFs for persistent, bioaccumulative, and toxic chemicals (PBTs) listed as being of concern by the U.S. EPA and the Persistent Organic Pollutants (POPs) Treaty. Clearly, vegetation and aquatic filter feeders are better indicators of DU migration into the eco-food chain than are deer and they should be sampled.

For example, the mean of the two clam data points, when compared to the mean of the surface water data provided in Table 2-1 indicate that the clams bioaccumulation factor (BAF) is approximately 900. This is the highest bioaccumulation rate determinable among the biota listed in Tables 2-1 and 2-2 on page 2-9 of the FSP. Since clams are also eaten by both wildlife (raccoons and wading birds, for example) and humans, clams are thus an important second species to include in the biotic sampling throughout the monitoring period. Additionally, the FSP proposes (and the Staff accepts on page 6 of the April 2006 SER) to sample other biota ONLY IF there is detectable levels of DU in the deer tissue, and will only do this in another sampling year. This proposal is directly contrary to what is considered to be "Best Practices" for sampling biota as part of an

ecological assessment. *See, e.g.,* , G.W. Suter II, *et al.*, Ecological Risk Assessment for Contaminated Sites, CRC Press [Lewis Publishers], Boca Raton, FL (2000), esp. at 77.

p. Basis [WITHDRAWN]. In its January 3, 2006 Reply, STV accepted the representation of the Army and the reputation of its contractor to resolve the issue raised in this basis regarding the use of GIS and other state-of-the art technologies in implementing the FSP, so this Basis is withdrawn.

q. Basis [PARTIALLY WITHDRAWN, WITH REMAINING BASIS SUPPLEMENTED].. In its January 3, 2006 Reply, STV accepted the representation in the Army's Response that DU dissolution rates would be calculated in multiple soil types, so this part of this Basis is withdrawn. However, DU dissolution rates should also be calculated under different site-specific wetness and temperature regimes in order to measure accurately DU dissolution at JPG. Thus, Table 4-1 and related text of the FSP are inadequate because they do not specify such multiple measurements. A recently published study of DU samples taken at Aberdeen Proving Ground demonstrates that some oxides of U are indeed relatively insoluble, and that U(VI) sorbs efficiently to soil. However, other U oxides are water soluble, and will wash out and through the soil. And, as clearly pointed out in this paper, U is not static in the environment, it changes valence state and interacts with other elements variably over time and space, given other changing parameters like moisture, soil content, and pH. *See* W. Dong, et al., *Sorption and Bioreduction of Hexavalent Uranium at a Military Facility by the Chesapeake Bay*, Environmental Pollution (2006), 132-142, esp. at 142.

r. Basis.. The Independent Technical Review Team Leader for the HSP and FSP is the same person as the Project Manager (Corinne Shia, SAIC). *See* FSP, Certification 4- Contractor

Certification of Independent Technical Review, and HSP, Certification 4 - Contractor Certification of Independent Technical Review. To assure "independent" technical review, these roles should be performed by different individuals.

2. Support for FSP Contentions: The FSP contentions are technical in character. STV will support them at the requested hearing with the expert testimony of Charles Norris, President, GeoHydro, Inc., regarding Bases a - k, and Diane Henshel, Associate Professor, School of Public and Environmental Affairs, Indiana University, regarding Bases k -r. The professional resumes of Mr. Norris and Dr. Henshel are attached. In preparing their expert analyses of the FSP, Mr. Norris and Dr. Henshel have been and will be guided especially but not exclusively by the criteria in NUREG-1757, Vol.2, Section 4.2, and NUREG-1575, Section 5.3.

In supporting Basis j, Mr. Norris will also rely on the results of the U.S.E.P.A. study by its Science Advisory Board, *EPA's Multmedia, Multipathway, and Multireceptor Risk Assessment (3MRA) Modeling System*, EPA-SAB-05-003, EPA Science Advisory Board, U. S. Environmental Protection Agency, Washington DC, November 2004 (at www.epa.gov/sab/fiscal05.htm)

In supporting Basis m, Dr. Henshel will also rely on the results of a study which was published after STV submitted its Initial Contentions: J.J. Whicker, *et al.*, from *Dust to Dose: Effects of Forest Disturbance on Increased Inhalation Exposure*, Science of the Total Environment (2006).

In supporting Basis q, Dr. Henshel will also rely on the results of a study which was published after STV submitted its Initial Contentions: W. Dong, *et al.*, *Sorption and Bioreduction of Hexavalent Uranium at a Military Facility by the Chesapeake Bay*, Environmental Pollution

(2006), 132-142, esp. at 142.

C. HASP Contentions

In its request for hearing on the Army's 2003 POLA request, STV pointed out that the Army had not provided an adequate factual basis for its contention that necessary site characterization activities could not be carried out due to the presence of UXO at the JPG site. In its most recent POLA request, the Army has addressed this concern by proposing both the FSP and the HASP, a combination which STV believes to be appropriate. However, STV does have multiple noteworthy concerns with the HASP.

1. Contention C-1: The HASP is very generic and not site-specific in nature, without identification of the particular UXO hazards to be addressed or the specific locations in which they are found.

a. Basis. Table 2-1, "DU Impact Area Site Characterization Project Onsite Tasks" (page 2-2), lists "Installation of 10 multi-well clusters ...", "Collect 24 samples (penetrators) from the DU Impact Area", and an optional task to sample "other biota (plants, earthworms, birds, mammals, and fish)" as project tasks that will be accomplished. It is possible that UXO may be encountered while performing these operations, but there is very little specific information on the UXO safety precautions required to be followed during these activities. For example, common industry practice is to have a UXO specialist locate a clear entry and exit pathway for the drill rig and then ensure that no subsurface metal objects are located at the well location. Then, the UXO specialist usually performs downhole geophysical avoidance surveys during the well drilling operation (this is usually done by hand boring the cleared area as far as possible and then removing the drill from the well at

2-ft. increments to check that no metal objects are in the path of the drill until a specified depth is reached).

b. Basis. In section 8.12, "Drill Rig Operations," there are also no specific precautions described for UXO. The text in this section appears to be standard drill rig precautions and should be modified to emphasize the potential UXO hazards that may be encountered during this intrusive operation and what specific UXO avoidance measures will be used to ensure the safety of the drillers.

c. Basis. Section 8.13 on "Unexploded Ordnance" is more general boilerplate. There is no site-specific information presented. This is highly unusual for field operations on a known UXO contaminated site. In what specific locations are the samples going to be collected? What is the type and density of UXO that is expected to be encountered in these locations? How deep are these UXO expected to penetrate (important information for the drillers)?

d. Basis. Appendix B is an "Example Activity Hazard Analysis." However, since this HASP is intended to be a site-specific health and safety plan it would be most appropriate to include the completed activity hazard analyses instead of just an example. Since this HASP does not contain the site-specific activity hazard analyses, when will they be completed and how will they be presented to the site personnel? This question was addressed to Army and SAIC personnel during a conference call on September 8, 2005. The only response was that the HASP would be subsequently supplemented with the necessary site-specific hazard analyses. To date, no such supplementary analyses have been supplied.

2. Contention C-2: The HASP is not effectively integrated with the FSP.

a. Basis. The person identified in Table 3-1 to serve as Field Manager for the FSP (Seth Stephenson) possesses the training and experience required to serve as the UXO expert on the project. However, he is the only UXO support person listed for the project. One UXO specialist is only able to monitor one field operation at a time, such as one sampling team or one drill rig. It is not likely that he will be able to perform any additional duties associated with being the Field Manager when sampling operations are being conducted because his presence will be required at the sampling site as the UXO expert. It is likely to be much more efficient to have the project Field Manager and UXO support specialist(s) be different people.

b. Basis. The last bullet in Section 4.0 notes that UXO is present at the site and also states that, "Site investigation plans will be adjusted, as appropriate and necessary, to ensure that the H&S of all field personnel are always protected." This type of statement shows an almost complete lack of knowledge and concern for UXO on the project. Accepted safety procedures on UXO sites require plans to be developed to safely perform sampling operations before beginning work, thereby minimizing the need to adjust the plans to maintain safety once sampling has begun. There is an virtually no planning for UXO safety incorporated into the sampling procedures included in the FSP.

c. Basis. Section 4.2 on "Applicable Regulations/Standards" does not mention any of the guidance documents covering UXO avoidance and safety procedures for environmental sampling projects. These documents are available on the website of the U.S. Army Corps of Engineers Engineering and Support Center, Huntsville, Alabama.

d. Basis. Section 6.1 describes the field procedures that will be accomplished during "Geophysics (Electrical Imaging)." This process involves driving electrodes into the ground and

transmitting electrical current between the electrodes. This involves UXO hazards caused by driving the electrodes into the ground and also by emitting electromagnetic radiation which may be a potential initiation source for electrically initiated ordnance. UXO safety procedures must be specified to support this sampling procedure and the issues involved with electromagnetic radiation must be incorporated in the plan.

e. Basis. Section 6.2 on sampling "Groundwater" contains no information on UXO avoidance or safety even though this section describes drilling wells. For example, Figure 6-1, the "Drill Rig Operational Checklist," lists numerous safety requirements including fire extinguishers, grounding the drill rig, watching for electrical lines, etc. However, there is *nothing* on the safety requirements for drilling in an area contaminated with UXO. Also, page 6-14 references setting three or four steel well guards in concrete 2-ft. into the ground around each well. But, again, there is no mention of having UXO safety support for this intrusive operation.

f. Basis. Sections 6.5 and 6.6 relate, respectively, to "Soil Sampling" and "Sediment Sampling." These sections contain no information on or references to specific UXO safety procedures for performing these two operations, both of which are intrusive and would be expected to encounter UXO.

3. Support for HASP Contentions: The HASP contentions are technical in character. STV will support them at the requested hearing with the expert testimony of James Pastorick, President, UXO Pro, Inc., whose professional resume is attached. STV will also support them with technical references developed by the U.S. Army Corps of Engineers, Huntsville, Alabama (Huntsville). Huntsville is the munitions and explosives of concern (MEC) Center of Expertise for

the Army Corps. As such, it develops technical guidance for working in UXO contaminated environments. The guidance documents that apply to the HASP contentions are:

a. Data Item Description ME-001 - Type 1 Work Plan, dated December 1, 2003, and available at http://www.hnd.usace.army.mil/oew/policy/dids/FY04DIDs/MR/mr001.pdf. This document requires the development of an Accident Prevention Plan (see 2.12.d).

b. Data Item Description ME-005-06 - Accident Prevention Plan, dated December 1, 2003, and available at http://www.hnd.usace.army.mil/oew/policy/dids/FY04DIDs/MR/mr005-06.pdf .

c. Also, the Huntsville guidance document EP 75-1-2, Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities, dated August 1, 2004 and available at http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/ep75-1-2/toc.htm provides specific requirements for performing this work including:

(1) Developing an MEC Support Work Plan with specific content requirements (section 3.3)

(2) Developing an Activity Hazard Analysis (section 3-8.b)

(3) Determining the probability of encountering MEC and developing the plans and procedures appropriately (section 1-1.b)

(4) Chapter 5 provides specific guidance and direction on how to provide MEC avoidance support including specific requirements for UXO support personnel (training and team compositon, section 5-2)), direction on how to perform site access surveys (section 5-6), surface soil sampling (section 5-7), passive soil gas sampling (section 5-8), active soil gas sampling and direct push sampling (section 5-9), subsurface soil sampling and installation of monitoring wells (section 5-10), test pitting and trenching (section 5-11), groundwater monitoring (5-12)

D. Timeliness and Financial Assurance Contentions

In addition to its technical concerns with the ERMP, FSP and HASP, STV also has significant legal and regulatory policy concerns with the Army's most recent POLA request regarding both the timeliness and the financial assurance provided for both site characterization and eventual decommissioning of the JPG DU Site.

Having shown in its January 3, 2006 Reply that the scope of this proceeding includes the entire JPG DU site decommissioning process, STV maintains that the timeliness of and financial assurance for the entire decommissioning process are unquestionably within the scope of the current hearing opportunity. Indeed, STV submits that the current status of the JPG DU site decommissioning process is such that *now* is clearly the time to address the issues of timeliness and financial assurance.

In his Memorandum of March 31, 2005, Judge Rosenthal referred the entire matter of the unacceptable status of the JPG decommissioning process to the Commission, a referral which resulted in the Commission Memorandum and Order of October 26, 2005 reinstating this proceeding. In that March 31 Memorandum, Judge Rosenthal summarized the status of the JPG decommissioning process as follows:

> [S]ome eleven years have now elapsed since the Licensee terminated testing activities on its JPG site that left behind an accumulation of DU munitions. Perhaps more to the point, this past March 23 was the fifth anniversary of the grant of the hearing request of Petitioner, an organization with members who live in proximity to that site and who profess concern about the site's condition – a concern scarcely unreasonable given that, according to what the Licensee apparently represented to the Staff, the site cannot now be even characterized without subjecting its personnel and that of contractors to an unacceptable safety risk.
>
> Over the course of the past five and a half years, the Staff has been favored with one proposed decommissioning plan; then a second one that was so deficient as submitted that the Staff would not commence a technical review of it; and, lastly, a proposal that the Licensee be granted a POLA, to be renewable until such time, if ever, that the Licensee should conclude that a site characterization can be safely

accomplished. Close to eighteen months have elapsed since the POLA proposal was accepted for technical review. Nonetheless, not only has the Staff not completed its technical review and issued the required EA and SER, but also, we are now informed that it is unable to provide at this time any estimate as to when that might be accomplished. This is said to be because of its endeavor to obtain information from the Licensee that is deemed necessary to complete the review but has not as yet been produced.

We find it difficult to believe that what is involved in passing judgment on a POLA proposal is so complex that it should take years to obtain from the Licensee required information. We have not, however, endeavored to explore that matter further. As we understand it, our jurisdiction in proceedings such as this does not extend to superintending the Staff's discharge of its review functions. See Duke Energy Corporation (Catawba Nuclear Station, Units 1 and 2), CLI-04-06, 59 NRC 62, 74 (2004). Apparently, the Staff is satisfied with allowing the technical review to remain in limbo while it continues its efforts – to this point far from totally successful – to get from the Licensee the information it considers necessary in order to complete the technical review. Although we might have our doubts as to the warrant for such an approach, as we see it we are foreclosed from either calling upon the Staff to justify it or directing the Licensee to furnish a full explanation regarding its default in furnishing to the Staff the information sought from it.

At the same time, this much is readily apparent. As a result of its failure over an extended period – justified or unjustified – to provide the information the Staff requested, the Licensee has, in effect, possessed the very POLA that is the subject of the present proceeding. Indeed, it might be reasonably said that it has had the equivalent of such a license for the entire eleven years or so since it ceased the testing of the DU munitions. It seems highly unlikely that such was the contemplation of the Staff or the Commission at the time of the grant of the materials license under which the testing was performed – to the contrary, we think it most probable that the expectation was that, upon cessation of operations at the JPG site, a decommissioning plan would be forthcoming in relatively short order.

LBP 05-09, at 6-8.

Fourteen more months have now passed since Judge Rosenthal wrote his March 31, 2005 Memorandum. In that period, the Commission has learned that the Army is seeking an additional *five years* to characterize and submit a decommssioning plan for the JPG DU site, *in addition to* the time required for the Commission to review, modify as appropriate, and approve the Army's characterization plan. Thus, if the Army's current alternate schedule request is approved, it could

easily be 2011 before the Army would even submit a decommissioning plan for the JPG DU site, with an additional, unknown number of years required to review, modify, approve and implement that plan before the site would actually be decommissioned.

Moreover, budgetary considerations are indisputably a significant reason for the protracted delay in the decommissioning of the JPG DU site. At the time that decommissioning of the JPG DU site was initially proposed in 1993, the Army estimated that it would cost only $17,462,500 to decommission the site for unrestricted use and stated its intent that "funding will be available sufficiently in advance of decommissioning to prevent delay of required actions." (ML003685261). By contrast, in its current proposal in 2005 for an alternate schedule to submit a decommissioning plan in 2010 (or, more likely, 2011), the Army provides no updated cost estimate for its plan to decommission the site only for restricted use, includes no budget even for the Site Characterization Project phase of the decommissioning process, and (through its contractor SAIC) admits that "schedule accelerations are desirable and possible technically if there are no budget constraints on an annual basis." (FSP, at 4-1).

Under these circumstances, this is clearly the appropriate time to require the Army to provide an updated timetable, projected budget, and financial assurance for the recently reinstated decommissioning process at the JPG DU site in its entirety. While preliminary planning for the decommissioning process has been taking place since 1993, no meaningful decommissioning activity has yet been initiated at the JPG DU site because of the protracted delays previously described which have taken placed in the intervening twelve-plus years. Moreover, the Army's most recent proposal seeks an additional delay to submit a new decommissioning plan for another five to six years. As a result, the circumstances here are essentially comparable to those

contemplated in the SRP for Licensee Requests to Extend the Time Period for Initiation of Decommisisoning Activities, under which a timetable, cost estimate, and financial assurance would be required at the present time.[4]

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[4]Alternatively, should the ASLB determine that issues relating to timeliness and financial assurance are limited during this hearing opportunity to those related to the Army's JPG DU Site Characterization Project, STV would request leave to restate its timeliness and financial assurance contentions as follows:

1. Contention D-1. The alternate schedule being proposed fails to meet the requirements of 10 C.F.R. § 40.42(g)(2) for a *timely* characterization of the JPG DU site.

a. Basis. The Army has proposed a further delay in the submittal of its decommissioning plan for the JPG DU site until a date five years after Commission approval of its alternate schedule request and supporting site characterization project.

b. Basis. The Army has proposed a five-year delay in the submittal of its decommissioning plan because of the time allegedly required to perform its JPG DU site characterization project. However, the Army's principal contractor for its site characterization project has admitted that "schedule accelerations are desirable and possible technically if there are no budget constraints on an annual basis." (FSP, p. 4-1).

c. Basis. The Army has failed to provide either the technical or the financial information necessary to identify, describe, and evaluate the site characterization schedule accelerations which are desirable and possible technically or the budget constraints which apparently preclude the Army from adopting those schedule accelerations.

2. Contention D-2: The financial assurance provided for the Army's alternate schedule is insufficient to meet the requirements of 10 C.F.R. §§ 40.36 and 40.42(g)(2) for a *complete, definite and quantified* financial commitment for the characterization of the JPG DU site.

a. Basis. The Army says in its May 25, 2005 alternate schedule request, "All actions under the plan are subject to funding of course." However, there is no specific budget for the overall JPG Site Characteriztion Project, its principal components, or the individual years in the five-year implementation period included with any of the supporting materials submitted by the Army.

b. Basis There was no formally expressed or executed Statement of Intent on the part of an Army official with the authority to approve or even to request the necessary funds for the JPG Site Characterization Project submitted with the Army's alternate schedule request.

c. Basis. In response to a Request for Additional Information from the NRC Staff following submission of its May 25, 2005 alternate schedule request, the Army belatedly submitted a purported Statement of Intent on September 14, 2005. *See* ADAMS Document ML052710071. However, this Statement does not satisfy the requirements of 10 C.F.R. § 40.36(e)(4) for Statements of Intent by government agencies such as the Army. In the first place, the Statement of Intent contains no cost estimate to conduct the JPG DU Site Characterization

1. Contention D-1. The alternate schedule being proposed fails to meet the requirements of 10 C.F.R. § 40.42 of a *definite* schedule for *timely* decommissioning of the JPG site.

a. Basis. A major STV concern with the Army's 2003 POLA request was that the indefinite postponement of decommissioning and decontamination at JPG would be inimical rather than essential to the conduct of effective decommissioning operations. The whole purpose of 10 C.F.R. § 40.42 is **timely** decommissioning and decontamination. In particular, the NRC said in proposing the rule in 1993:

> The lack of definitive criteria as to when licensees shall commence and complete decommissioning their facilities has resulted in instances where the Commission has had to issue orders to establish schedules for timely decommissioning. Because timeliness in decommissioning is a generic issue, the Commission is proposing to

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Project, let alone to perform eventual site decommissioning as required by the rule. There is also no information accompanying the Army's Statement as to what effect, if any, the requested delay in submitting a decommissioning plan will have on the eventual cost of decommissioning. In particular, there is no information regarding the effects, if any, of the additional time built into the schedule for the Site Characterization Project beyond that which is technically desirable and feasible due to annual funding constraints. NRC guidance puts the Army on specific notice that this is significant information to be submitted in support of an alternate schedule request of the length and nature of the one here. *See, e.g.,* NUREG-1757, Vol.3, Section 2.6 (requiring "discussion of the current decommissioning cost estimate and the potential for increased decommissioning costs if an extension of the time period is approved") *and* Vol.1, Section 5.4 (stating "waste disposal costs have, in the past, increased at rates significantly higher than the rate of inflation and therefore delaying remediation will result in higher costs to the public.") In the second place, the Army's Statement of Intent does not provide adequate documentation that the funds required to perform , whatever the amount may be, will be requested when necessary to permit timely implementation of the JPG Site Characterization Project. There is also no documentation whatsoever of the authority of the letter's signator to request and approve disbursement of the funds necessary for these actions, let alone decommissioning of the site. *See* NUREG-1757, Vol. 3, Sections 4.3.1 and 4.3.2.13 and Appendix A-16.

3. Support for Alternate Timeliness and Financial Assurance Contentions. In addition to the documents cited in this Reply, STV relies on the legal opinions of its attorney, Michael A. Mullett, whose resume was previously provided, to support its timeliness and financial assurance contentions and bases.

amend its regulations to clearly delineate the licensee's responsibility for timely decommissioning. **The proposed rule would provide the needed regulatory basis for compelling decommissioning in a timely manner. In addition, the proposed rule would place a limit on the time permitted to decontaminate and decommission and place the burden of proof directly on the licensee to demonstrate that a longer period of time is required for completing decommissioning.**

See 58 Fed. Reg. at 4100 (emphasis added).

Here, the alternate schedule being proposed fails to "place a limit on the time permitted to decontaminate and decommission" the site, as required by the Timely Decommissioning Rule. The Army's May 25, 2005 letter does not state when decommissioning will start nor when it will end. Instead, it simply requests approval to extend the time for submission of a DP by five years following approval of the current POLA request. In effect, the current five-year POLA request, as filed, represents no more than the first installment of the indefinite POLA with five year renewals previously proposed and supposedly withdrawn by the Army.

b. Basis. The current proposal also fails to "place the burden of proof directly on the licensee to demonstrate that a longer period of time is required for completing decommissioning" as required by the Timely Decommissioning Rule. The Army's May 25, 2005 letter does not even commit to completing decommissioning with twenty-four months of DP approval. Instead, it effectively places the burden on STV (or any other concerned group in the future) to demonstrate that a shorter, more definite period is required. This effectively turns the Timely Decommissioning Rule on its head and creates precisely the type of situation which the rule was adopted to correct and prevent: the indefinite postponement of the decommissioning and decontamination of licensed sites. And, it does so at a former SDMP site at which there have already been multiple, lengthy delays in decommissioning.

c. Basis. The Army's current proposal provides no description of its regulatory history, especially but not exclusively at the JPG site, to establish a pattern of compliance with Commission decommissioning rules and guidance which would instill confidence that timely decommissioning will actually occur at JPG. Such a showing is especially critical in a situation in which the Army is once again requesting an extended period of delay in decommissioning and decontamination at a former SDMP site at which there have already been multiple, lengthy delays in decommissioning. Such a showing is also expressly contemplated by Commission guidance on the evidence required for an alternate schedule for decommissiong. In particular, NUREG-1757, Vol.3, Section 2.6, provides, in pertinent part: "To demonstrate that delaying the start of decommissioning will not be detrimental to public health and safety, a licensee should submit the following: A discussion of its record of regulatory compliance, particularly its compliance with NRC regulations."

2. Contention D-2: The financial assurance provided for the Army's alternate schedule for decommissioning is insufficient to meet the requirements of 10 C.F.R. §§ 40.36 and 40.42 for a *complete, definite and quantified* financial commitment for the decommissioning of the JPG site.

a. Basis. The indefiniteness of the Army's alternate schedule is compounded by the vagueness of its funding. All the Army says in its May 25 letter to the NRC Staff is, "All actions under the plan are subject to funding of course." There is no specific budget for the overall plan, its principal components, or the individual years in the five-year implementation period. There is no formally expressed or executed statement of intent on the part of an Army official with the authority to approve or even to request the necessary funds. This effectively turns the relationship between the NRC as regulator and the Army as licensee on its head, making the Army the ultimate authority

with respect to JPG decommissioning by virtue of its budgeting decisions and funding requests determining whether and when the site is characterized, decommissioned and decontaminated in accordance with NRC regulations. This inverted relationship promises nothing other than continuation of the pattern of repeated delays and changes in plans which has characterized the Army's decommissioning activities regarding the JPG site over the past ten years and recently resulted in the establishment of this docket following the referral of this unacceptable situation to the Commission for its consideration and action.

b. Basis. In response to a Request for Additional Information from the NRC Staff following submission of its May 25 letter, the Army belatedly submitted a purported Statement of Intent on September 14, 2005. *See* ADAMS Document ML052710071. However, this Statement does not satisfy the requirements of 10 C.F.R. § 40.36(e)(4): "In the case of Federal, State, or local government licensees, a statement of intent containing a cost estimate for decommissioning . . . and indicating that funds for decommissioning will be obtained when necessary." In the first place, the Statement of Intent submitted by the Army contains no cost estimate to conduct the FSP and implement the HASP, let alone to perform eventual site decommissioning as required by the rule. There is also no indication in the Army's Statement as to what effect, if any, the requested delay in decommissioning will have on the eventual cost of decommissioning. NRC guidance puts the Army on specific notice that this is significant information to be submitted in support on an alternate schedule request. *See, e.g.,* NUREG-1757, Vol.3, Section 2.6 (requiring "discussion of the current decommissioning cost estimate and the potential for increased decommissioning costs if an extension of the time period is approved") *and* Vol.1, Section 5.4 (stating "waste disposal costs have, in the past, increased at rates significantly higher than the rate of inflation and therefore

delaying remediation will result in higher costs to the public.") In the second place, the Army's Statement of Intent does not provide adequate documentation that the funds required to perform decommissioning, whatever the amount may be, will be obtained when necessary. The stated intention to seek and secure funds is limited to the actions contemplated in the Army's May 25 letter to support an alternate schedule, namely conducting the FSP and implementing the HASP; it does not include eventual decommissioning itself. There is also no documentation whatsoever of the authority of the letter's signator to request and approve disbursement of the funds necessary for these actions, let alone decommissioning of the site. Indeed, there is no express reference or other evidence in the Army's statement of any conscious effort to follow the Commission's written guidance for a statement of intent which would meet the applicable regulatory requirements. *See* NUREG-1757, Vol. 3, Sections 4.3.1 and 4.3.2.13 and Appendix A-16.

3. Support for Timeliness and Financial Assurance Contentions: Contentions D-1 and D-2 raise legal and/or regulatory policy rather than technical issues. STV will support them by reference to applicable NRC regulations, guidance documents, and precedents relevant to the Army's request for an alternate decommissioning schedule pursuant to 10 C.F.R. 10.42(g)(2) in memoranda, briefs and arguments submitted by its attorney, Michael A. Mullett, Senior Counsel, Mullett, Polk & Associates, LLC, who also serves as an Adjunct Professor at the Indiana University School of Law in Indianapolis, IN and the Lewis & Clark School of Law in Portland, OR. Mr. Mullett's professional resume is attached.

E. Safety Evaluation Report Contentions.

On April 28, 2006, the NRC Staff issued its Safety Evaluation Report ("SER"). By approving the Army's POLA request and accepting the FSP and HSP as proposed by the Army, the

SER is clearly inadequate because it does not sufficiently address or resolve the Contentions and supporting Bases submitted by STV, as clarified or supplemented herein, to identify and describe relevant and significant deficiencies in the Army's plan for characterization of the JPG DU Site. Specifically:

1. Contention E-1: The SER is clearly inadequate because it does not sufficiently address or resolve the Contentions and supporting Bases submitted by STV, as clarified or supplemented herein, to identify and describe relevant and significant deficiencies in the Army's FSP.

a. Basis. The SER is premised on the assumption that the Army's responses to the Staff's January, 2006 Requests for Additional Information ("RAIs") have addressed and resolved the deficiencies in the FSP identified and described by STV and, to some extent, the Staff as well. However, the Army's RAI responses do not address in any meaningful way most of the deficiencies in the FSP and even the deficiencies which are addressed are not resolved. There is a disturbing disconnect between the SER discussion of the Army's responses and the actual Army responses to the RAIs. The thrust of the SER discussion is what the Staff might wish the Army had responded, but certainly not what it did respond.

b. Basis. The Army's RAI responses do propose an alternative sequence and modified content for collection of stream and cave gauging data and the modified content for collection of climate data. However, as explained further below, the new program is set forth without explanation or rationalization of how it will overcome the inadequacies of the original program. It is just an alternative data collection program.

c. Basis. The alternative program described in RAI Response No. 1 does not correct the deficiencies of the program in the original FSP that are described in the STV's Bases for Contention

B-1, especially but not exclusively Basis a, which has been accepted as admissible by both the Staff and the Board. The timing of the initiation of the stream gauging is moved up to overlap with the timing of the well installations under the new calendar, as opposed to starting after the well installation under the original FSP. However, the flaw in the original FSP is that these two activities are perceived and implemented as though the data collected from the wells and the stream gauging are independent and unrelated with respect to the objective of site characterization. That perception and implementation will result in data that cannot be used to reliably characterize the site and, therefore, cannot be used to reliably model the transport of uranium from the DU impact area.

d. Basis. As demonstrated in several of the bases supporting Contention B-1, including the bases accepted as admissible by Staff to date, the locations of the well clusters should be located not only based on the results of the fracture analysis and EI survey, but also based on the information that can be gained by a stream reach evaluation of gaining and losing portions of the streams in the area. As also demonstrated in several of the bases supporting Contention B-1, this type of stream reach evaluation is critical to appropriately select meaningful locations for the stream gauging locations and the stream gauging activities discussed in Army's response to RAI No. 1. This is a critical type of stream gauging is not part of the FSP, as acknowledged by Army in its response to STV's Initial Contentions. The response to RAI Request 1 does not add such stream surveying to allow proper location of the wells or the stream gauging stations. It merely moves forward the time of the inadequate FSP stream gauging program such that it overlaps with an inadequate program for choosing well locations, a change that does not correct the inadequacy of either of those individual FSP characterization programs in any way.

e. Basis. The Army's Response to RAI No. 2 is non-responsive to the request from NRC for information to justify why it will not use a phased approach for determining the hydraulic properties of bedrock and unconfined sediment of the DU impact area at JPG. It is clear that Army still intends to avoid collecting hydraulic property data, even when it is possible to do so. This obstinate refusal to collect critical data needed to characterize the hydraulic performance of the site remains the same fatal flaw that was previously included among the original bases for STV contentions. Without the data for hydraulic properties of the bedrock and the unconfined sediments, meaningful transport modeling is not possible and an adequate decommissioning plan cannot be developed.

f. Basis. The activities enumerated by Army in response to RAI No. 2 are *non sequitur* with respect to determining hydraulic properties. Fracture analysis, EI surveying, and soil verification individually and collectively will not determine the hydraulic properties of the bedrock and/or the unconsolidated sediments. The one bone tossed by Army, that a long-term pumping test "may be considered" for "the aquifer" is both unresponsive and discloses a poor conceptual understanding of the site geology. The proper design of a long-term pumping test is inherently linked to a prior determination of the hydraulic properties of the materials being tested. A long-term pumping test has not been added to the FSP, only the assertion that it will be considered. Further, there is the *a priori* assumption that there is but a single aquifer in the area to be tested, an unlikely assumption for the geology of this site and one that would need to be critically evaluated rather than uncritically accepted by the site characterization program yet to be performed.

g. Basis. The Army's response to NRC's third request for information is either non-responsive or represents a fundamental lack of understanding of hydrogeologic processes.

NRC requested a description of Army's approach to measuring, calculating or estimating recharge to groundwater at each water bearing unit. The Army responded by describing how it would measure discharge from ground water to a stream at a particular point. These two elements of the hydrologic system are, of course, related, but they are not equal or equivalent, nor is one a surrogate for the other. Quantifying the difference between these two elements for each water bearing unit and for all water bearing units is one of the fundamental tasks that must be completed as part of site characterization. One cannot quantify the difference without knowing the recharge as well as the discharge. In karst terrain, the relationship between groundwater recharge and discharge to surface water is further complicated where the karst drainage does not correspond in pattern or direction with the surface drainage. (Such discordant drainage patterns were documented at JPG sites 12A, -B, and -C and must conservatively be expected in the DU area also.) Thus, recharge to ground water that discharges somewhere other than the local stream drainage will be lost to the Army's stream gauge exercise entirely and the exercise will be measuring part of the water recharged somewhere else entirely.

h. Basis. Assuming, as does Army in its response to RAI No. 3, that the discharge to a stream is equal to the recharge to any one, or all, water bearing unit(s) ensures a fundamental mischaracterization of site hydrogeology that will propagate through any transport model or decommissioning plan that relies upon such mischaracterization.

i. Basis. The Staff did not direct RAIs to the Army and the SER does not address the fundamental deficiencies in the FSP identified and described by STV's regarding soil, air and biota sampling.

j. Basis. For example, STV's sampling expert has been express, specific and insistent with respect to the inadequacy of the FSP's biota sampling regime. *See* Contention B-1, Bases n and o. Furthermore, the professional standards for such a regime are clear. As summarized in G.W. Suter's recent and authoritative book, Ecological Risk Assessment for Contaminated Sites, at p. 77, the Rules for Sampling Biota are stated as follows (taken from page 77):

- o Take enough samples to represent the variability of the site adequately.
- o Sample endpoint taxa for which internal measures of exposure are useful.
- o Sample organisms or parts of organisms that represent the food of assessment endpoint species.
- o Take samples of biota and contaminated media at the same locations and at effectively the same time
- o Take samples at reference and contaminated locations or on contamination gradients.
- o Because chemical concentrations in organisms may vary seasonally, take samples from all sites at approximately the same time.
- o Be aware of information that is lost when samples are composited.

Yet, the SER effectively disregards totally the FSP's failure to comply with essentially all of these rules.

k. Basis. The SER also ignores the lessons which the Staff itself has previously said should be learned from past experience in decommissioning sites like JPG. In a document dated May 28, 2004, "NRC Regulatory Issue Summary of the License Termination Rule Analysis," nine issues were highlighted as being of concern to the NRC. Two of these issues are specifically applicable to

the FSP but are ignored in the SER. These two issues (as summarized in the "Summary of Issues" on page 2 of 4 of RIS 2004-08) are issues numbers 6 and 8:

"(6) Realistic Exposure Scenarios: Clear guidance is needed for selecting more realistic scenarios to estimate potential doses to the public after termination of the license." Here, the FSP is being proposed to support a decommissioning plan where the DU will continue in place on site following decommissioning for perpetuity. Yet, the sampling activities proposed simply are not responsive to the indefinite temporal duration of the contamination.

"(8) Measures to prevent future legacy sites by changes to licensee operations." The relevant issue here is summarized best on pages 9 and 10 of RIS 2004-08 Attachment 1 of the Summary of License Termination Rule Analysis:

> NRC also evaluated the lessons-learned from decommissioning existing contaminated sites and identified specific risks, during facility operations, that could eventually lead to sites with decommissioning problems. NRC concluded that chronic releases and reporting deficiencies were two key operational risks.

Here, the FSP is being proposed at a site where the existing monitoring program is known to be inadequate and where any past or future releases will be chronic because the contemplated decommissioning will not involve DU clean-up. Yet, the sampling activities proposed are effectively insensitive to the risk the NRC itself has recognized of the possible need to revisit decommissioning at sites like JPG if the site has not been properly characterized and DU fate and transport over time accurately modeled, monitored and measured.

l. Basis. The inadequacies and insufficiencies of the Army RAI Responses regarding the groundwater sampling activities in the FSP directly negate the SER which relies upon them. The inability of the FSP, even with the changes the Army promised the Staff, to characterize the site in a meaningful manner means that even after the 5-year extension the Army will not yet be able to

develop a reliable transport model for DU and will not be able to produce an acceptable decommissioning program. Further, there will, after yet another 5 years, be no confidence that the public is even being protected by an adequate monitoring system, one that is able to monitor effectively the movement of DU from the impact areas. Such a situation, the direct result of uncorrected deficiencies in the Army's proposed site characterization and monitoring activities, is neither "necessary to the effective conduct of decommissioning operations" nor "otherwise in the public interest."

2. Contention E-2. The SER is clearly inadequate because it does not sufficiently address or resolve the Contentions and supporting Bases submitted by STV to identify and describe relevant and significant deficiencies in the Army's HSP and their critical interrelationship to implementation of the Army's FSP.

a. Basis. The SER expressly states, "The HSP dealt solely with worker protection in the DU impact area. As such, the staff made no findings regarding the HSP and did not rely on it to reach conclusions regarding the proposed license amendment." (SER, page 4).

b. Basis. It is the stated opinion of STV's UXO expert that, as filed, the HASP simply does not apply the detailed guidance in EP 75-1-2 to develop detailed plans for UXO avoidance with respect to each of the principal field sampling activities described in the FSP. The subsequent addenda referenced by the Army *may* correct this glaring deficiency in the HASP, but there is no way to determine at this time whether that will prove to be the case because these Addenda have yet to be filed. Consequently, in the opinion of STV's expert, the HASP is grossly deficient as it stands.

c. Basis. It is also the opinion of STV's expert based on his personal experience, professional judgment, and knowledge of practices observed on other projects that inadequate

planning which does not comply with EP 75-1-2 will delay the implementation and increase the cost of both HASP and FSP field activities. It is also likely to increase the risk of an accidental detonation, which will not only endanger on-site personnel but further delay and increase the cost of both the HASP and the FSP.

d. Basis. The last bullet in Section 4.0 of the HASP expressly asserts that UXO is present at the site and that, "Site investigation plans will be adjusted, as appropriate and necessary, to ensure that the H&S of all field personnel are always protected." This type of statement shows an almost complete lack of knowledge and concern for UXO on the project. Accepted safety procedures on UXO sites require plans to be developed to safely perform sampling operations before beginning work, thereby minimizing the need to adjust the plans to maintain safety once sampling has begun. There is an virtually no planning for UXO safety incorporated into the sampling procedures included in the FSP. As a result, the HASP contemplates unspecified *ad hoc* adjustments to site investigation activities contemplated in the FSP as needed to ensure safety of personnel.

e. Basis. In its now withdrawn 2003 POLA request, the Army cited UXO risk as an excuse to delay JPG DU site characterization indefinitely. In its currently pending 2005 request, the Army is now expressly stating in its HASP that it will adjust the site investigation activities proposed in its FSP in unspecified ways in order to assure the absolute safety of project personnel – a vague, *ad hoc* approach to integrating the HASP and the FSP which STV has harshly criticized but the SER does not even reference let alone discuss. But, this vague, *ad hoc* approach to integrating the HASP and the FSP leaves completely unevaluated and necessarily unresolved whether the unspecified adjustments to planned site investigation activities which will be made by the Army to protect project personnel will also assure adequate site characterization.

f. Basis. For example, suppose that site investigation activities identify a groundwater conduit at a location where UXO is present. Will the UXO be cleared and a sampling well drilled at that location? Will the initial location be avoided and a well drilled at another location found along that same conduit? Or, will a sampling well simply not be drilled in a potentially critical groundwater conduit? The SER inexplicably and unjustifiably ignores this obvious and important issue.

3. Support for SER Contentions. STV's SER contentions are technical in character. STV will support them at the requested hearing with the expert testimony of James Pastorick, President, UXO Pro, Inc. (Contention E-2), Charles Norris, President, GeoHydro, Inc. (Contentions E-1 and E-2), and Diane Hensel, Associate Professor, School of Public and Environmental Affairs, Indiana University (Contentions E-1 and E-2), whose professional resumes are attached.

F. Environmental Assessment Contentions.

On March 6, 2006, the NRC Staff issued its Environmental Assessment ("EA") with a finding of no significant impact ("FONSI") from the Army's POLA. However, STV submits that both the reasoning and the assumptions supporting the FONSI are faulty in significant respects Specifically, STV submits the following Contention and supporting Bases:

1. Contention F-1: The reasoning and the assumptions supporting the EA's FONSI are faulty in significant respects.

a. Basis. The EA considered two alternatives, the No-Action alternative and the requested 5-year extension for the decommissioning plan to perform the level of characterization needed to develop a transport model and the development of an adequate decommissioning plan. Although the extension would create some slightly higher impacts, it was selected because a) the impacts are

perceived as minimal (if unquantified) and b) added characterization must be done before decommissioning can continue. (EA, pages 3 and 4)

b. Basis. There are four principle threads of logic behind the interpretation of minimum radiological and nonradiological impacts that might occur as a result of a 5-year delay, described on page 3 of the EA. First, some monitoring wells of the current monitoring network were installed "near" the southwest corner of the DU impact area without radiological or nonradiological impacts. Second, the risk from radiological impacts from exploding UXO is "insignificant." Third, the existing monitoring program has found "no DU". Fourth, NRC staff interprets NUREG/CR-6705, SAND2000-2554, *Historical Case Analysis of Uranium Plume Attenuation*, to indicate that groundwater plumes of uranium would likely be too short to reach JPG boundaries and may have already reached their full extent. The assessment goes on to propose that in the unlikely event that a groundwater plume were to reach the JPG boundary, the existing monitoring system would detect it and trigger corrective actions to reduce the DU concentrations to below the action level. The faulty logic of three of these four threads is transparent.

c. Basis. Thread One hypothesizes no radiological impacts from wells installed inside the DU impact area because earlier wells installed outside of the DU impact area did not have radiological impacts. Since there would be no DU contamination in the area of the earlier installations, there could be no radiological impacts associated with their installation. But that carries no significance by analog to installations of wells in an area where DU contamination is present. Thread Two is an assertion that is offered without supporting data or a quantification of what would constitute a significant risk were there a UXO explosion. Thread Three, and the "even if" safety net of corrective action, rely on the supposition that the monitoring program of the ERM is

adequate to identify migrating DU from the DU impact area. The need for the characterization to be done during the five-year extension is the direct result of the inadequacy of that monitoring system and the existing site characterization. Any data from inadequate system cannot be relied upon to provide evidence of safety or lack of impact.

d. Basis. In offering Thread Four, NRC Staff simply lifts text from NUREG/CR-6705, without critical consideration what the data from that document actually mean and don't mean with respect to migration away from the DU Impact area at JPG. There is very little of the data underlying in the study that is at all relevant to JPG, and the data that are relevant do not support the conclusions asserted by NRC Staff in the EA.

e. Basis. NUREG/CR-6705 evaluates groundwater uranium patterns in and around 32 individual source areas representing 26 locations. Summary information on these sites is provided in Table 5, pages 20 through 23 of the paper. None of the 32 is a DU weapons testing or use area. There are 6 natural uranium ore bodies from 4 sites. There is a single explosive site. There are two uranium mines. There are 23 sites from 19 uranium mill tailings operations around the United States. None of these sites is directly analogous to JPG.

f. Basis. The sites that are most relevant to JPG are the mill tailings sites in that they constitute uranium that has been placed in a setting for which the uranium is likely not in chemical equilibrium with the placement area. However, most of these sites exhibit characteristics and conditions that are far removed from those of JPG. Seventeen of the 23 mill tailings sites, representing 15 locations, are Type I UMTRA (uranium mill tailing remedial action) sites. Six of the mill tailings sites, representing four locations, are Type II UMTRA sites. Type I sites are those that have been remediated with removal, relocation or isolation of the uranium-bearing wastes. For

these sites, one would expect less extensive and slower plume development than at the Type II sites where no remediation has yet taken place. The data bear this out; the median interpreted "plume" for the Type I sites is 1.12 km and the median interpreted "plume" for the Type II is 2.26 km. It is noted that there has been no removal or isolation of the uranium from the DU impact area at JPG.

g. Basis. There are, moreover, other biases to the NUREG/CR-6705 data set that need be considered with respect to JPG.

- The sites analyzed for plume interpretation are overwhelmingly from arid or semi-arid areas, not the humid midcontinent. Seventeen of the sites are from Colorado, Utah, Arizona, Wyoming, New Mexico or the interior desert of Washington. The availability of precipitation to drive ground water flows is greatly restricted in such areas when compared to precipitation rates comparable to those at JPG. Only three of the locations in the study are from the Midwest; one each in Missouri, Pennsylvania, and Ohio. Each of these sites is UMTRA Type I, influenced by waste removal and isolation.
- Only the two site at the Weldon Springs location in Missouri are in a setting with carbonate bedrock (DOE), as is JPG. Carbonate bedrock may, but does not necessarily, show karst development. Based upon the pattern of uranium migration from the disposal areas, it does appear there is a karst element there and that pattern underscores the complexity of mapping uranium migration through karst networks. Even with a much greater density of wells than are postulated for JPG under the FSP and precisely known source areas, plumes are not well constrained and uranium concentrations are not distributed simply. The comment column of Table 5 (NUREG/CR-6705, p22) states for both of these sites, "Plume length is very approximate. [U] well data is very heterogeneous. Multiple plumes are observed. Very

localized plume lengths with [U]>15 pCi/L(~45 ppb) are only reported." It is noted that the authors of NUREG/CR-6705 elected not to include or analyze data from the Savannah River Site (p.15), a facility with karst geology that could serve as an analog for migration patterns at JPG.

h. Basis. Simply lifting text from NUREG/CR-6705 is also subject to misinterpretation unless care is taken to understand the term "plume" as used in that paper. As used in this paper, plume does not represent the distance uranium has migrated downgradient from a source area. The term plume is used as shorthand for "maximum plume axial length", which in turn is defined as

> the maximum distance between two points encompassing the farthest boundaries of the plume as constrained and/or permitted by the sampling well network in a particular site where measurable U concentrations in the range of 10-20 ppb have been obtained. (NUREG/CR-6705, pp. 18 & 19)

As implemented, the maximum plume axial length reported in Table 5 often represents a distance not to concentrations of 10-20 ppb, but of many-fold higher concentrations. In one case, the "plume" was defined based on the boundaries of concentrations as high as 900-1000 ppb. In a different type of inconsistency, NUREG/CR-6705 reports a "plume" length of 0.4 km at Maybell CO for a site at which the caretaker, DOE, reports it has never had water quality measured as part of the monitoring program. *See* Maybell, Colorado, *Disposal Site Fact Sheet Nov-05*, U.S.D.O.E, Office of Legacy Management, at p. 1, *available at*: http://www.lm.doe.gov/documents/sites/co/maybell/fact_sheet/maybell.pdf.

i. Basis. Another limitation of the NUREG/CR-6705 paper is that its reported measurements are based on single "snap-shots" of the extent of contamination for the reported sites. There are no data and is no discussion regarding the rate of plume expansion, and at no point does the paper suggest that the reported plumes are at maximum extent. The paper does expressly

caution, however, about the temporal aspect of meauring plume lengths. On page 19, the paper says, "Note there is a general lack of temporal data for periods longer than 5 years for most sites." The NRC Staff mistakenly takes this to mean that maximum plume length develops in a few years, rather than giving the plain meaning to the caution that the reported plume lengths represent only how far the plumes have developed during their respective measurement periods, not their ultimate lengths.

j. Basis. The most critical element to NUREG/CR-6705 study that was apparently not recognized by the NRC Staff, however, is that for most of the plumes, the actual downgradient migration limit for plume length is when the groundwater plume discharges into a surface body of water such as a river or pond. NUREG/CR-6705 shows the plume patterns for five sites at four locations in its Figures 8-11. In four of the five cases, the groundwater plume has reached a maximum extent only because it terminates against a surface water body and delivers its uranium to that stream or river. Were the surface water body further away, the plume would have been longer. This same pattern is documented at all sites for which appropriate data are available for the UMTRA sites as examined on the DOE website http://www.lm.doe.gov/ .

k. Basis. The ready transfer of dissolved uranium from matrix groundwater flow to a free-flowing body of water, as documented for the majority the NUREG/CR-6705 locations, is particularly problematic for JPG. Unlike most of the cases for the NUREG/CR-6705 study, where this transfer was to a surface water body, at JPG, this transfer is likeliest to occur into free-flowing water in the karst development. That water, although of course underground, flows in systems analogous to surface water streams, with comparable speed through as-yet uncharacterized flow networks. Thus, although the matrix-flow groundwater paths may be relatively short and slow until

the karst network is reached, at that point migration rates will be dramatically faster, maybe kilometers per day, and in directions that have not been established.

l. Basis. Finally, the NUREG/CR-6705 discussion of uranium geochemical controls and natural ore bodies has important implications that are unrecognized in the NRC Staff comments for areas downgradient and downstream of the DU impact. The Army and NRC Staff approach the DU problem from the standpoint of migration away from a relatively concentrated source, with a resulting plume that will disperse or attenuate with distance from that source. With a contaminant such as uranium, however, that is only one side of a two-edged sword. Ore bodies (concentrated uranium) develop in nature because geochemical boundaries create local areas where relatively dilute uranium is extracted from the passing water, causing uranium concentrations in the soils to build to extremely high concentrations. NUREG/CR-6705, Sections 2.0 and 2.1, pp. 1-7. The inherent implication of this is that even a dilute plume, one below the concentration of an action level, can build concentrations in soil or sediments that are problematic further along the transport path when geochemical conditions change.

m. Basis. On page 3 in paragraph 3, the EA states that "no DU has been detected in the samples collected." This is inaccurate and misleading.

n. Basis. According to the FSP, Tables 2-1 and 2-2 (page 2-9 of the May 2005 Field Sampling Plan produced by SAIC), radiation was detected in the vegetation up to 3,4476 pCi/g with a mean of 627.5 pCi/g in 10 vegetation samples, and was detected in the vegetation root wash (soils accumulating under the vegetation and therefore the source of the radioactivity taken up by the plants) at levels as high as 14,258 pCi/g with an average of 2,868.8 pCi/g in 10 samples. (The source for these data was SEG 1995.)

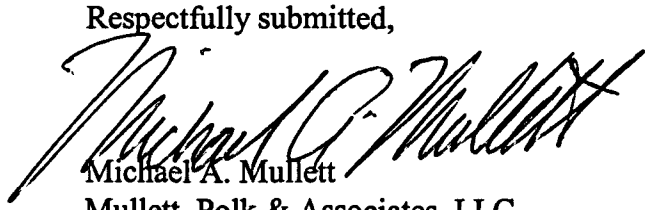
o. Basis. Biota are generally better indicators of contaminant releases and exposures over time. This is especially true in water, where, as discussed in RAGS Chapter 4 [EPA/540/1-89/002], concentrations in fast-flowing waters can be highly variable over time and space. JPG streams can be very fast flowing during and following rain events, as the karst topography lends itself to rapid rises in the water table and thus frequent flooding. As Suter says in Ecological Risk Assessment for Contaminated Sites, "the concentrations of chemicals in water may be highly variable over relatively short time periods. The resolution of temporal issues in aqueous sampling and data reduction must be based on the variability of the concentrations in the stream and the toxicokinetics and toxicodynamics of the chemicals and receptors." (Suter et al, page 79). At JPG, the surface sampling rate historically and as approved in the EA is effectively one sample every six months, which can not be expected to enable any resolution of contamination variability over time and space. Thus, better estimates of whether DU is or has been present in surface water comes from the aquatic bioaccumulators.

p. Basis. In Table 2-2 of the FSP, freshwater clams represent the stationary bioaccumulators that provide good evidence for the presence of DU in both surface waters and the food chain. Freshwater clam samples (2 data points provided) are 0.774 and 0.334 pCi/g. The mean of the two clam data points, when compared to the mean of the surface water data provided in Table 2-1, indicates that the clams bioaccumulation factor (BAF) is approximately 900. This is the highest bioaccumulation rate reported among the biota listed in Tables 2-1 and 2-2 on page 2-9 of the FSP. Since clams are also eaten by both wildlife (raccoons and wading birds, for example) and humans, the reported presence of bioaccumulating DU in them is potentially quite significant.

q. Basis. Thus, the logic and data underlying the EA will simply not support its FONSI. While a FONSI may still be warranted for the POLA, the EA as drafted is simply insufficient to justify it.

2. Support for EA Contention. STV's EA contention is technical in character. STV will support its contention at the requested hearing with the expert testimony of Charles Norris, President, GeoHydro, Inc. (Bases a through l, q), and Diane Hensel, Associate Professor, School of Public and Environmental Affairs, Indiana University (Bases m through q), whose professional resumes are attached.

Respectfully submitted,



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FACULTY PROFILE

Diane Henshel
Associate Professor

Ph.D., Neurobiology, Washington University, 1987

Professor Henshel's interests focus on the sublethal health effects of environmental pollutants, especially on pollutant effects on the developing organism. Recent research has emphasized the effects of polychlorinated dibenzo-p-dioxins (PCDDs) and related congeners on the developing avian nervous system using a combination of neuroanatomical, immunohistological, biochemical and behavioral techniques. In order to understand the environmental implications of these effects, she studies both animals exposed in the wild, and animals exposed to known concentrations under controlled conditions in the laboratory. The studies are designed for ultimate use in improved risk assessment procedures.

Her teaching interests lie in the fields of developmental toxicology, risk assessment and risk communication.

She also conducts the Developmental Neurobiology and Environmental Toxicology Laboratory

Recent Publications

"Developmental and neurotoxic effects of dioxin and dioxin-like compounds on domestic and wild avian species" Henshel, D.S. *Environmental Toxicology and Chemistry* 17(1):88 - 98 (1998)

"The relative sensitivity of chicken embryos to yolk or aircell - injected 2,3,7,8 - tetrachlorodibenzo-p-dioxin." D.S. Henshel, B. Hehn, R. Wagey, M. Vo, J.D. Steeves. *Environmental Toxicology and Chemistry* 16(4):725-732 (1997).

"Brain Asymmetry as a Potential Biomarker for Developmental TCDD Intoxication: A Dose-Response Study." Henshel, D.S., Martin, J.W., DeWitt, J.C. *Environmental Health Perspectives*, 105(7):718-725 (1997).

"Risk Assessment of Mercury Exposure Through Risk Consumption by the

Riverside People in the Madeira Basin, Amazon", 1991 A.A.P. Boschio and D.S. Henshel, *Neurotoxicology* 17(1): 169-176 (1996).

"A short-term test for dioxin teratogenicity using chicken embryos," D.S. Henshel, M.T. Vo, B. Hehn, and J.D. Steeves. In: Hughes, J., et al. (eds.), *ASTM STP #1173: Second Symposium on Environmental Toxicology and Risk Assessment.* American Society for Testing and Materials (ASTM), Philadelphia pp. 159-174 (1993).

RESUME
of
MICHAEL A. MULLETT

PERSONAL DATA

Home Office Address: 723 Lafayette Street, Columbus, IN 47201
Home Office Telephone and Fax: (812) 376-0734

Height: 5'll" Weight: 210 lbs Health: Excellent
Birthdate: December 15, 1945 Citizenship: U. S.
Marital Status: Married

EMPLOYMENT HISTORY

Self-employed attorney, Mullett, Polk & Associates, LLC, and Mullett & Associates, Indianapolis & Columbus, IN, 1982 to Present. Extensive litigation and legislative experience concentrated in representation of environmental and consumer groups on high-profile environmental, natural resources and public utility issues and cases. Listed in Who's Who in American Law since 1990 and Who's Who in Finance and Industry since 1996. Indiana Environmental Litigator of the Year, 1999 and 2004. Indiana Trial Lawyer of the Year, 1994 (co-recipient).

Clients have included the Indiana Clean Energy Campaign, the Hoosier Environmental Council, the Hoosier Environmental Council Action Fund, Save The Valley, Protect Our River Environment, Protect Our Woods, the Citizens Action Coalition of Indiana, the Citizens Action Coalition Education Fund, and numerous individuals and community groups.

Major reported cases include Save the Valley, Inc. v. Indiana-Kentucky Elec. Co., 820 N.E.2d 667 (Ind. Ct. App. 2005), *aff'd on reh'g*, 824 N.E.2d 776, *trans. denied* (authorizing associational standing for citizens organizations under Indiana Administrative Orders and Procedures Act); Norris v. Indiana Board of Licensure for Professional Geologists, 9 CADDNAR 67 (Ind. Nat'l Res. Comm'n 2002) (ordering issuance of professional license improperly denied to geologist in retaliation for expert testimony on behalf of environmental groups); Indiana Gas Co. & Citizens Gas & Coke Utility, 2002 Ind. PUC LEXIS 293 (Ind. Util. Reg. Comm'n 2002) (approving innovative alternative regulatory plan for joint procurement of natural gas services by local distribution companies); PSEG Lawrenceburg, LLC, 2000 Ind. PUC LEXIS 512 (Ind. Util. Reg. Comm'n 2000) (approving innovative regulatory framework for siting of merchant power plant); Hoosier Environmental Council v. U. S. Army Corps of Engineers, 105 F. Supp. 2d 953 (S.D. Ind. 2000) (rebuffing Clean Water Act and NEPA challenge to siting of riverboat casino); Citizens Action Coalition v. PSI Energy, 612 N.E.2d 199 (Ind. Ct. App. 1993) (reversing "sliding-scale" incentive rate plan for electric utility); Citizens Action Coalition v. PSI Energy, 582 N.E.2d 330 (Ind. 1991) (disallowing recovery through rates of $100+ million of "hidden charges" for cancelled Marble Hill nuclear project); NIPSCO v. Citizens Action Coalition, 548 N.E. 123 (Ind. 1989) (mandating $56 million refund, $25 million in interest, and attorneys' fees for consumers who successfully challenged recovery through rates of costs of cancelled Bailly nuclear project); and Citizens Action Coalition v. NIPSCO, 485 N.E.2d 610 (Ind.

1985), appeal dismissed & cert. denied, 486 U.S. 1137 (1986) (reversing recovery through rates of sunk costs of cancelled Bailly nuclear project).

Executive Director, Governor's Committee on Youth Employment, Indianapolis, IN. 1980 - 1982. Responsibilities included research, policy analysis, pilot projects and published reports on youth employment in Indiana for blue-ribbon panel advising two Governors.

Project Consultant, Cummins Engine Foundation, Columbus, IN, 1978 - 1980. Projects included internal review and summary documentation of national grants program, feasibility study of a statewide network of volunteer community advocates for low-income persons, policy analysis of structural unemployment, and proposal for legislatively-funded study of local post-secondary and vocational education, which subsequently led to new facilities and programs for IV Tech Region 10 and IUPUI - Columbus.

Executive Director, Human Services, Inc., Columbus, IN, 1975 - 1978. Responsibilities included rebuilding the administrative, programmatic and financial structures of a bankrupt community action agency. Projects included original program of para-legal service delivery through volunteer community advocates (later replicated by the Legal Services Corporation as a national demonstration project) and the Poor People's Yellow Pages (later a Volunteers in Service to America (VISTA) project).

Research Associate, Indiana Center on Law and Poverty, Indianapolis, IN, 1974 - 1975. Projects included legislative information program on poverty-related issues, policy analyses of poverty-related legislation, and research for class-action lawsuits.

Personnel Manager and Personnel Director, Cummins Engine Company, Columbus, IN, 1969 - 1971. Responsibilities included corporate wage and salary, organizational planning, and personnel development programs. Projects included transfer of office workforce from hourly to salaried status, revision of shop job evaluation system, computerization of organizational directory, and initial career planning data system for management personnel.

Personnel Administrator, Ford Motor Company, Dearborn, MI, 1966 - 1969. Responsibilities included organizational planning, salary administration and recruiting for Ford Division. Projects included initial Executive Authorities Manual, initial college co-op and disadvantaged hiring programs and revision of several significant operating policies for the Division.

EDUCATIONAL BACKGROUND

L.L.M., Northwestern School of Law, Lewis & Clark College, 1999. Coursework concentrated in environmental and natural resources law, especially hazardous waste law. Thesis directed to the implications of the ongoing restructuring of the electric utility industry for the financing of the storage and disposal of high-level nuclear waste from commercial power plants.

J. D., Indiana University School of Law, 1982. Graduated magna cum laude, with honors including Dean's List and an academic standing in the top 12% of the 1982 class. Related activities included a clerkship at the Indiana Judicial Center providing legal research and analyses to Indiana trial judges on a wide variety of issues.

M. A., Public Policy and Administration, University of Michigan, 1973. Graduated with honors including Edwin F. Coneley Scholarship in Government, Ford Foundation Fellowship and a Rackham Prize. All requirements except dissertation completed for Ph. D. Related activities included service as a student government representative and a student member of a departmental committee on admissions and financial aid.

B. A., Political Science, University of Michigan, 1966. Graduated with high distinction, with honors including Phi Beta Kappa, Phi Kappa Phi and Political Science Honorary. Related activities limited to full-time work to finance education.

TEACHING EXPERIENCE

Adjunct, Lewis & Clark Law School - Portland, OR, Winter 2005 to present. Teach seminar in Nuclear Waste Law and Policy for second- and third-year and LL.M. students.

Adjunct, Indiana University School of Law - Indianapolis, Fall 1999 to present. Teach seminars in Public Utility Regulation and Deregulation and Nuclear Waste Law and Policy for second- and third-year students.

Adjunct, Indiana University School of Law - Indianapolis, Fall 1989 through Spring 1990. Taught Legal Research and Writing I and II to first-year students.

Instructor, Indiana University School of Law - Indianapolis, Fall 1984 through Spring 1987. Courses taught included a Seminar in Public Utility Regulation for second- and third-year students and Legal Research and Writing I and II for first-year students.

Teaching Assistant, University of Michigan, 1972. Team-taught a section of undergraduates in an American Government course.

PUBLICATIONS

Financing for Eternity the Storage of Spent Nuclear Fuel: A Crisis of Law and Policy Precipitated by Electric Deregulation Will Face New President, 18 Pace Envtl L. Rev. 383 (Summer, 2001). Article analyzing the implications of the ongoing restructuring of the electric utility industry for the financing of the storage of spent nuclear fuel from commercial power plants.

Utility Regulation in Indiana: Restriking the Balance. 8 SPEA Rev. 13 (Fall, 1986). Article analyzing past performance and recommending future action by the Indiana Utility Regulatory Commission in balancing the interests of utility customers and investors.

Interim Report of the Governor's Committee on Youth Employment (1982). Report presenting factual background and policy prescriptions for the youth employment problem in Indiana.

Preliminary Report of the Governor's Committee on Youth Employment (1980). Report assessing the nature and magnitude of the youth employment problem in Indiana.

REFERENCES

Furnished upon request

Geo-Hydro, Inc.
1928 East 14th Avenue
Denver CO 80206
cnorris@geo-hydro.com

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(303) 322-3171
cnorrisghi@aol.com

SUMMARY OF QUALIFICATIONS

Thirty plus years of professional experience in geology, hydrogeology and management in the applied and theoretical geosciences. Experience includes performance, oversight review, or management of site assessment; RI/FS; computer modeling of fluid flow, contaminant transport, and geochemistry (applications and code development); policy and rule making procedures; aquifer evaluation; resource development; and litigation support; nationwide and internationally.

PROFESSIONAL EXPERIENCE

GEO-HYDRO, INC., Denver, Colorado, (1996-present), Principal, President
HYDRO-SEARCH, INC., Golden, Colorado, (1992-1996), Director of Hydrogeology
UNIVERSITY OF ILLINOIS, Urbana, Illinois, (1987-1992), Research Associate; Manager, Industrial Consortium for Research and Education for the Laboratory for Supercomputing in Hydrogeology
Consulting Hydrogeologist/Geologist, Champaign, Illinois and Denver, Colorado, (1980-1992)
MGF OIL CORPORATION, Denver, Colorado, (1985 - 1986), Manager Geological Engineering
EMERALD GAS AND OIL, Denver, Colorado, (1980 - 1986), President and Owner
PETRO-LEWIS CORPORATION, Denver, Colorado (1980), Districts Geologist
TENNECO OIL COMPANY, Denver, Colorado and Houston, Texas, (1977-1980), Senior Geological Engineer
AMOCO INTERNATIONAL OIL COMPANY, Chicago, Illinois, (1975-1977), Senior Geologist
SHELL OIL COMPANY, Houston and Midland, Texas, (1972-1975), Exploration Geologist

PROFESSIONAL REGISTRATIONS, MEMBERSHIPS, AND AFFILIATIONS

Professional Geologist: Illinois (# 196-001082), Indiana (# 2100), Pennsylvania (PG003994), Utah (#5532631-2250), Wisconsin (# 924), Wyoming (#2989)
Registered Environmental Professional (#5350), State of Colorado, Petroleum Storage Tank Fund

National Ground Water Association
Colorado Groundwater Association (Vice President 1999, President 2000, Past-President 2001)
Professional Geologists of Indiana (past)
The Colorado Mining Association (past)
Illinois Groundwater Association (past)
American Association of Petroleum Geologists (past)

Phi Beta Kappa, Phi Kappa Phi, Sigma Xi

EDUCATION

B.S., Geology, University of Illinois, High Honors and Distinction in Geology, 1969
M.S., Geology, University of Washington, National Science Foundation Fellow, 1970
University of Illinois, all but dissertation completed for Ph. D., Hydrogeology, 1992

PROJECT EXPERIENCE

RI/FS & GENERAL SITE INVESTIGATIONS

- Manager for technical assistance through a Technical Assistance Program (TAP) grant from PRPs to local citizens' group. Assistance through grant to provide assessment and feedback on site work products as they are developed and implemented, explain the remediation processes and activities to the citizens, and serve as technical liaison between citizens and remediation team.

- Modeler and hydrogeologic consultant at industrial tank farm adjacent to the Chicago Sanitary and Ship Canal in northeastern Illinois. Assess hydrogeologic data, interpret aquifer testing, and model groundwater flow in soil and fractured carbonate bedrock in area of DNAPL accumulation as part of site characterization and voluntary remediation design.

- Manager and Hydrogeologist of groundwater investigation at an industrial dump site adjacent to the Illinois River in north Central Illinois. Investigated fate and transport of 3-4 decades of disposal of mixed, hazardous industrial wastes at a non-engineered floodplain dump site. Expert testimony and legal support. Pre-trial settlement provided for installation of monitoring system in lieu of site characterization.

- Manager of groundwater flow modeling performed as part of the groundwater characterization effort and as part of the preliminary remedial designs. The site is a Superfund site involving both organic and metals contaminants at a wood treating facility in an urban area in Alabama adjacent to a major commercial waterway.

- Manager of groundwater flow modeling performed as part of the groundwater characterization effort and as part of the 90% and Final remedial designs. The site is a high profile Superfund site involving both organic and metals contaminants at a wood treating facility in Northern California.

- Technical Advisor assisting in the evaluation of aquifer properties and well performances for an extraction well field near Sacramento CA. A high volume pump and treat system for chlorinated solvents showed strong and anomalous decline in productivity. Detailed evaluation identified both possible causes and recommended operations changes to alleviate the problems.

- Technical Advisor assisting in the evaluation of aquifer properties and well performances for initial installation of a high volume extraction well field in Southern California. The chlorinated solvent plume associated with a Superfund site impacted a large area in a layered, heterogeneous groundwater basin managed intensively for public water supplies.

- Senior oversight and review in the evaluation of aquifer and soil properties, and the remediation of the soils contamination and groundwater impacts associated with compressor facilities of interstate gas transmission companies. Various projects and sites in western Colorado, Wyoming, and the Texas panhandle.

- Technical Advisor for the Remedial Investigation/Feasibility Study (RI/FS) of the Landfill Solids and Gases Operable Units at the Lowry Landfill CERCLA site located near Denver, Colorado. This project involves the characterization of the extent of potential contamination within the unsaturated zone adjacent to this high profile site. Work involves extensive coordination and interaction with multiple PRP groups as well as various regulatory agencies.

- Project Manager for independent oversight of a proposed low-level radioactive waste disposal site. Task was to develop technical and legal program for governmentally funded intervener's case as part of adjudicatory hearings on a high-profile, proposed disposal facility and involved identifying, retaining and educating legal staff, retaining a team of technical experts, negotiating fees, coordinating work product and presentations, providing liaison with citizen's groups, responding to press and integrating personal testimony on

hydrogeology and modeling. Expert testimony and legal support.

- Technical Reviewer of site assessment and re-assessment of a proposed inter-governmental regional landfill in central Illinois. Verified unanticipated, politically unacceptable risks to major aquifer system serving public water supplies. Assisted in drafting of technical policy statement that permitted new siting efforts to proceed in the jurisdiction. Expert testimony.

LANDFILL SERVICES

- Project Manager and Hydrogeologist for a geologic and hydrogeologic assessment for siting of a proposed regional landfill by expansion of local landfill in Kankakee County, Illinois. Expert testimony and legal support. Review identified errors in application, unaddressed existing off-site leakage, and inappropriate modeling design and implementation. Application was denied, revised and resubmitted, and again denied.

- Project Manager and Hydrogeologist for a geologic and hydrogeologic assessment for siting of a proposed regional landfill by expansion of local landfill in Ogle County, Illinois. Expert testimony and legal support. Review identified in errors application, unaddressed existing leakage, and potential risk to public water supply. Application was denied, revised and resubmitted and again denied.

- Project Manager and Hydrogeologist for a geologic and hydrogeologic assessment of a proposed regional landfill in Will County, Illinois. Expert testimony and legal support. Research documented numerous errors in application which resulted in underestimation of infiltration rates and potential migration rates. Established evidence of sub-karstic migration pathway from site to nearby stream. Application was approved with some 56 modifications.

- Project Manager and Hydrogeologist for a geologic and hydrogeologic assessment of a proposed regional landfill expansion at East Peoria, Illinois. Research documented current leakage from the existing landfill into the regional unconfined aquifer within the cone of depression of the municipal water supply wells. In part as a result of the evaluation, the proposed expansion has been abandoned. Expert testimony and legal support.

- Project Manager and Hydrogeologist for a geologic and hydrogeologic assessment of a proposed regional landfill at Ottawa, Illinois. Provided testimony at county hearings identifying and documenting site-specific conditions that invalidated part of the ground water evaluation testing, necessitating the need to re-evaluate the groundwater flow system and redesign the monitoring system. Expert testimony and legal support.

- Project Manager and Hydrogeologist for a geologic and hydrogeologic assessment of existing municipal landfills and a proposed landfill redesign and expansion at Salem, Illinois. Provided testimony at city hearings documenting existing landfill leakage and identifying site-specific conditions that complicate the design of a reliable monitoring system. Expert testimony and legal support.

- Project Manager and Hydrogeologist for site evaluations of the geology and hydrogeology of several proposed municipal landfills and a landfill expansion in Bartholomew County, Indiana. The review of the expansion demonstrated inadequate monitoring of the existing facility. One proposed site showed possible, current ground water usage from under the proposed facility and conditions that may preclude state-level site approval.

- Project Manager and Hydrogeologist serving in consultation to the Board of Wayne County, Illinois, regarding a proposed expansion to a regional landfill. Investigation and oversight established viability of the physical site and improvements that were needed in operating procedures and monitoring efforts. Expert testimony and legal support.

- Project Manager and Hydrogeologist for an assessment of an existing regional municipal landfill at Urbana,

Illinois. Principle problems included ground water contamination, unplugged well(s) within the facility boundary that penetrated the aquifer serving public water supplies and a monitoring system inadequate to evaluate the contaminant migration. Results of the evaluation include an expanded system of monitoring wells, improved protocols for ground water sampling and revised statistical procedures to determine background water chemistries.

- Project Manager and Hydrogeologist for a site assessment of a proposed municipal landfill expansion in west central Indiana. Established feasibility of using the engineering and design features of the expansion to prevent contamination from the pre-existing non-engineered facility.

- Project Hydrogeologist for a site assessment of a proposed saturated-zone, regional balefill in central Illinois. Principal problems involved the evaluation of the hydrogeologic characteristics of the strip mine spoils within which excavation would occur, the blasted mine bottom upon which the liners would be built and the materials available for liner construction. Numerous improvements to the initial design were incorporated in the approved and permitted facility. Expert testimony and legal support.

- Project Manager and Hydrogeologist for a site assessment of a proposed municipal landfill expansion in Livingston County, Illinois. Principal problems involved the evaluation of the impact of shallow coal tunnel mining beneath the site and reaction of waste leachate with unusual clay mineralogy important to waste isolation at the site. Expert testimony.

WATER RESOURCE EVALUATION & DEVELOPMENT

- Manager for review of an application for an expansion of a large long-wall mine in southeastern Ohio. The review identified extensive unrecognized mining-related impacts to water supplies from historic mining and identified hydrologic risks to a unique old-growth forest adjacent to the proposed expansion, and resulted in an appeal of the application. Expert testimony and legal support.

- Manager for ground water modeling effort associated with the development of a surface reservoir designed for conjunctive use of ground and surface water to reduce peak ground water pumping demands in Denver metro area. The effort included investigating and evaluating a previously used, model, adapting and updating the model, and applying the model to assess the impacts of project on other water rights. Study is a component of the EIS.

- Manager for ground water modeling effort associated with the development of a high-volume ground-water supply and delivery project in Colorado. The effort included investigating and evaluating a previously used, court-accepted model, adapting and updating the model, and applying the model to assess the impacts of a proposed private ground-water diversion project that would be the largest in the United States. Ongoing effort includes regulatory interfacing and litigation support.

- Project Manager for multi-company effort to model thermal loading of northern Nevada surface waters as a result of mine dewatering project. Successful liaison among technical staffs and regulators and modeling work for a high profile EIS resulted in approval of discharge permit.

- Project Hydrogeologist for the feasibility study of a small lake for a northern Illinois nursery, to be used for recreation, fishing and irrigation. Evaluated shallow and intermediate ground water and surface run-off, reviewed engineering design and directed ground and surface water sampling program to determine nutrient levels.

HYDROCHEMISTRY

- Appointed member of a Quality Assurance Committee under the West Virginia Department of Environmental Protection. The committee, comprised of representative of state and federal regulators, industry , and interveners, was charged with a year-long review of state mining applications and approval practices relative to mining under the state and federal surface mining laws.

- Principal Investigator for grant to research the geochemical implications of using alkaline addition as one means for preventing and/or remediating inorganic contamination resulting from acid mine/rock drainage. Empirical and modeling evidence showed conditions under which alkaline addition can cause or exacerbate contamination of some constituents of concern.

- Project Manager, hydrogeologist, geochemist for ongoing investigation of metals contamination of a trout stream in West Virginia. Impacts from natural and industrial sources , present and past, evaluated to segregate relative significance of various sources. Includes expert testimony and legal support.

- Project Geochemist and Hydrogeologist for evaluation and critique of modeling protocols used by USEPA for risk assessments performed as part of regulatory determinations for various solid wastes. Identified errors in methodology and input that had caused previous modeling to mischaracterize risks for settings with observed damage cases. Computer modeling.

- Geochemist and Hydrogeologist for evaluations of inorganic groundwater chemistry at an industrial RCRA site near Joplin MO. Federal lawsuit filed pursuant to PRP contribution and sources and timing of contamination. Was able to use geochemical interpretations to establish significant elements of aquifer characteristics and implications for contamination routes. Expert testimony.

- Project Hydrogeologist and Geochemist for evaluations of proposed coal combustion waste disposal as part of reclamation activities at surface coal mines in Southwestern Indiana. Ongoing efforts are targeted toward refining regulatory framework for disposal efforts, establishing effective characterization and monitoring programs and determining appropriate operation and engineering practices. Project involves extensive interdisciplinary effort and expert testimony.

- Project Geochemist for the investigation of the impacts of remediating acid mine drainage by installing bulkheads to flood exhausted mine working. Predictively modeled water chemistries in situ, within flooded mine, along flow paths and upon surface discharge. Assisted in preparation of testimony that resulted in permit approval for the San Juan County, Colorado project.

- Project Manager and Project Geochemist/Hydrogeologist for investigation of potential environmental impacts of disposal of coal combustion wastes (CCW) as part of a reclamation plan at a surface coal mine in northern New Mexico. Performed or directed geochemical, infiltration and flow modeling of the proposed project to identify optimum disposal methods and worst case impacts. Presentation to State resulted in approval of this precedent-setting project.

- Project Manager, Geochemist and Hydrogeologist for an investigation of a proposed disposal/construction project to build a central Illinois ski mountain from fly ash produced by a co-generating plant operated by a major food products manufacturer. The investigation involved overseeing an engineering review of project plans, a site investigation and evaluation, geochemical modeling of initial and final mineralogical composition of the mass and of the leachate chemistry and evolution and the impact on the hydrogeologic and structural integrity of the project. Expert testimony and legal support.

RELATED PETROLEUM INDUSTRY EXPERIENCE

- Project Manager for the environmental assessment of 82 Texas producing properties targeted for acquisition. Evaluations included site walk-overs, surface soil and liquid sampling, radiological monitoring and geoprobe sampling of soils and ground water. The assessments documented a multitude of impacts from both exempt and non-exempt wastes that, unrecognized, could have resulted in substantial financial exposure to the client.

- Project Geologist and Petrophysicist for an investigation of resource potential of coal bed methane in San Juan Basin of New Mexico and Colorado. Study focused on innovative log analysis techniques; formation water chemistries, production rates and disposal problems; well drilling, completion and re-completion practices; and detailed subsurface facies and structural mapping and stratigraphic correlation in shallow coal beds of Kirtland/Fruitland/Pictured Cliffs shoreline complex and relationships to overlying Tertiary sandstones.

- Developed a successful play in the Hunton and Mississippi Lime formations of northwest Oklahoma. The play recognized the secondary porosity systems of both formations (dolomitization and fracturing, respectively) and the genetic significance to each of the buried topography at the intervening unconformity.

- Managed a detailed reservoir study of a Cotton Valley gas field in east Texas that resulted in RRC approval of non-standard spacing based upon the recognition of secondary porosity and a dual-conductivity system that resulted from drape-induced fractures. The revised spacing both protected resource ownership and conserved the costs of infill drilling. Expert testimony and legal support.

- Project Geologist, Petrophysicist and Expert for various contested adjudicatory hearings apportioning oil and gas ownership. Cases involved primary recovery of both oil and gas and secondary recovery of oil. Accepted as expert (geology, hydrogeology, and/or geological engineering) in Oklahoma, Texas, and Wyoming.

ADDITIONAL PROJECT EXPERIENCE

- Project Manager and Hydrogeologist for the review of Proposed and Revised Proposed Criteria for the Siting of a Low Level Radioactive Waste Disposal Facility in Illinois. Evaluation was targeted toward both technical content and processes of selection. Testimony and written comments led to significant improvements and flexibility in the Criteria as finally published.

- Project Hydrogeologist testifying at hearings before the Illinois Pollution Control Board on regulatory language for the Illinois Ground Water Protection Act. Contributed major conceptual and specific language changes to the final promulgated rules for Ground Water Quality Standards and Regulations for Existing and New Activities with Setback Zones and Regulated Recharge Areas. Expert testimony and legal support.

- Project Hydrogeologist and Log Analyst for three applications to U.S. EPA for permits to continue deep well disposal of hazardous wastes in east central Illinois and southern Ohio. Project required evaluation of geophysical logging data to determine injection zone and confining layer properties, regional flow systems, chemical interactions of the waste stream with the native rock and the ability of the injection system to isolate the waste from the environment.

REPORTS, PRESENTATIONS, AND PUBLICATIONS

Norris, Charles H., 2005, "Water Quality Impacts from Remediation Acid Mine Drainage with Alkaline Addition", draft version released to National Research Council of the National Academy of Sciences, Committee on Mine Placement of Coal Combustion Wastes, Geo-Hydro, Inc., Denver CO, July 3, 2005

Norris, C. H., "notes from the front. . . Overview of three sites", invited paper before National Research Council of the National Academy of Sciences, Committee on Mine Placement of Coal Combustion Wastes, Evansville IN, March, 2005.

Norris, Charles H., 2004, "Environmental Concerns and Impacts of Power Plant Waste Placement in Mines", Presented at Harrisburg PA, May 4-6, 2004. Published in Proceedings of State Regulation of Coal Combustion By-Product Placement at Mine Sites: A Technical Interactive Forum, Kimery C Vories and Anna Harrington, eds, by U. S. Department of Interior, Office of Surface Mining, Alton IL, and Coal Research Center, Southern Illinois University, Carbondale IL.

Norris, C. H., "Developing Reasonable Rules for Coal Combustion Waste Placement in Mines. Why? When? Where? How?", USEPA Contract 68-W-02-007, IEI Subcontract 7060-304, Invited paper at USEPA MRAM meeting, Rosslyn VA, September, 2003.

Norris, C. H., "So, You think You're a Geologist? (F. Kafka to A. Liddell, In Wonderland)", Colorado Ground Waster Association Monthly Meeting,, Denver CO, September, 2002.

Norris, C. H., "Assessment of the Anker Energy Corporation proposal for mining and reclamation, Upshur County, West Virginia." Independent evaluation on behalf of Anker Energy Corporation and West Virginia Highlands Conservancy , July, 2002.

Norris, C. H., "Coal Combustion Waste: Coming soon to a neighborhood (and maybe a faucet) near you." Colorado Ground Waster Association Monthly Meeting,, Denver CO, May, 2001.

Norris, C. H., "Slurry-to-ashes, and ashes-to . . . A case of a coal company and citizens working together to evaluate alternatives." Invited paper before National Research Council of the National Academy of Sciences, Subcommittee on Alternatives, Study on Coal Waste Impoundments, St. Louis MO, June, 2001.

Norris, C.H., and C. E. Hubbard, "Use of MINTEQA2 and EPACMTP to Estimate Groundwater Pathway Risks from the Land Disposal of Metal-Bearing Wastes", for Environmental Technology Council, submitted as public comment to USEPA on regulatory determination for Fossil Fuel Combustion Wastes, May, 1999.

Norris, C.H., "Report on the Determination of Intermittent Streams and the Potential Impacts of Valley Fill on Area Drainages, Southern West Virginia", expert report for litigation prepared for Mountain State Justice, Inc, Charleston WV, March, 1999.

Norris, C.H., "Report on the Geology and Hydrogeology of the Caterpillar Levee Site with an Evaluation of Potential Pathways on- and off-site for the Movement of Solid and Hazardous Wastes", expert report for litigation prepared for Citizens for a Better Environment, Chicago IL, March, 1998.

Norris, C.H., "Dr Pepper, Biorhythms, and the Eight-Hour Pumping Test ", Colorado Ground Waster Association Annual Meeting, Golden CO, December, 1997.

Norris, C.H., "Characterizing Ash Composition and (vs.) Projecting Environmental Impact for Purposes of Permitting CCW Disposal ", Coal Combustion By-Products Associated with Coal Mining - Interactive Forum, Southern Illinois University at Carbondale, Carbondale IL, October, 1996.

Norris, C.H., "Geochemical Modeling". Co-instructor for Short Course on Hydrogeologic Issues Related to Mine Permitting, Reclamation and Closure, SME Annual Convention, Phoenix AZ; March, 1996.

Norris, C.H., in prep., An Improved Method for Middle Time Analysis of Slug and Bail Test. 1994.

Norris, C.H., "Evolution of the Landfill", presentation as part of a Telnet program, *Garbage Dilemma Educational Series*, sponsored by Illinois Farm Bureau and Cooperative Extension Service of the College of Agriculture, University of Illinois, Urbana, Illinois, April 20, 1992.

Norris, C.H., "Technical Analysis or Political Acceptability: The Domesticated Fowl or its Ovum", Solid Waste Management and Local Government Workshop, sponsored by Institute of Government and Public Affairs, University of Illinois, Urbana, Illinois, Jan-Apr, 1992.

Norris, C.H., Report on the Geology and Hydrogeology [of the] SWDA Proposed Landfill Site, Township 8 North, Range 6 East, Section 31, Bartholomew County, Indiana, for Central States Education Center, Champaign, Illinois, 1991.

Norris, C.H., Hydrogeology and Modeling of the Proposed Illinois Low Level Radioactive Waste Disposal Site at Martinsville, Illinois; testimony before the LLRW Siting Commission, October and November, 1991, Martinsville, Illinois.

Norris, C.H., Ground Water Quality Standards for the Illinois Ground Water Protection Act; testimony before Illinois Pollution Control Board, Chicago, Illinois; February, May, October and December, 1990; May, 1991.

Norris, C.H., Hearing on a Petition for a Special Use Permit for the Construction of a Ski Mountain in Oakley Township, Macon County, Illinois; testimony before the Macon County Zoning Board of Appeals; February 16, 1990.

Norris, C.H., Hearing on a Solid Waste Disposal Permit for the Siting of a Municipal Landfill for Streator, Illinois; testimony before the Livingston County Board; August 6, 1990.

Norris, C.H., In the matter of the Gallatin National Company Proposed Balefill, Fulton County, Illinois, written comments to the Illinois Environmental Protection Agency, Springfield, Illinois, 1990.

Norris, C.H., 1990, Log Analysis of the Allied Chemical Corporation Waste Injection Well, Danville, Illinois, for Alberto Nieto, Champaign, Illinois.

Norris, C.H., 1989, Log Analysis of the Cabot Corporation Waste Disposal Wells, Tuscola, Illinois, for Alberto Nieto, Champaign, Illinois.

Norris, C.H., Regulations for Existing and New Activities Within Setback Zones and Regulated Recharge Areas for the Illinois Ground Water Protection Act; testimony before Illinois Pollution Control Board, Chicago, Illinois, June, 1989.

Norris, C.H., and C.M. Bethke, (Abstract) "Mathematical Models of Subsurface Processes in Sedimentary Basins", Conference on Mathematical and Computational Issues in Geophysical Fluid and Solid Mechanics, Society for Industrial and Applied Mathematics Annual Meeting, Houston, Texas, September 28 (invited paper), 1989.

Norris, C.H., "An Evaluation of the Geology and the Monitoring Well Data [at the] City of Urbana Regional Landfill", report submitted to the City of Urbana, Champaign County, Illinois, for Central States Education Center, Champaign, Illinois, 1989.

Norris, C.H., Gallatin National Proposed Balefill/Landfill [at] Fairview, Illinois; testimony before Fairview Town Council, Fairview, Illinois, November, 1988.

Norris, C.H., "Evaluation of the Hydrogeologic Factors Influencing Risk [at the] ISWDA Regional Landfill Site B", report submitted to the Inter-Governmental Solid Waste Disposal Association, Champaign County, Illinois, 1988.

Norris, C.H., and C.M. Bethke, "Status and Future Directions of Quantitative Flow Modeling in Sedimentary Basins", Workshop on Quantitative Dynamic Stratigraphy (QDS), Colorado School of Mines, Lost Valley Ranch, Colorado, February 14-18, 1988.

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Professional Qualifications

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Jim Pastorick is an Unexploded Ordnance (UXO) Technician with over eighteen years of active Explosive Ordnance Disposal (EOD) and UXO experience. He has served in various missions as an officer in U.S. armed forces EOD including Officer-in-Charge of an EOD unit deployed in the Mediterranean Sea and tasked with providing emergency EOD response to the Sixth Fleet. Since leaving the military he has continued his EOD activities as Senior UXO Project Manager for UXB International, Inc. and IT Corporation and as President of the specialty UXO consulting companies Geophex UXO, Ltd. and UXO Pro, Inc.

Mr. Pastorick is currently serving on the National Research Council Committee on Disposal of Non-Stockpile Chemical Warfare Material (CWM). This important committee is investigating ways to safely handle and dispose of UXO containing CWM in an efficient manner to allow cost-effective cleanup of non-stockpile CWM burial sites. He is also a member of the ITRC UXO Work Team where he develops and presents UXO training courses and assists in the development of technical guidance documents related to UXO technical issues of interest to state regulators.

Education

B.A., Journalism, The University of South Carolina, Columbia, South Carolina; 1980
Additional Training:
EOD Technician, U.S. Naval School of EOD, Indian Head, Maryland; 1986
U.S. Navy Diver and Salvage Officer, Naval Diving and Salvage Training Center, Panama City, Florida; 1982
40-Hour OSHA Hazardous Waste Operator Training (with annual refreshers)
8-Hour OSHA Hazardous Waste Supervisor Health and Safety Training
Department of Energy Radiation Worker II
CPR

Registrations/Certifications

Certified Surface Blaster, State of Virginia; 1990
EOD Technician, U.S. Navy, 1986
Deep Sea Diver, U.S. Navy, 1982
Certified Quality Manager (CQM) #8236, 2004, American Society for Quality

Experience and Background

1999 - Present
President, Geophex UXO, Ltd and UXO Pro, Inc.., Alexandria, Virginia
Mr. Pastorick is President of this UXO consulting company that assists private sector clients and state governments in the planning, management, and quality assurance (QA) of UXO investigation and cleanup projects. Specifically, Mr. Pastorick reviews and develops written comments on MEC-related technical documents, attends technical and public meetings to provide technical support to state regulator Project Managers, and performs site visits to ensure that work is being performed in accordance with the approved work plan.

Mr. Pastorick is currently serving as the UXO technical consultant to the State of Alaska Department of Environmental Conservation (ADEC) on the cleanup of the former **U.S. Naval Base on Adak Island**, the former **Fort Glenn on Umnak Island** and the former World War II facility on **Amchitka Island**. Previous projects for ADEC have included the former **Gerstle River Expansion Area**, near Delta Junction, and former Department of Defense facilities on **St. Lawrence Island, Kodiak Island**, and at **Dutch Harbor**. The **Adak UXO cleanup** has recently reached a milestone with the transfer of property from the U.S. Navy to a Native American corporation. This land transfer required the completion and signing of the first Record of Decision (ROD) for a Superfund UXO site.

He is also managing contracts in support of the Environmental Quality Board (EQB) of Puerto Rico on the cleanup of **Vieques Island** and in support of the Arizona Department of Environmental Quality (ADEQ) in support of the investigation and cleanup of **Camp Navajo**. In Puerto Rico Mr. Pastorick is providing technical support to EQB on the cleanup of the former **Vieques Naval Bombing Range and former Naval Ammunition Support Detachment**. These two project sites are currently undergoing remediation by the U.S. Navy and their contractors. Mr. Pastorick provides technical consulting services directed toward achieving an adequate cleanup of the island to permit the planned end use of the property by Puerto Rico and the Municipality of Vieques. In Arizona he is managing a Geophex UXO employee in assisting ADEQ in the oversight of the National Guard and U.S. Army Corps of Engineers (USACOE) cleanup of UXO contaminated areas of **Camp Navajo**.

Mr. Pastorick has recently completed providing UXO technical support to Laing/Village LLC on the cleanup of a portion of the **former Lowry Bombing and Gunnery Range** in Aurora, Colorado. On this project he supervised another Geophex UXO employee in working with the client, the contractor and Colorado State regulators in devising and implementing a UXO removal project which would allow the property to be used for residential development. This work resulted in the successful issuance of a letter from the Colorado State regulators certifying that the work done is adequate for reuse of the property for residential development.

He has also provided extensive UXO technical support to a legal team working for **Panama** to assess the cleanup of UXO in the former **Canal Zone and on San Jose Island**. In Panama Mr. Pastorick provided technical support to lawyers retained by Panama to help them evaluate the condition of property formerly used by the DoD. This evaluation consisted of conventional UXO contamination in the Canal Zone Ranges and chemical weapons contamination on San Jose Island. He investigated and documented the ordnance contamination at both locations and presented the findings to high-ranking delegations from the U.S., Panama, and the United Nations.
UXO Pro has recently begun providing UXO technical support to the Alabama Department of Environmental Management (ADEM) and the Texas Commission on Environmental Quality (TCEQ). Since beginning the ADEM support work in March 2005 Mr. Pastorick has been providing technical consulting to ADEM Project Managers on the base closure and site reuse project at **Fort McClellan,** the active facility MEC cleanup at **Redstone Arsenal,** and on the non-stockpile chemical ordnance live-fire area at the **Camp Sibert Formerly Used Defense Site.** For the Texas state regulators he has provided similar technical consulting services for the **Pantex, Camp Bowie, Camp Swift and Camp Maxey Formerly Used Defense Sites.**

1991 - 1998
Senior UXO Project Manager, IT Corporation, Pittsburgh, Pennsylvania
Responsible for management and supervision of projects concerning investigation and remediation of sites contaminated with explosives and UXO for federal government and industrial clients. Specific experience includes the following:

UXO Technical manager for the base closure environmental restoration of **Fort Ord, California** performed under the USACOE Sacramento District Total Environmental Restoration Contract (TERC). UXO was encountered routinely during the environmental restoration work at Fort Ord and Mr. Pastorick was responsible for ensuring the safe detection, removal and disposal of UXO interfering with the restoration work. UXO was encountered and handled safely during site investigations, fence and pipeline installations,

and landfill excavations. Mr. Pastorick worked closely with USACOE and California Department of Toxic Substances Control (DTSC) as he developed the Fort Ord UXO Program Management Plan and individual Site Specific UXO Plans.

UXO Technical Manager for the environmental restoration field activities performed under the USACOE Southeast Division TERC at **Redstone Arsenal** and **Fort McClellan, Alabama**. This work required the development of an overall UXO Program Plan and Site Specific Plans, including procedures for handling UXO containing CWM, and periodic monitoring of site workers to ensure compliance with the plans. UXO was routinely encountered on these sites during intrusive operations including well drilling, cutting access roads through wooded areas, and while excavating.

UXO Technical Manager during environmental restoration activities on **Wake Island**. This work, performed for the U.S. Navy NAVFAC Pacific Division, required the development of UXO safety plans for the live U.S. and Japanese ordnance expected to be encountered on this World War II battle site. U.S. 5-in. projectiles, U.S. bombs and U.S. anti-aircraft rounds were discovered and marked for later disposal. Mr. Pastorick also developed and supervised a diving plan for the underwater inspection of the **Peacock Point debris pile**. This required planning and implementing the work for a five-person SCUBA team to perform an underwater inspection of the trash pile and to document the inspection with still and video cameras. The documentation of the inspection is being used to determine whether or not the debris pile should be removed as part of the environmental restoration of Wake Island.

UXO Technical Manager for the remediation of various U.S. Army World War II encampments in the vicinity of **Nome, Alaska** for USACOE. This project required developing an overall UXO Safety Plan to allow work to safely be conducted at these remote sites. UXO Specialists were provided, under Mr. Pastorick's supervision, to inspect each site prior to work being performed to determine if UXO was a potential hazard. The UXO Specialists then provided UXO safety support to those sites determined to potentially contain UXO to ensure the safety of the field workers.

Project Manager for the thermal decontamination of an explosively contaminated building and its associated external wastewater sump for USACOE at the **U.S. Army Depot Activity, Umatilla, Oregon**. This former TNT process building had been dismantled and gross decontaminated by water washing. Mr. Pastorick directed a team of UXO Specialists in the restacking and open burning of the building and components in accordance with the Scope of Work requirements. The same team built a remote excavation apparatus, designed by Mr. Pastorick, and used it to remotely excavate the TNT contaminated sludge from the wastewater sump. Approximately 500-lb. of removed explosive sludge was transported to the facility burn area and burned. The contaminated sump was then loaded with charcoal and an air injection system, designed by Mr. Pastorick, and in accordance with the Scope of Work requirements, and was burned to decontaminate it for removal and disposal

Project Manager and onsite supervisor of the geophysical site survey and the removal and disposal of landmines at the USACOE **Fort Belvoir Engineer Proving Ground, Virginia.**

Project Manager for the base closure UXO survey of **Fort George G. Meade, Maryland**. Duties included the development of all project plans and coordinating the survey, location, removal, and disposal of UXO from 1,400 acres of this former tank training area in support of the DOD Base Closure and Realignment Program. Mr. Pastorick supervised all phases of this large UXO remediation project including site mapping using Global Positioning System (GPS) interfaced with Autocad and a computerized database.

Project Manager for the UXO survey of a 50-acre area of the former **Fort Sheridan, Illinois** in support of the USACOE under the DoD Base Realignment and Closure Program.

Project Manager for the explosives investigation at the former **Chemical Insecticide Corporation in Edison, New Jersey**. This USACOE project required development of field sampling and analysis methods to identify buried deposits of black powder, which had previously caused two accidental detonations during drilling by another contractor. The sampling and analysis methods developed by Mr.

Pastorick were successfully implemented and the construction of a landfill cap and venting system were successfully completed.

UXO Technical Manager for the UXO removal and disposal of a surface-dumping site at the **U.S. Naval Weapons Station, Yorktown, Virginia.** This site was used for the disposal of mixed scrap and UXO and over 4,300 UXO, including 743 large naval mines, were recovered and disposed of.

UXO Technical Manager for the UXO removal and disposal of six surface disposal pits at the **U.S. Department of Energy's (DOE) Tonopah Test Range in Nevada.** UXO and debris were removed and disposed of from the six pits. UXO including more than 20,700 antipersonnel bomblets, 2,000-lb., 1,000-lb., and 500-lb. bombs, large artillery projectiles, and missile components were disposed of by detonation or explosive cutting. Demilitarized UXO and large amounts of decontaminated scrap were sold by the DOE to a local scrap dealer for recycling.

1989 - 1991
Senior UXO Project Manager, UXB International, Inc., Chantilly, VA
Responsible for management and supervision of UXO and explosive-related projects for prime contractors working under U.S. Department of Defense (DOD) contracts. Specific project experience includes the following:

Managing USACOE explosive waste and UXO remediation projects at the **former Naval Ammunition Depot, Hastings, Nebraska** and the former **Temecula Practice Bombing Range, Orange County, California.** Specific duties performed include conducting site visits, project cost estimating and accounting, work plan and safety plan development, monitoring field activities to ensure compliance with requirements, and development of project final reports.

Managing investigations to determine the amount and type of UXO contamination remaining at the USACOE projects at the **former Kingsbury Ordnance Plant, LaPorte, Indiana;** the former **Pantex Ammunition Plant, Amarillo, Texas;** and the former **Sioux Ammunition Depot, Sidney, Nebraska.**

Managing UXO site clearance and safety escort services during soil sampling and well drilling operations at USACOE UXO projects at **Umatilla Army Depot Activity, Oregon; Fort Sheridan, Illinois; Savanna Army Depot Activity, Illinois; Milan Army Ammunition Plant, Tennessee; Cornhusker Army Ammunition Plant, Nebraska; Fort Jackson, South Carolina;** and **Sierra Army Depot, California.**

Managing and supervising field operations on USACOE projects involving hazardous and toxic materials and requiring Level "B" personal protective equipment including the decanting and removal of explosive Lead Azide Sludge from 55 gallon storage drums at the **Savanna Army Depot Activity, Illinois** and testing for toxic military chemical agents at **Umatilla Army Depot Activity, Oregon; Aberdeen Proving Ground, Maryland,** and **Fort Sheridan, Illinois.**

Conducting an underwater live firing range clearance at **Tuno Knob, Denmark.** Mr. Pastorick provided planning, management, and supervision of eight UXO Specialist/Divers performing the location, identification, and disposal of UXO at this former target area. The removal and disposal of over 500 UXO and the removal and salvaging of two former Danish Navy warships that were used as targets was accomplished.

1981 - 1989
Naval Officer and EOD Technician/Diver, U.S. Navy, Various Commands
Responsibilities and achievements include managing, directing and supervising personnel assigned to a variety of units from five-person EOD teams to fifty-person shipboard divisions, and maintaining all equipment assigned including specialized EOD tools and diving life-support systems. Completed two Western Pacific deployments and one Mediterranean deployment as Diving Officer and EOD Team Officer-In-Charge. Conducted frequent EOD training and operational deployments, and advanced to final

rank of Lieutenant Commander.
1978 - 1981
Photojournalist, The Columbia Record, Columbia, South Carolina
Responsibilities and achievements include reporting on news, sports, and feature stories for a daily newspaper using photographs supplemented by written articles. 1980 South Carolina Photojournalist of the Year. Developed exceptional writing skills under deadline pressure.

1972 - 1976
Enlisted Service, U.S. Navy Seabees, Various Commands.

Publications

Carberry, John B. et. al., 2004, *Assessment of the Army Plan for the Pine Bluff Non-Stockpile Facility,* National Research Council Board on Army Science and Technology, National Academy Press, Washington, DC.

Carberry, John B. et. al., 2002, *Systems and Technologies for the Treatment of Non-Stockpile Chemical Warfare Materiel,* National Research Council Board on Army Science and Technology, National Academy Press, Washington, DC.

Carberry, John B. et. al., 2001, *Disposal of Neutralent Wastes,* National Research Council Board on Army Science and Technology, National Academy Press, Washington, DC.

Carberry, John B. et. al., 1991, *Disposal of Chemical Agent Identification Sets,* National Research Council Board on Army Science and Technology, National Academy Press, Washington, DC.

Pastorick, J. P., 1994, "Ordnance, Explosive Waste, and Unexploded Ordnance," *Protecting Personnel at Hazardous Waste Sites,* W. F. Martin and S. P. Levine, ed., 2nd ed., Butterworth-Heinemann, Stoneham, Massachusetts, pp. 404-421.

Pastorick, J. P., 1993, "Detection, Retrieval, and Disposal of Unexploded Ordnance at U.S. Military Sites," *Handbook: Approaches for the Remediation of Federal Facility Sites Contaminated with Explosive or Radioactive Wastes,* U.S. Environmental Protection Agency (EPA), Office of Research and Development, Washington, DC (EPA/625-R-93-013).

Pastorick, J. P., 1993, "Critical Considerations for Project Sites Containing Unexploded Ordnance," *Remediation Journal,* vol. 3, No. 2, pp. 221-232 and *Federal Facilities Environmental Journal,* Vol. 4, No. 1, pp. 81-92.

Pastorick, J. P., J. Bern, and F. Adeshina, 1992, "Ranking Combined UXO/CSM /HTW Sites Requiring Restoration: An Initial Protocol," presented at the *Annual Explosive Safety Seminar of the Department of Defense Explosive Safety Board,* Anaheim, California.

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Jerome E. Polk, Lead Counsel

May 31, 2006

Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
ATTN: Rulemakings and Adjudications Staff

Re: Motion for Leave to Withdraw, Amend and Supplement Contentions and Final Contentions of Save the Valley, Inc.

In the Matter of the U.S. Army (Jefferson Proving Ground Site), Docket No. 40-8838-MLA, ASLBP 00-776-04-MLA

Dear Secretary:

Enclosed please find for filing in the above-referenced docket the original and two conformed copies of the Motion for Leave to Withdraw, Amend and Supplement Contentions and Final Contentions of Save the Valley, Inc.and the related Certificate of Service.

Thank you for your assistance in this matter.

Respectfully submitted,

Michael A. Mullett
Attorney for Save the Valley, Inc.

cc: Service List – Docket No. 40-8838, ASLBP 00-776-04