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A PROPOSAL TO CHANGE THE IODINE-129 CONCENTRATION
EVALUATION CRITERION GIVEN IN THE HYDROLOGY OPTION PAPER

BY

Preliminary

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Summary

This paper proposes that the Iodine-129 (I-129) concentration of 10^{-8} picocurie per liter (pCi/L) given in the option D hydrology strategy report (GWG, 1987) is three orders of magnitude too stringent because:

- o Standard drilling and groundwater sampling procedures are not adequate to assure collection of such sufficiently pure water samples,
- o Natural flow system interconnection and or man-made mechanisms by which I-129 was introduced into the confined aquifers from Hanford waste water disposal operations are not understood,
- o Naturally occurring I-129 background levels in a basalt-groundwater environment are uncertain, and
- o Above background levels of I-129 are already present in portions of the confined aquifers in the vicinity of the new boreholes identified in GWG (1987) and in the pump test area at the RRL-2B site. This iodine was introduced from past drilling operations when hundreds of thousands of gallons of mud and Columbia River water were lost into basalt flow tops. The I-129 concentration in river water is 10^{-5} pCi/L.

It is likely that I-129 concentrations above the 10^{-8} pCi/L evaluation criterion listed in GWG (1987) for groundwater samples from the first large scale pump tests already exist in the RRL-2B area. Even if this contamination did not exist, there is still no method to detect I-129 at the 10^{-8} pCi/L level against the probable levels of surface-source contamination introduced through drilling fluids. If an I-129 evaluation criterion is to remain in the option D report, then a new value of equal to or less than 10^{-5} pCi/L is proposed for water discharged during the first pump tests. This value would be identified as the "likely background concentration" for I-129. The previous value of 10^{-8} pCi/L would remain in the option report but be qualified as "best analytical sensitivity" for I-129 detection.

The option D report states that if any evaluation criterion is found to be exceeded, then additional testing and analyses would be needed to determine if said condition was "pervasive" across the site. In other words, any I-129 findings must be examined in the context of all hydrochemical, hydraulic, and geologic data useful in defining flow system dynamics. Nevertheless, any evaluation criterion used in the option paper must be a meaningful number. Presently, one can not distinguish, using I-129 values alone, between iodine introduced into the basalts from natural flow system leakage and that artificially introduced by borehole drilling or past waste disposal operations. Nor is there a supportable basis for establishing a true background concentration for I-129 in a basalt-groundwater environment.

1.0 Introduction

The objective of this paper is to propose a change in the Iodine-129 (I-129) concentration given as an evaluation criterion in the option D hydrology strategy report (GWG, 1987). That report outlines the geohydrologic testing program to be undertaken before construction of the first exploratory shaft. The evaluation criteria contained in GWG (1987) apply to the test results of and groundwater samples collected during the first large scale pump tests. The collection of drill and test information (i.e. hydraulic testing and or groundwater sampling during borehole drilling) is not planned for boreholes DC-24, -25, -32, and -33.

The rationale for including I-129 as an evaluation criterion in the option D paper is discussed in section 2.0. This is followed in section 3.0 by a summary of what is known about I-129 concentrations in the local surface and groundwater flow system. This discussion is condensed from information contained in section 3.9.5.5 of the Site Characterization Plan (SCP). Sections 4.0 and 5.0 address background levels of I-129 and how it can be introduced into groundwater samples via borehole drilling and water sample collection. Section 5.0 also presents an evaluation of borehole cleanup needs to remove drilling fluids. Report conclusions are summarized in Section 6.0. These discussions are followed by section 7.0 which proposes a specific text change to the option D paper. This change reflects a more realistic role on how I-129 can be used to support the hydrology site characterization strategy.

2.0 Background

An I-129 concentration of 10^{-8} picocurie per liter (pCi/L) was given in GWG (1987) as one of several criteria related to:

"... evaluating the presence of disqualifying conditions... Should the testing program provide data that exceed the evaluation criteria and thereby indicate the potential presence of a disqualifying condition, all available data related to that criterion will be evaluated and/or additional testing will be performed to confirm whether the data are representative of the site and the condition if pervasive across the site." (page 4).

The above I-129 concentration was selected because it was the understanding of the working group that levels above 10^{-8} pCi/L ("background") of I-129 was not expected in the Grande Ronde Basalt. Therefore, this concentration was identified as an evaluation criterion in the GWG (1987) report. Any higher iodine values measured during pump

testing was thought to suggest vertical groundwater leakage. Such leakage might indicate the presence of a disqualifying condition (rapid groundwater travel time) for the basalt site. However, the authors of this white paper (Gephart, Hall and Wallick) believe that one should be cautious in using induced leakage (and any associated I-129) as a potential criterion for disqualification. Rather, one should use leakage under equilibrium conditions.

However, it appears that the following information was not adequately factored into the option D report: (a) information on known and suspected I-129 concentrations in the groundwater system, (b) recognized uncertainties in attempting to drill holes and sample waters for detecting low I-129 concentrations, (c) the extraordinary borehole cleanup needs for removing past drilling fluid losses containing above background I-129 levels, and (d) the uncertainty associated with what is a true I-129 background level.

3.0 Presence of I-129 in Surface Water Near and Groundwater Beneath the Hanford Site

Iodine-129 concentrations of 6×10^{-5} pCi/L and 2×10^{-2} to 8×10^{-3} pCi/L have been detected in the Columbia River and Hanford 300 Area rain water, respectively. Price et al. (1985) reported that I-129 concentrations in the Columbia River during 1984 ranged from 1.2×10^{-5} pCi/L upstream from the Hanford Site to 7.4×10^{-5} pCi/L downstream from the Hanford Site. Within the unconfined aquifer, I-129 concentrations range from 1×10^3 pCi/L to 1×10^{-6} pCi/L. Concentrations are primarily influenced by the sampling site's closeness to present or past waste disposal facilities. The highest concentrations generally occur within and adjacent to the 200 Areas. Iodine-129 concentrations within the confined aquifers of the Saddle Mountains and Wanapum Basalts range from about 10^{-2} pCi/L to 10^{-6} pCi/L.

Most I-129 data for the confined aquifer system are from the Rattlesnake Ridge and Mabton interbeds. Fourteen boreholes completed in the Mabton interbed were periodically sampled in the 1970's. Most of these are located along or near the eastern extension of the Umtanum Ridge-Gable Mountain anticline. This is an area of known vertical groundwater leakage that is or has taken place along an area of folded and faulted basalt (Gephart, et al 1976, Graham et al 1984, DOE 1986).

The U.S. Department of Energy derived concentration guideline (draft) for I-129 is 500 pCi/L (Gerton, 1987). The U.S. Environmental Protection Agency drinking water standard is 1.0 pCi/L (EPA, 1976).

Large scale pump testing will begin at the RRL-2B site located in the central portion of the controlled area study zone (GWG, 1987). Borehole drilling in this area over some 8 years has resulted in the loss of hundreds of thousands of gallons of drilling fluid into the basalts. Specifically, at the RRL-2 site alone, over a hundred thousand gallons of drilling fluid (water and muds) were lost into the same basalt flow tops scheduled for large scale pump testing. Since Columbia River water

was used for drilling some of these holes, local I-129 concentrations of at least 10^{-5} pCi/L are presumed to already exist in the groundwater to be withdrawn during pump testing.

4.0 Expected I-129 Background Concentrations

This section addresses natural background levels of I-129 in a basalt groundwater system, theoretically calculated limits on I-129 concentrations, and groundwater sample size dependence for measuring low iodine concentrations.

4.1 Natural Background Levels Evaluated for I-129 in a Basalt Groundwater System

Iodine-129 (a beta emitter with a half life of 16 million years) is a naturally occurring radioactive tracer that is useful for study of hydrogeologic processes on time scales up to 100 million years. Iodine-129 is constantly produced in the upper atmosphere by the interaction of cosmic rays with stable elements in the atmosphere and by fission of heavy elements in the crust of the earth. Man-made sources include gaseous emissions from nuclear reactors and reprocessing plants, leaching of high-level radioactive wastes, and fallout from atmospheric testing of nuclear weapons.

Fabryka-Martin et al (1985) calculated that the steady state inventory of I-129 in the hydrosphere is 1.2×10^{27} atoms, neglecting production by neutron-induced U-235 decay. The global average of I-129/total Iodine (I-129/I) in the hydrosphere ranges from 3×10^{-13} to 3×10^{-12} , depending on the extent of mixing between iodine in recent marine sediments with iodine in sea water. If this mixing is assumed to be 50% efficient, then the predicted average hydrospheric ratio is 5.5×10^{-13} . The I-129/I ratio in deep groundwater was given as 4.5×10^{-13} , a somewhat lower value, because of removal from active exchange with the atmospheric source reservoir.

Fabryka-Martin et al (1985) also presented calculated data for I-129 production rates and steady-state concentrations in various rock types, depending upon the typical concentrations of uranium and iodine. For example, the highest I-129 content would be found in a marine black shale, while the lowest would be found in a halite. The ratio of I-129/I for basalt was given as 16×10^{-13} .

Comparing the ratio for deep groundwater with that of basalt, in theory at least, shows that leaching of iodine from basalt into groundwater can significantly raise the background ratio.

The background activity of Iodine-129 in deep basalt groundwater is, at a minimum, the activity that corresponds to the deep groundwater ratio. According to Fabryka-Martin et al (1985), a minimum of 10 mg of iodine must be available for analysis. This information can be used to arrive at a specific background activity for iodine in groundwater.

Consider the decay equation: $-dN/dt = N \text{ Lambda}$

Given that:

- o I-129/I ratio in deep groundwater is 4.5×10^{-13} ;
- o Lambda (decay constant for I-129) = $1.3724 \times 10^{-16} \text{ sec}^{-1}$;
- o Minimum of 10 mg total iodine for analysis. Assumed to be present in one liter;
- o Avogadro's number = 6.02×10^{23} atoms per mole;
- o One curie = 3.7×10^{10} disintegrations per second,

The equation may be solved to yield a background activity of 7.8×10^{-9} pCi/L. This is approximately the value of 10^{-8} pCi/L that is given in GWG (1987).

$$\left[\frac{(4.5 \times 10^{-13}) (10^{-3} \text{ g/L}) (6.02 \times 10^{23} \text{ atoms/mole})}{(1.3724 \times 10^{-16} \text{ sec}^{-1})} \right] \\ \left[\frac{1}{(129 \text{ g atoms/mole}) (3.7 \times 10^{10} \text{ sec}^{-1}/\text{Ci})} \right]$$

As mentioned earlier, basalt rock can have a ratio of I-129/I that is about four times larger than the value is for deep groundwater. The contribution of this I-129 to the groundwater resulting from leaching of iodine along the flow path in a basalt groundwater flow system is unknown. Leaching would have the effect of increasing the background to a level somewhat higher than the stated 10^{-8} pCi/L. A discrete value could only be obtained by:

- o Determining the ratio of I-129/I for Columbia River Basalts,
- o Studying the abundance and distribution of iodine in the basalts, and
- o Studying the change in total iodine concentration in groundwater as it evolved chemically along a flow path.

Fabryka-Martin et al (1985) pointed out that total iodine concentrations increase with groundwater age due to leaching of iodine from the host rock. The isotope signature of this second I-129 source will be a function of lithology and formation age. In cases where significant leaching of iodine takes place, the initial isotope ratio of I-129/I in the groundwater would be the same as that of the recharge water. However, then the overall groundwater ratio would increasingly reflect the age of the host rock rather than that of the water.

Another problem in defining the background specific activity of I-129 in Hanford groundwaters is variable contamination of the system with Columbia River water that has a specific activity of about 10^{-5} pCi/L. Contamination has been variable due to differing volumes of fluid lost into basalt flow tops as a result of drilling and testing on the Hanford Site over the years.

Based upon data from the literature, the uncertainties of iodine leaching, and variable contamination, a background range of 10^{-8} to 10^{-5} pCi/L appears reasonable until additional geochemical data become available. For the present, this range is expressed as equal to or less than 10^{-5} pCi/L.

4.2 Theoretically Calculated Limits and Sample Size Dependency Summarized for Measuring Low I-129 Concentrations

Determining I-129 concentrations in water is complicated by two factors:

- o Low concentrations of iodine in natural groundwater, and
- o Low isotopic abundances of I-129 in natural iodine.

The measurement of I-129 in water requires the isolation of about 10 mg of iodine. Considering that the concentration of iodine in Hanford groundwaters is on the order of 2 parts per billion (ppb), large quantities of water must be collected to obtain the necessary concentrate.

According to Fabryka-Martin et al (1985), tandem accelerator mass spectrometry (TAMS) is the instrumental method of choice for determination of I-129/I ratios as low as 1×10^{-13} . At the 10% level of significance, a sample containing 10^7 atoms of I-129 in 20 mg of silver iodide gave a ratio of I-129/I of 8×10^{-13} . This information indicates that current analytical sensitivity is barely sufficient to resolve levels of I-129 at the 10^{-8} pCi/L level. Fabryka-Martin et al (1985) also state that resolution improvements of about one order of magnitude are expected and may already be available.

For I-129 analysis of Hanford groundwaters, the following realities must be considered at this time:

- o Detection of an I-129 concentration of 10^{-6} pCi/L requires a groundwater sample of about 50 L (13 gallons).
- o Detection of an I-129 concentration of 10^{-8} pCi/L requires a groundwater sample of about 5000 L (1300 gallons).

Large quantities of groundwater should not be collected in an attempt to reach background levels that overlap with instrumental detection limits. Not only is the possibility of contamination from large sampling containers a danger, but there is also the increased uncertainty as to which stratigraphic section is actually supplying the water.

5.0 Sources of Groundwater Sample Contamination and Borehole Cleanup Needs

The laboratory measurement of I-129 in a groundwater sample represents the weighted average of the concentration of the isotope in the groundwater and that of the residual drilling fluid (which is also part of the collected sample) plus any I-129 introduced into the sample during collection, handling, and analysis. This latter contribution can be minimized and compensated by using scrupulously clean and consistent technique, and by using analytical blanks.

Residual drilling fluid in the sample presents a difficult problem in attempting to collect representative groundwater samples. The following hypothetical example shows how drilling fluid can add enough I-129 to the collected sample to completely mask the true I-129 concentration. Assume that the drilling fluid used to penetrate a basalt aquifer is Columbia River water, taken from the northern side of the Hanford Site. This water has an I-129 concentration of 10^{-5} pCi/L (see Section 3.0). Also, make the unlikely assumption that the drilling fluid has not been further contaminated by contact with air, soil, or groundwater from the unconfined aquifer. Finally, assume that the I-129 concentration in the groundwater is a natural background level of 10^{-8} pCi/L.

Some of the drilling fluid will effectively be injected into the aquifer during borehole penetration. Most of that fluid will be removed by development (cleanup) pumping. Simple calculations show that if the sample collected after development is 99% groundwater and 1% residual drilling fluid, the I-129 concentration of the sample will be 1.1×10^{-7} pCi/L, which is eleven times higher than the assumed true groundwater value. Similarly, if the sample represented 99.9% groundwater and 0.1% residual drilling fluid, the result of laboratory analysis would show an I-129 concentration of 2×10^{-8} pCi/L or twice the actual groundwater value. For this example, the collected water sample must be 99.99% free of residual drilling fluid before the I-129 level is representative within 10% of the actual groundwater concentration of I-129. It is clear that residual drilling fluid contamination is a major problem because it creates an unfavorable signal-to-noise ratio. Data analysis techniques, developed to monitor hydrochemistry at boreholes DC-18 and DC-23, can be used to quantify borehole development. These techniques (Hall, 1986) depend upon time-series sampling and field analysis during development pumping. Results show the following approximate relationship between residual contamination and pumped water volume during development of Hanford basalt aquifers:

Pumped volume/injected volume* % residual drilling fluid in samples

1	33%
10	2%
100	0.2%
1000**	0.02%

* "Injected volume" is the amount of drilling fluid lost to the aquifer during borehole penetration.

** Extrapolated. This value has not been reached in practice.

These results show that to reach the 99.99% cleanup cited in the example above, the water volume pumped during development must be over 1000 times the fluid loss during drilling. This figure is about 10 times greater than has been achieved to date during the best drill-and-test mode sampling conducted on site. At borehole DC-18, a pumped volume-to-injected volume ratio of over 100 was reached in the Rosalia flow top of the upper Wanapum Basalt during a three-week pumping campaign. This large ratio was achieved only because an unusually low volume of drilling fluid (3160 liters or 836 gallons) was lost during penetration. No other drill-and-test horizons have been developed to this degree. It would have required about 30 weeks of pumping (about a million gallons pumped) to reach 99.99% cleanup. Moreover, the pumped water has to come from somewhere. After such a massive pumping campaign, the final collected sample would not represent water from the original borehole site. Rather, it would represent a composite of groundwater induced to flow from the surrounding flow systems. Crossover of contaminants from any nearby boreholes that have penetrated the same aquifer then becomes a very real sample contamination concern, especially if such boreholes were not originally developed to a high degree (this is the usual case with most boreholes at the Hanford Site).

In the hypothetical example, it was assumed that there was no I-129 contamination in the drilling fluid beyond the 10^{-5} pCi/L already measured in the Columbia River water. In reality, there are several sources of contamination. Airborne I-129 from processing facilities at Hanford can contaminate drilling fluids in the mud pits. Similarly, the soils are contaminated, so soil dust is a potential problem. Finally, water from the unconfined aquifer can contaminate the drill string and fluid recirculation system during drilling. This contamination can persist throughout the drilling campaign, i.e., throughout the drilling of the lower confined aquifers.

In the vicinity of RRL-2B, the pumping well designated for the forthcoming pump tests, literally hundreds of thousands of gallons of river water in drilling fluids have already been lost to aquifers, including over 380,000 liters (100,000 gallons) to the Birkett flow top alone. This is one of the flow tops to be pump tested and sampled for comparison against the evaluation criteria given in GWG (1987). Though the I-129 concentrations of these fluids are unrecorded, and the degree of borehole development is uncertain, an I-129 concentration of 10^{-5}

pCi/L may be assumed as a minimum. Consequently, the degree of existing contamination of aquifers due solely to drilling activities cannot be evaluated. In other words, I-129 measurements for samples taken during large-scale pump testing may be meaningless. Thus, there is no technical basis for assigning a supportable evaluation criterion ("yellow flag") value for the I-129 measurements.

Using the above information, another calculation can show how inadequate the planned total discharge volume for the first large-scale pump tests will be to remove "above background" levels of I-129 from some test horizons. For example, assume a discharge rate of 19 liters per minute (5 gpm) for 30 days. This gives a total discharge of 818,000 liters (216,000 gallons). Next, make the optimistic assumption that only 380,000 liters (100,000 gallons) of drilling fluid was originally lost into the RRL-2 test horizon. (This is the case for the Birkett flow top.) To reach a 99.99% cleanup, then over 380 million liters (100 million gallons) of water must be removed. At 19 liters per minute (5 gpm), this would take nearly 14,000 days or 38 years of pumping. Clearly, this is an unreasonable expectation to meet an I-129 evaluation criterion that itself has no solid basis.

A fundamental question in reviewing data for any groundwater sample and any laboratory analysis of that sample is, "What does the sample itself represent?" The above discussion has shown that actual groundwater samples collected at the Hanford Site represent part groundwater and part drilling fluid. For I-129 measurements, it has been shown that, within reasonable limits of development pumping, the drilling fluid contribution to a groundwater sample would completely mask the contribution from any uncontaminated deep groundwater.

6.0 Conclusions

The following conclusions are drawn from the information presented or referenced in the previous sections:

- o I-129 appears to be present in the confined aquifers near the 200 Areas particularly along the Umtanum Ridge-Gable Mountain anticline. Vertical groundwater leakage takes place within this geologic structure.
- o The mechanism(s) by which Hanford derived I-129 is introduced into the confined aquifers is not fully identified. Explanations include both natural and man-made mechanisms.
- o The true background level of I-129 naturally occurring in a basalt-groundwater environment is uncertain.

- o I-129 at concentrations of at least 10^{-5} pCi/L has been introduced into the groundwater beneath the area planned for the first large-scale pump test. This I-129 is associated with the thousands of gallons of drilling fluids lost into the basalt rock since the late 1970's. These groundwaters are the same as those to be withdrawn during pump tests planned in the option D hydrology strategy report.
- o Based upon the facts that (a) analytical precision is poor in the 10^{-8} pCi/L range, (b) large water sample volumes are needed to approach this range, and (c) there already is large uncertainty in the theoretical natural background for I-129 in basalt groundwater, it is necessary to seriously reconsider what is thought to be a realistic background value for I-129 in the option D strategy paper.
- o Massive borehole development is necessary to remove I-129 already introduced into the basalt-groundwater environment by drilling. The required cleanup exceeds that historically accomplished in past basalt drilling operations. In addition, the planned discharge volumes from the first large-scale stress tests appear to be inadequate to fully clean out the test horizons for low level I-129 measurements.
- o To separate the signal (true background) from noise (drilling fluid contamination) level of I-129, the in situ I-129 concentrations must be no less than about one-hundredth of the concentration in the drilling fluid itself. Otherwise, signal to noise separation is not possible.
- o Until analytical improvements and further geochemical studies are available, the background value given on I-129 in the option D strategy paper should be no more stringent than equal to or less than 10^{-5} pCi/L.

7.0 Recommended Text Change to the Option D Report

The only reference to I-129 in the option D paper is in the first page of the table entitled "Strategies to Investigate Disqualifying Conditions". There an evaluation criterion of 10^{-8} pCi/L is given. It is proposed that a footnote labeled "a" be placed next to this criterion. At the bottom of the page, the footnote would read "a=best analytical sensitivity". In addition, it is proposed that a second I-129 value of equal to or less than 10^{-5} pCi/L be listed below the 10^{-8} pCi/L value. Next to this new value, a footnote "b" would be placed. This footnote would be explained at the bottom of the page as "b=likely background concentration".

In proposing these changes, it must be recognized that even a 10^{-5} pCi/L value may be meaningless because of the numerous unknowns discussed in previous sections. This is why section 2.0 emphasized the importance of not taking any single test value (whether it's a hydraulic or hydrochemical value) out of the context of all other known geohydrologic data. That is simple and sound scientific practice.

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Westinghouse
Hanford Company

Internal
Memo

From: BWIP Quality Assurance Department 12100-87-DDD-177
Phone: 6-8358 1135 Jadwin/18/1100 Area
Date: July 8, 1987
Subject: AUDIT REPORT NO. BWIP-IA-87-004, SITE CHARACTERIZATION PLAN,
PRODUCTION

To: DE Mahagin

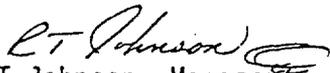
cc: DD Dorsey CDC-2/3000 KM Tominey FMIT Tr/300
DC Gibbs CDC-2/3000 RJ Viens CDC-2/3000
J Graham CDC-2/3000 Audit File BWIP-IA-87-004
GW Jackson CDC-1/3000 RTJ:DDD File/LB
JR Kirkendall CDC-2/3000 ~~BRMC 3503/008 (2)~~

The attached report presents the results of the Rockwell Hanford Operations Basalt Waste Isolation Project (BWIP) audit of the Site Characterization Plan, Production conducted May 26, 1987 through June 17, 1987.

The scope, purpose, executive summary, and personnel contacted during the audit are detailed in the attached Audit Report. The Audit Report also includes the Audit Finding Reports, Audit Observation Reports, and Attendance Sheets for the Pre-Audit and Post-Audit Conferences.

Please provide corrective action responses on the original Audit Finding Response Reports and Audit Observation Reports presented at the Post-Audit conference. Responses must be submitted to the BWIP Quality Assurance (QA) Audit Group Manager by the agreed to date.

Should you have any questions, please contact DD Dorsey, Lead Auditor, Westinghouse Hanford Company BWIP QA Audit Group on 376-1987.


RT Johnson, Manager
Basalt Waste Isolation Project
Quality Assurance Department

tak

Attachment

Rockwell Hanford Operations Basalt Waste Isolation Project	AUDIT REPORT
ACTIVITY AUDITED Rockwell/BWIP Licensing Department 345 Hills St./3000 Area	REPORT NO. <u>BWIP-IA-87-004</u> DATE OF AUDIT <u>5/26/87 - 6/17/87</u> PROJECT <u>BWIP</u>
AUDIT TEAM (Name and Title) <u>D. D. Dorsey, Lead Auditor</u> <u>H. Litz, Auditor/DOE-RL</u>	<u>R. O. Mahood, Auditor-in-Training</u>
<p>SUMMARY</p> <p>SCOPE:</p> <p>To verify implementation of responsibilities and requirements relative to control of Site Characterization Plan (SCP) production as set forth in Licensing Department Procedures (PMPM's) 1-108, 10-102, 10-103, 8-111, and 8-112.</p> <p>PURPOSE:</p> <p>The purpose of the audit was to evaluate the implementation of procedures (PMPM's) as they apply to the production of the SCP. Both Licensing and its interfaces with personnel from various other departments were examined.</p> <p>EXECUTIVE SUMMARY:</p> <p>This report presents the results of the Rockwell Hanford Operations (Rockwell) Basalt Waste Isolation Project (BWIP) audit of the SCP production conducted May 29, 1987 through June 17, 1987.</p> <p>Thirteen findings and two observations were recorded. These reports document procedural noncompliance and/or poor business practices. Responses must be submitted to the BWIP Quality Assurance (QA) Audit Group Manager by the agreed date.</p> <p>The implementation of the above referenced procedural requirements was determined to be ineffective. Those areas which are significantly impaired by improper procedural control are:</p> <ol style="list-style-type: none"> 1. The capture and retention of records which would provide the historical basis for the validity of the rigorous review process by which the end product (SCP) was formulated (Ref. Findings 1, 3, 4, 6, 7, 9, 10, 12, and Observation A). 2. Training (Ref. Findings 2 and 11). 3. Interfaces between Licensing Department personnel and persons outside the department; (Ref. Findings 5, 8, 13 and Observation B). <p><u>R. J. Viens</u> 7/1/87 R. J. Viens, Manager BWIP QA Audit Group</p> <p><u>[Signature]</u> Audit Team Leader <u>D. D. DORSEY</u></p> <p>6-26-87 Date</p>	

No evaluation of the technical content of the SCP was made and no inference should be drawn between the lack of procedural compliance and the technical quality of the SCP.

The following is a summary of the findings and observations:

Finding No. 1

The SCP Review Comment Record (RCR) described in Revision 0 to procedure PMPM 10-102 has never been used. The SCP RCR, or similar, shown in Revision 1, effective June 5, 1987 has been used exclusively as far back as July of 1986. Entries on these forms are in many cases illegible, hand written, in pencil, in various shades of ink other than the allowable black, and the forms used have been reproduced on pink, blue, green, and goldenrod paper and in various combinations of all of the above. All of these are in violation of procedures and/or good business practices.

Finding No. 2

PMPM 13-106, Revision 1 requires that a determination of an individuals knowledge, skills and abilities be measured against "established requirements" in order to be considered qualified. While a BWIP Review Qualification form has been filled out on all members of the Senior Technical Review Team (STRT) and about 25% of the Lead Authors, no requirements have been established with which to measure a persons knowledge, skills, and abilities.

Finding No. 3

There is no evidence that the Licensing Department has established a system of checks and balances which will "maintain and control" the SCP Guidance Manual in a manner which assures that users have, and are using, the latest revision.

Finding No. 4

The record hard copy of the Administrative Record is not being maintained as an "In Process Quality Assurance Record" (Ref. PMPM 8-115, Revision 2) as required in PMPM 10-103 Revision 0.

Finding No. 5

SCP RCR's and copyright permission forms are being transmitted to the U. S. Department of Energy - Head Quarters (DOE-HQ) and the U. S. Department of Energy - Richland Operations Office (DOE-RL) by The Licensing Department personnel in violation of the requirements of RHO-GM-MA-2, 14-06.1 which requires all outgoing correspondence to be signed by the Project Director. The sole exception granted to

this policy is correspondence to major project participants which is signed by a Contracting Officers Technical Representative (COTR) to whom DOE has granted approval authority.

Finding No. 6

The Text Control Coordinator (TCC) is required to review all drafts of the SCP against a checklist called the SCP Text Acceptance Criteria. No mechanisms have been devised to document this required review.

Finding No. 7

The TCC is required to send a copy of each controlled draft, as they are returned from Technical Publications, to the Lead Author for a final accuracy check prior to submitting the draft to the reviewers. Due to time constraints, the TCC is sending the drafts to the reviewers at the same time as the copy is sent to the Lead Author.

Finding No. 8

PMPM 8-111, Revision 0 makes reference to an organization called "Data Management" and directs the Licensing Department personnel to forward documents to this organization. There is no such organization in BWIP as "Data Management."

Finding No. 9

PMPM 10-103, Revision 0 directs the SCP Files Coordinator to complete a "CTP Transmittal" per PMPM 8-113, Revision 1 to transmit documents to BRMC for microfilming. This procedure and CTP's are only to be used to transmit raw data and not documents.

Finding No. 10

PMPM 1-108 Revision 1 discusses "small group review" and resolving comments received from these reviews. PMPM 10-102, Revision 1 requires that all comments be recorded on RCR's, or other appropriate means, that documents concurrence with comment dispositions. While it could be argued that a marked up draft is an "other appropriate means" it does not provide for tracking resolution of comments as required.

Finding No. 11

Valid records reviewed at the training records area list only 30.3% of the 79 people, involved in SCP production, as having read PMPM 8-111, Revision 0. PMPM 1-108, Revision 1 states that this procedure (8-111) is applicable to the preparation of all parts of the SCP.

Finding No. 12

Revisions to the SCP File Index are not being approved by the Licensing Department Manager as required in PMPM 10-103, Revision 0.

Finding No. 13

An internal letter addressed to personnel in the Licensing Department requested SCP related documentation to be forwarded to the SCP Files Coordinator without identifying what this consisted of. No written direction has been given anyone outside of Licensing what to collect or to whom to send it.

Observation A

There is no approval log to show who has approval/acknowledgement authority for DOE-HQ; DOE-RL, Rockwell, and other entities for the various forms used in formulation of the SCP. Many signatures/initials are illegible and do not conform to BWIP requirements for legible records.

Observation B

There is no mechanism to assure that authors incorporate contentious comments with which they strongly disagree even though those comments have been elevated through the accepted approval cycle.

PERSONNEL CONTACTED:

H. Babad	Principal Scientist, Systems Engineering Department
S. K. Baker	Engineering Aide, SCP Production Group
P. R. Clements	Sr. Engineer, SCP Production Group
D. L. Duncan	Staff Engineer, SCP Production Group
S. J. Eckert	Administration Specialist, Project Qualification and Training
G. C. Evans	Staff Engineer, Systems Engineering Department
J. I. Feaster	Procedure Analyst, Document Control Unit
E. L. Fisk	Staff Engineer, Repository Design and Development Group
L. J. Garvey	Sr. Engineer, SCP Production Group
D. I. Herborn	Principal Engineer, Licensing Department

AUDIT REPORT
NO. BWIP-IA-87-004
PAGE 5 OF 5

J. A. Hoogendoorn	Administrative Coordinator, Operations and Test
W. J. Hotarek	Manager, Records Management Unit
G. W. Jackson	Director, Science and Engineering
B. M. Johnson	Licensing Analyst, SCP Production Group
C. L. Koski	Licensing Analyst, SCP Production Group
R. J. Landon	Manager, SCP Production Group
L. K. Maday	Forms Designer, Technical Publications
R. K. Otte	Clerk, SCP Production Group
G. G. Penny	Sr. Engineer, QA Program Administration Unit
L. C. Preston	Editor, Technical Publications
W. Prosk	Staff Engineer, SCP Production Group
R. K. Ramsgate	Manager, QA Program Development Unit
C. S. Ransom	Administrative Coordinator, Science and Engineering
R. A. Singer	Principal Engineer, SCP Production Group
J. C. Sonnichsen	Manager, Systems Performance Assessment Group
M. J. Wagner	Clerk, SCP Production Group
C. R. Wilson	Engineering Aide, SCP Production Group

The following attachments are an integral part of the Audit Report:

Attachment A	Pre-Audit and Post-Audit Attendance Sheets
Attachment B	Audit Finding Reports
Attachment C	Audit Observation Reports

ATTACHMENT A

PRE-AUDIT AND POST-AUDIT

ATTENDANCE SHEETS

AUDIT ATTENDANCE SHEET

A. ATTENDED PRE-AUDIT CONFERENCE DATE 5/26/87 TIME 11:00
 B. PERSONNEL CONTACTED DURING AUDIT
 C. ATTENDED POST-AUDIT CONFERENCE

NAME	*	ORGANIZATION	TITLE
1. G. C. Mahood		EWIP O.A. Group	ENGINEER (AUDIT - IN-TRIP)
2. John Boralew		Licensing	Manager
3. Z J Clens/11/6/87		EWIP QA Audit Grp	Manager
4. Louis J. Garvey		RHO Licensing	Staff Engr.
5. Roger J. Landon		RHO Licensing	Manager, SCP Prod. Group
6. J. D. DORSEY		EWIP O.A. Audit Grp	SR ENG (EPA AUDITOR)
7.			
8.			
9.			
10.			
11.			
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24.			
25.			

(See reverse side for completion instructions)

* Indicate A, B, or C as applicable

DATE

TIME

- A. ATTENDED PRE-AUDIT CONFERENCE _____
- B. PERSONNEL CONTACTED DURING AUDIT
- C. ATTENDED POST-AUDIT CONFERENCE 6-17-87 _____

NAME	ORGANIZATION	TITLE
1. HAROLD B. LITZ ^{RP*}	DOE/RL	QSD/QE.
Richard O. Mahood 2. Richard O. Mahood	BWIP GA	"ENGINEER"
3. R. A. SINGER	RHO-BWIP	ENGINEER
4. W. Prost	RHO-BWIP	ENGINEER
5. P. R. Clements	RHO-BWIP	^{Call 10-12} ENGINEERING
6. D. D. DORSEY	BWIP QA	LEAD AUDITOR
7. R. J. Landon	BWIP/Licensing	Mgr. SCP Production/Op.
8.		
9.		
10.		
11.		
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(See reverse side for completion instructions)

* Indicate A, B, or C as applicable

ATTACHMENT B

AUDIT FINDING REPORTS

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 01
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-GM-MA-2 Standard Requirements and Procedures 15-01 Forms Administration Rev. 0 Part 4.4 Using Department "Using department is responsible for: coordinating new or revised forms with all impacted departments and obtaining approval for use..."

RHO-BW-MA-17 PMPM 8-103 Rev. 0 Part 3.8 Quality Assurance Records "...Any records that meet one or more of the following criteria shall be maintained as lifetime records... Records used in support of site selection, site nomination, site characterization..."

RHO-BW-MA-17 PMPM 8-105 Rev. 1 Part 6.1 Recording Data "1. Record data in black ink (pencil is not acceptable) on clear (i.e. mylar) or white paper whenever possible... 2. Recorded data shall be legible when reproduced with any media to the fourth generation."

FINDING:

Official records in the Review Comment Record file include unapproved forms, blue ink, red ink, hand written comments, pencil entries, pink, blue, green, and goldenrod paper and illegible handwriting. More than 90% are unacceptable as Quality Assurance Records by one or more of the above criteria.

Response Commitment Date: 7-31-87

Acknowledged By: John Molan

Date: 6-17-87

FOLLOW-UP VERIFICATION
(COMMENTS)

Adequate Inadequate

Evaluated By: _____

Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

AUDIT FINDING REPORT
AUDIT NO. BWIP-IA-87-004
FINDING NO. 01
PAGE 2 OF 2

"o Hand written, hand printed, typed and mechanically/electronically recorded data must be of sufficient penmanship quality and color intensity to be easily read."

RHO-BW-MA-17 PMPM 10-102 Rev. 1 Part 6.2 Senior Technical Review "...The individual STRT Reviewers transmit typed technical comments to the STRT Leader..."

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

Page 1 of 2

Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 02
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-QA-MA-3 Chapter 2.0 Rev. 3 Part 3.14 "...Records of the evaluation of a candidates education, experience and training compared to the documented requirements for the position shall be maintained."

RHO-BW-MA-17 PMPM 13-106 Rev. 1 Part 3.11 Qualification of Personnel "Determination that the knowledge, skills and abilities gained through training and experience, as measured against established requirements, qualify an individual to perform a required job or task in a safe and proficient manner."

RHO-BW-MA-17 PMPM 10-102, Rev. 1 Part 5.2 Reviewer Qualifications "The qualifications of the STRT Leader and all Review Team Personnel shall be documented on a BWIP Review Qualification Form..."

FINDING:

There is no documented evidence that the Review Team Leader, Review Team Personnel or Lead Authors were "qualified", as measured against established, documented, requirements, as required.

Response Commitment Date: 7-31-87 Acknowledged By: John Grolan Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

AUDIT FINDING REPORT
AUDIT NO. BWIP-IA-87-004
FINDING NO. 02
PAGE 2 OF 2

RHO-BW-MA-17 PMPM 1-108, Rev. 1 Part 6.2.1 Initial Text Preparation "...A technically qualified Lead Author will be assigned for each chapter of the SCP..."

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 03
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 8-111 Rev. 0 Para. 3.2 SCP Guidance Manual "The SCP Guidance Manual is a collection of pertinent Rockwell, DOE, Nuclear Regulatory Commission (NRC) and regulatory guidance documents that is maintained and controlled by the Licensing Department.

FINDING:

There is no documented evidence that a Document Control System is in place in the Licensing Department to maintain and control the SCP Guidance Manual in a manner which assures that users have the current revision.

Response Commitment Date: 7-31-87 Acknowledged By: John Gralar Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 04
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 5.2 Site Characterization Plan Record Hard Copy File "A hard copy of the Administrative Record will be maintained at BWIP by the SCP Files Coordinator and copies will be forwarded to the U.S. Department of Energy-Richland Operations Office on request. The SCP record hard copy file will be maintained and protected as in-process records in accordance with PMPM 8-115."

FINDING:

The record hard copy of the Administrative Record is not being maintained per the requirements of PMPM 8-115.

Response Commitment Date: 7-31-87 Acknowledged By: John Galan Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 05
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 8-101 Rev. 1 Part 3.2 Outgoing External Correspondence "Refers to all written communications directed to organizations, government agencies or individuals outside the Integrating Contractors (IC) organizations."

RHO-BW-MA-17 PMPM 8-101 Rev. 1 Part 4.3 Outgoing Correspondence "All outgoing correspondence will be signed per RHO-GM-MA-2 Procedure 14-06.1. Deviation from this policy is not authorized, with the exception of those individuals who have been given signature authority by the U.S. Department of Energy - Richland Operations Office (DOE-RL)."

FINDING:

Comments from reviewers (RCR's) and copyright permission forms are regularly transmitted to DOE-RL and HQ in an informal manner by Licensing Personnel.

Response Commitment Date: 7-31-87 Acknowledged By: John Grodan Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 06
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 8-111 Rev. 0 Part 6.1 Original Text Development "...The TCC reviews the draft against the SCP Text Acceptance Criteria."

FINDING:

There is no documented evidence that this review is being completed.

Response Commitment Date: 7-31-87 Acknowledged By: John Ingram Date: 6-17-87

FOLLOW-UP VERIFICATION (COMMENTS) Adequate Inadequate

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 07
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 8-111 Rev. 0 Part 6.3 Text Verification "The TCC forwards a copy of the Controlled Draft to the Lead Author for a final accuracy check."

FINDING:

The TCC forwards the draft at the same time as general distribution not in a separate prior step as required.

NOTE: Also see 6.3.1, 6.3.2, and 6.4.

Response Commitment Date: 7-31-87 Acknowledged By: John Brosten Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____

Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 08
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 8-111 Rev. 0 Part 6.5.2 Reference Provided and Part 6.6 Reference Duplication

6.5.2 Reference Provided "If two copies of the reference are provided, the Reference Coordinator forwards one copy to Data Management, and places one copy in the Licensing Department SCP Reference File."

6.6 Reference Duplication "Data Management coordinates microfilming and duplication of the reference, and stores the completed reference sets (hard copy and microfiche) until required for distribution."

FINDING:

Reference is made to an organization called "Data Management", no such organization exists at the Basalt Waste Isolation Project (BWIP).

Response Commitment Date: 7-31-87 Acknowledged By: John Bonlan Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 09
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 6.3.1 Document Transmittal "The SCP Files Coordinator completes a CTP transmittal and attaches it to a copy of each group of applicable documents, as required, in accordance with PMPM 8-113. The documents are then transmitted to BRMC for microfilming per PMPM 8-103."

FINDING:

Documents are not being submitted per this procedure.

Response Commitment Date: 7-31-87 Acknowledged By: John Graham Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 10
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 1-108 Rev.. 1 Part 6.2.1 Initial Text Preparation "...each chapter/section will be subjected to a small group review by DOE-RL, DOE-HQ and PNL representatives. Comments from these reviews will be addressed by the lead author and other contributing authors..."

RHO-BW-MA-17 PMPM 10-102 Rev. 1 Part 5.1 Review Comments "All comments shall be recorded on SCP Review Comment Sheets (or other appropriate means) that documents concurrence with comment dispositions. The name, organization, and department of the reviewer(s) should be included on the form."

FINDING:

Comments from the small group review were not documented on SCP Review Comment Sheets, as required.

Response Commitment Date: 7-31-87 Acknowledged By: John G. ... Date: 6-17-87

FOLLOW-UP VERIFICATION (COMMENTS) Adequate Inadequate

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 11
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 1-108 Rev. 1 Part 6.2.1 Initial Text Preparation "The preparation of initial SCP text will be accomplished in accordance with PMPM 8-111. Which establishes the responsibilities of all participants as they relate to SCP text development including original writing, word processing, editing, and control of the SCP text. In addition, this procedure identifies the interfaces between BWIP authors, Licensing Department staff, and Technical Publications staff. The requirements of this procedure are applicable to the preparation of all parts of the SCP."

FINDING:

Only 30.3% of the 79 persons listed as involved in the preparation of the SCP have valid evidence of having read PMPM 8-111. The PMPM 8-111 is not included on the required reading lists of a majority of those persons employed in departments other than licensing.

Response Commitment Date: 7-31-87 Acknowledged By: John Graham Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 012
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 5.1 Site Characterization Plan File Index "...Revisions to the SCP File Index will be proposed to the SCP Files Coordinator by a Rockwell employee that is involved with preparation of the SCP. All revisions must be approved by the Licensing Department Manager prior to implementation..."

FINDING:

Revisions to the SCP File Index are not being approved by the Licensing Department Manager as required.

Response Commitment Date: 7-31-87 Acknowledged By: John Larkin Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

Page 1 of 1

Responsible Organization Licensing Department Audit No. BWiP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 013
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 6.1.1 Document Identification "...The Licensing Department Manager identifies existing SCP related documentation and correspondence and requests the SCP Files Coordinator to obtain copies.

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 6.1.2 Document Acquisition "...The Licensing Department Manager directs all group managers to forward copies of SCP related documentation and correspondence to the SCP Files Coordinator. All other department managers involved in the preparation, revision and publication of the SCP, direct that group managers forward copies of SCP related documentation and correspondence to the SCP Files Coordinator..."

FINDING:

There is no documentary evidence that "SCP related documentation" has been adequately identified to allow the SCP Files Coordinator to obtain copies, or that department and group managers, outside the Licensing Department have been directed to forward copies to the SCP Files Coordinator.

Response Commitment Date: 7-31-87 Acknowledged By: John Salain Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ATTACHMENT C

AUDIT OBSERVATION REPORTS

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT OBSERVATION REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Observation No. A
Date 6/17/87
Response Rev. No. _____

OBSERVATION:

Many Review Comment Records and other documents were reviewed in the course of the audit. These require various approvals and acknowledgements which primarily consist of initials or signatures. There is no approved signature log to show who has authority, from the various entities, to sign approval or an example of that persons signature/initials to verify the correctness of the approval. Also many of the signatures/initials are illegible or unintelligible and need to be made to conform to BWIP requirements for legible records.

Response Required yes X no _____ Auditor: D. D. Dorsey Date: 6/17/87
Commitment Date For Response: 7-31-87 Acknowledged By: John Bratan Date: 6-17-87
OBSERVATION RESPONSE:

Commitment Date For Completion: _____ Prepared By: _____ Date: _____
RESPONSE EVALUATION: Adequate _____ Inadequate _____

Comments:

Evaluated By: _____ Date: _____ Lead Auditor: _____ Date: _____

FOLLOW-UP VERIFICATION: Adequate _____ Inadequate _____

Comments:

Evaluated By: _____ Date: _____

Observation Closed By: _____ Date: _____

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT OBSERVATION REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Observation No. B
Date 6/17/87
Response Rev. No. _____

OBSERVATION:

Several "contentious" comments have been identified in the reviews conducted to date. While these comments have been handled in the manner prescribed by the procedures, many of them show on the logbooks as open from as long ago as August of 1986. This is due in some part to authors being strongly resistant to incorporating statements that they disagree with even though a committee of their peers voted to accept the comment. There needs to be a mechanism in place to follow up these contentious comments to assure their "timely" incorporation.

Response Required yes no _____ Auditor: D. D. Dorsey Date: 6/17/87

Commitment Date For Response: 7-31-87 Acknowledged By: John Bolan Date: 6-17-87

OBSERVATION RESPONSE:

Commitment Date For Completion: _____ Prepared By: _____ Date: _____

RESPONSE EVALUATION: Adequate _____ Inadequate _____

Comments:

Evaluated By: _____ Date: _____ Lead Auditor: _____ Date: _____

FOLLOW-UP VERIFICATION: Adequate _____ Inadequate _____

Comments:

Evaluated By: _____ Date: _____

Observation Closed By: _____ Date: _____

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

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Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 11
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 1-108 Rev. 1 Part 6.2.1 Initial Text Preparation "The preparation of initial SCP text will be accomplished in accordance with PMPM 8-111. Which establishes the responsibilities of all participants as they relate to SCP text development including original writing, word processing, editing, and control of the SCP text. In addition, this procedure identifies the interfaces between BWIP authors, Licensing Department staff, and Technical Publications staff. The requirements of this procedure are applicable to the preparation of all parts of the SCP."

FINDING:

Only 30.3% of the 79 persons listed as involved in the preparation of the SCP have valid evidence of having read PMPM 8-111. The PMPM 8-111 is not included on the required reading lists of a majority of those persons employed in departments other than licensing.

Response Commitment Date: 7-31-87 Acknowledged By: John Galan Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

Page 1 of 1

Responsible Organization Licensing Department Audit No. BWIP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 012
Stop Work Order Issued yes no Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 5.1 Site Characterization Plan File Index "...Revisions to the SCP File Index will be proposed to the SCP Files Coordinator by a Rockwell employee that is involved with preparation of the SCP. All revisions must be approved by the Licensing Department Manager prior to implementation..."

FINDING:

Revisions to the SCP File Index are not being approved by the Licensing Department Manager as required.

Response Commitment Date: 7-31-87

Acknowledged By: John Sorlain

Date: 6-17-87

FOLLOW-UP VERIFICATION
(COMMENTS)

Adequate

Inadequate

Evaluated By: _____

Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)

ROCKWELL HANFORD OPERATIONS
BASALT WASTE ISOLATION PROJECT
AUDIT FINDING REPORT

Page 1 of 1

Responsible Organization Licensing Department Audit No. BWiP-IA-87-004
Location 345 Hills St./3000 Area Finding No. 013
Stop Work Order Issued yes no X Date 6/17/87
Stop Work Order No. N/A Auditor D. D. Dorsey

REQUIREMENT(S)/REVISION

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 6.1.1 Document Identification "...The Licensing Department Manager identifies existing SCP related documentation and correspondence and requests the SCP Files Coordinator to obtain copies.

RHO-BW-MA-17 PMPM 10-103 Rev. 0 Part 6.1.2 Document Acquisition "...The Licensing Department Manager directs all group managers to forward copies of SCP related documentation and correspondence to the SCP Files Coordinator. All other department managers involved in the preparation, revision and publication of the SCP, direct that group managers forward copies of SCP related documentation and correspondence to the SCP Files Coordinator..."

FINDING:

There is no documentary evidence that "SCP related documentation" has been adequately identified to allow the SCP Files Coordinator to obtain copies, or that department and group managers, outside the Licensing Department have been directed to forward copies to the SCP Files Coordinator.

Response Commitment Date: 7-31-87 Acknowledged By: John Zelman Date: 6-17-87

FOLLOW-UP VERIFICATION Adequate Inadequate
(COMMENTS)

Evaluated By: _____ Date: _____

Finding Closed By _____ Date _____

(Refer to audit response for basis of closure)



Westinghouse
Hanford Company

Internal
Memo

From: Hydrology Section
Phone: 6-4764 PBB/430/1100
Date: September 15, 1987
Subject: IODINE-129 WHITE PAPER

77420-87-130

To: TA Curran PBB/543/1100

GW Jackson CDC-1/7/3000
RE Gephart PBB/432/1100
SH Hall PBB/437/1100
EI Wallick PBB/436/1100
BRMC (2)
PEL/REG File/LB

The white paper "A Proposal to Change the Iodine-129 Concentration Evaluation Criterion Given in the Hydrology Option Report" is attached. Changes to the original draft version of this paper, as recommended during the September 9, 1987 meeting with D. C. Gibbs and others, were incorporated. Please contact me if there are any questions.

P. E. Long, Manager
Hydrology Section

mst

87282150
WM Project: WM-10
PDR w/encl
(Return to WM, 623-88)

WM Record File: 101
LPDR w/encl

H

300 packet 4
for enclosure

WM DOCKET CONTROL
CENTER

'87 SEP 30 A9:41

WM Record File

101

WM Project

10

Docket No.

PDR

XLPR

(B)

Distribution:

REB

MJB

Youngblood

YOB

Waster

(Return to WM, 623-SS)

From: Cook, NRC

2628