HANFORD NATURAL RESOURCE TRUSTEE COUNCIL

FY 2013 Hanford Natural Resource Damage Assessment

Activity and Accomplishment Report

1. Summary

This report provides a summary of the Hanford Natural Resource Damage Assessment (NRDA) activities and accomplishments for FY 2013. The report is organized by the key work breakdown structure (WBS) elements that were established for planning, budgeting and scheduling the Hanford NRDA project and subsequent progress reporting. These elements include Assessment Planning, Injury and Service Loss Studies, Restoration Planning, Technical Analysis, Project Management, Information Management and Administration. See Figure 1 for the project WBS.

Hanford NRDA work in FY 2013 was focused primarily on completion of the Injury Assessment Plan (IAP), continuation of injury studies initiated in FY 2012 and strategic planning for implementation of the IAP with a goal of completing injury assessment and preparing a Restoration Compensation and Determination Plan (RCDP) by 2024. The strategic planning effort resulted in the development of a draft Project Execution Plan (PEP). The PEP defines the overall work scope, schedule, and budget for the Hanford injury assessment and establishes the means to execute, monitor, and control the project in a disciplined manner.

The Hanford Natural Resource Trustee Council (Council) has prioritized the list of studies from the IAP, with several targeted for initiation in FY 2014, including analysis of tribal service loss and analyses of existing information to prioritize contaminants for study and to start defining injury threshold concentrations for those contaminants. Implementation of the IAP is a dynamic, iterative process and the list of studies is subject to change as additional data becomes available during the injury assessment process.

Initial injury studies are continuing. A final report summarizing results of the Groundwater Contaminant Plume Mapping study has been drafted by the contractor (USGS) and the Mussel Toxicity Study (also being conducted by

USGS) continued in FY 2013. A statement of work was developed and a proposal received for the planning of a study of contaminant upwelling in the Columbia River.

Early in FY 2013, US DOE proposed acquisition of McWhorter Ranch as partial restoration for Hanford injuries. This project would have preserved and protected over 14,000 acres of mostly high quality native shrub-steppe habitat, including portions of Rattlesnake Mountain, directly adjacent to the Hanford Site. This proposal triggered an extensive effort by trustees and our contractor (IEc), the State of Washington, US DOE, and US DOJ to evaluate land value and to determine credits for land acquisition and restoration of disturbed land at McWhorter. Although the project did not come to fruition because the ranch was sold to a private entity, the effort provided a good collaborative Trustee effort and dry run for planning future restoration projects.

The Council continued to meet on a monthly basis to plan, organize, implement, and control Hanford NRDA activities. Six Technical Work Groups (TWGs) met on a regular basis to assist in study development, oversee studies, review environmental/contaminant release data, and make recommendations to the Council. Each TWG prepared, and the Council approved, five year work plans providing a prioritized list of tasks, task descriptions, and sequencing information for TWG work.

The scope of work for a data management contractor was finalized and an administrative record (AR) procedure manual was completed. At the request of the HNRTC, proposals for implementing and maintaining the AR and for developing and implementing a comprehensive data management system (DMS) were prepared by DOE's Mission Support Contractor. Both the AR and DMS proposals are under review for tentative implementation in FY 2014.

1. Assessment Planning

The IAP was completed during FY 2013. The draft IAP was posted for public review in November, 2012, and a public meeting was held in December to discuss and receive comment on the draft. The plan was edited in response to comments and was finalized and approved by the Council in January, 2013. The IAP was prepared by Industrial Economics, Inc. (IEc) on behalf of the Council. The IAP provides an outline of the approach the Hanford Trustees will take to assess injuries to natural resources stemming from releases of Site-related hazardous substances. The development of an IAP is intended to ensure that NRDA is conducted in a planned and systematic manner and at a reasonable cost (43 CFR § 11.30(b)). The IAP describes 42 ongoing and anticipated studies designed to evaluate past, current, and future natural resource injury and associated losses of resource services. Ultimately, the information collected through implementation of the IAP will inform the scope and scale of restoration activities needed to restore natural resources and restore services to their baseline condition.

The IAP formalizes the Trustees' current understanding of data gaps and identifies studies that may be necessary to determine and quantify injury to site resources and resource services. The Council performed a prioritization process in May 2013 to identify the initial set of studies that will be implemented in FY 2014. The initial studies include tribal service loss studies and work to review and

prioritize contaminants of concern for further study in terrestrial and aquatic systems at Hanford, also to define threshold concentrations for injury to media and biota at Hanford. The Hanford injury assessment is planned as an iterative process; as results of initial studies become available, plans and priorities for follow-on work will be adjusted as appropriate; new studies may be added to the current list, and others may be deprioritized or dropped.

2. Injury and Service Loss Studies

Three injury studies initiated in prior years were at various stages of completion in FY 2013. A follow on report to the Contaminants in Terrestrial Biota Study was completed, results of the Groundwater Contaminant Plume Mapping study were drafted, and the study of Effects of Hexavalent Chromium and Other Stressors on Native Mussels continued through the year. Options for a study to characterize contaminant upwelling in the Hanford Reach of the Columbia River were developed but implementation has been deferred due to the high cost and funding constraints.

a. Contaminants in Terrestrial Biota

The primary goal of this study, to compile and summarize data for contaminant concentrations (metals, radioisotopes, and organic chemicals) in terrestrial biota on the Hanford Site, was completed in FY 2012. A follow on report was prepared in FY 2013 to document the procedure used to test the capabilities of RESRAD-BIOTA software in a Tier 3 evaluation of radiological dose to Hanford Site biota using measured tissue concentrations compiled in the 2012 report (Hanford Site Terrestrial Biota Contaminant Data Compilation, HNF-53589). The objective of the 2013 exercise was to test the software's ability to handle a variety of hypothetical scenarios using readily available tissue data, and not to infer or conclude whether or not dose from measured tissue concentrations resulted in any effect. A secondary interest of the 2013 effort was to evaluate the applicability and potential issues of using existing data for dose assessment.

The report concluded, with specific consideration of the limitations of existing data, RESRAD-BIOTA could potentially be used as a screening tool to focus assessment processes and identify exposed populations. In combination with soil, water, sediment, or tissue concentration data, RESRAD-BIOTA can be used to identify analytes of concern and distinguish receptor groups or locations/areas where doses exceed established thresholds. Radionuclides serve as good measures of exposure because they are easily sourced to the Hanford Site and have been consistently detected in both abiotic and biotic media, as indicated by numerous studies. The Level 3 assessment of existing data in RESRAD-BIOTA helps elucidate the analytes and receptors most likely to be potentially affected by contaminant exposure based on body burdens. However, site-specific studies (e.g., DOE/RL-2007-21, DOE/RL-2007-50) have had difficulty substantiating exposure pathways, as the concurrent detection of radionuclides in paired abiotic and biotic media has been erratic.

b. Evaluation of Hanford Groundwater Contaminant Plume Mapping

This study was initiated in FY 2012, and is being performed by the United States Geological Survey (USGS) under a contract with the United States Fish and Wildlife Service (USFWS).

The purpose of this study is to evaluate reliability of existing Hanford groundwater plume maps. The USGS independently developed groundwater contaminant plume maps for selected areas of the Hanford site, calculated plume volumes, determined uncertainty of the resulting information and made an initial determination of the adequacy of existing contaminant plume maps at Hanford for the Trustee needs, by comparing their maps to previously-generated maps from DOE contractors. A draft report was issued for Trustee review in March 2013. Results have since been presented to trustees, and a revised, final report is expected in the first quarter of FY 2014.

c. Effects of Hexavalent Chromium and Other Stressors on Native Mussels

This study was initiated in FY 2012 and is expected to be completed in FY 2014. The study is being performed by the USGS under a contract with the USFWS. The purpose is to determine if adverse changes have occurred in native mussels exposed to hazardous substances released from the Hanford Site. Adverse changes might include acute or chronic toxicity resulting from exposure to hazardous substances in water or sediments.

In this study, hexavalent chromium is being tested alone and in the presence of three co-stressors: temperature, nitrate, and zinc. There was a change in the metal co-stressor chosen - from uranium to zinc - during 2013. Although uranium is released from the site, it is less likely than zinc to co-occur with hexavalent chromium. Two mussel species - the western pearlshell and fatmucket, were used in the tests. Acute toxicity tests were conducted in the spring of 2013, with chronic tests beginning in late September. Acute test results indicate that the fatmucket may work as a surrogate for the western pearlshell, should issues arise in propagation or survival of western pearlshell, which has not previously been cultured and used in laboratory assays. Initial results from the acute test indicate that temperature affects the toxicity of hexavalent chromium in the western pearlshell, although nitrate and zinc did not appear to have a significant effect on hexavalent chromium toxicity.

3. Restoration Planning

Notable accomplishments for restoration planning included the development and approval of sections of the Draft Hanford Natural Resource Restoration Plan (HNRRP) addressing early restoration and restoration project evaluation criteria. In addition, thirteen potential projects have been identified for potential evaluation of injury debits and restoration credits; the 100-K 116-K-2 Trench is a primary candidate site for development and testing of a draft procedure for debit and credit analysis. Acquisition of the McWhorter Ranch was, as noted above, also a focus for debit/credit assessment during the year. See accomplishments of the Restoration TWG below for additional details.

4. Technical Analysis

This element includes work planned and conducted by Technical Work Groups (TWGs), peer reviews and expert panels. Six TWGs met on a regular basis to assist in study development, to review and analyze existing Hanford environmental/contaminant data, and to make recommendations to the Council for action. The following is a summary of TWG activities and accomplishments for the year:

a. Aquatic

The Aquatic TWG (A-TWG) started the year by continuing to review and provide feedback on contractor products, specifically the IAP and the mussel toxicity study discussed previously.

The A-TWG drafted a five-year work plan that was approved by the Council in December 2012. During the year, the A-TWG had continuing discussions on the mussel study, upwelling study, data management, study planning, thresholds, and operable unit analysis.

Throughout the year, the A-TWG continued to summarize existing contaminant and resource information in an effort to help characterize injury and inform study planning. This included continuing GIS analysis focusing on integrating contaminant, resource at risk information and injury threshold information. This work is continuing in FY 2014.

In April, the A-TWG developed a draft flow chart to show a process for injury threshold development. The process provides a science-based approach and includes feedback loops to revisit thresholds based on new information gained and through research or studies.

Two aquatic studies were chosen in May by the Council as priorities for FY 2014. These included: Comparison of Hanford Sediment COC concentrations to Injury Effects Thresholds; and Comparison of Aquatic Biota Tissue COC Concentrations to Injury Effects Thresholds. The need for technical contractor support for this work was discussed and a contractor was recently hired.

b. Terrestrial

The Terrestrial TWG (T-TWG) completed its series of terrestrial species profiles early in this fiscal year.

On behalf of the Council the T-TWG continued to express concern with DOE's failure to implement the integrated vegetation management program on the Hanford Site. The TWG regards Hanford Site noxious weeds proliferation as a very significant issue that endangers site restoration now and in the future.

The T-TWG evaluated and commented on the draft prioritization of injury assessment studies and cost estimates provided the IAP.

Based on the Council's Strategic Plan and the final Injury Assessment Plan, the TWG updated its Five-Year Work Plan that was previously approved by the Council.

The scope of work for the Hanford Terrestrial Biota Contamination Report was completed by the contractor and the project report reviewed by the T-TWG. This major document summarizes many years of COC concentration data for tissues in Hanford biota; the data will

be incorporated in the Councils database, and should be very useful in analyses done for Injury Assessment. Collaboration with the contractor for this work (MSA) continued well into summer on issues including lab data qualifiers and limitations/usability of data in the Hanford Environmental Information System (HEIS).

Throughout the year the T-TWG coordinated with the Aquatic TWG on RESRAD data analyses and procedures for screening contaminants of concern (COCs) and for establishing injury thresholds. To enhance ongoing TWG coordination future meeting schedules were combined.

Early objectives for FY 2014 include compilation of soil data and analyses to prioritize COCs and begin assessment of potential injury to soils and terrestrial biota, and work with MSA on RESRAD study results.

c. Groundwater

Following the Trustee Council's lead with the Strategic Plan, the Groundwater TWG (GW-TWG) re-evaluated goals and priorities with a GW-TWG member survey. The GW-TWG recognized that a primary goal is to provide input to the Council about how to best facilitate the easiest and earliest groundwater injury assessment possible. As a result of the survey, the TWG reworked the Five-Year Work Plan to better reflect new priorities. The relative importance of validation of the Hanford modeling was much reduced and since Vadose Zone studies lead the priorities, the GW-TWG are preparing to provide the Council with guidance and a plan on how to approach this injury topic in the strategic plan and budget.

A vadose zone Statement of Work has been developed, edited, approved and sent to the Council. The next GW-TWG priorities included methods for determining the existing extent of groundwater injury, for determining the amount of future groundwater injury while considering current and future remediation practices, and for determining what this injury means in terms of resource injury to groundwater and the vadose zone.

In 2012, the Groundwater TWG proposed and then supervised an injury study done by the USGS to evaluate the contaminant plume maps developed by DOE and its contractors to verify that they were sufficient for NRDA needs. The project extended into 2013; preliminary plume maps were provided in March, and GW-TWG comments about the study were provided to the Council. The Council created official comments, which were sent to the USGS, and the report was revised to accommodate the Trustee comments and a draft final report (pending USGS internal review) was prepared in August, 2013. The principal investigator from the USGS presented the report results at the August Council meeting.

The GW-TWG is participating in planning and design for the Data Management Project.

Trustees considered the concept of using the 100-F Operable Unit as a pilot injury assessment to test the approaches being developed in the TWGs and in Council, and to find gaps in our knowledge and approach, also to define an initial data set for building and testing the data

management system. The GW-TWG supports this idea, and is embarking on developing a specific groundwater injury approach for 100-F to be ready for the pilot study.

To be prepared for budgeted work in future years, the Groundwater TWG has been working on a number of issues internally this year, including creating hand-contoured and Phoenix-provided plume maps for comparison to the USGS and DOE maps; looking at river-stage impacts on groundwater chemistry especially near the river; determining the current knowledge level (from data density) of the vertical distribution of contaminants in Hanford groundwater; doing an entry-level look at future impacts on plume extent from groundwater remediation methods; and determining the extent and risk posed by daughter-product isotope plumes.

The GW-TWG is now working on a near-term work plan to prioritize the activities for early 2014. Two looming issues requiring Council guidance include determination of groundwater injury (thresholds), and how to best determine groundwater injury extent.

d. Restoration

The Restoration Technical Working Group (R-TWG) has continued to fulfill its mission to advise the Hanford Natural Resource Trustee Council on a path forward for restoration at Hanford. To that end, the past year included the following activities and accomplishments.

The R-TWG began the Fiscal Year by wrapping up planning for debiting/crediting for possible acquisition of the McWhorter Ranch and, with IEc, developing a summary and lessons learned.

At the request of the Council and along with the other T WGs, The R-TWG developed a five year work plan which was approved by the Council.

As a result of the lessons learned with the McWhorter Ranch Project, it was determined there is much work to be done to better understand cultural service losses, recognizing the differing viewpoints of how cultural service losses may integrate into NRDA. The R-TWG worked closely with the Human Use TWG on this topic and received some valuable input particularly from the CTUIR. This topic became a priority for the Council and there are now some studies funded and/or proposed to further explore tribal service losses.

The Council discussed early restoration and asked that the R-TWG move forward to scope the planning and implementation of potential early restoration projects. As a result the R-TWG has developed a draft Early Restoration Action Plan/Process. The R-TWG has been developing a list of potential pilot early restoration projects as part of this process and will be using the process to be able to bring the best suited potential pilot projects before the Council in FY14.

The R-TWG provided a substantial amount of input to, and review of updates to two DOE documents – the Biological Resources Management Plan and Site wide Revegetation Plan which have been adopted by DOE.

e. Human Use/Tribal

For the public workshop on the IAP, the Human Use TWG (HU-TWG) provided a concept and outline to IEc for a poster explaining natural resource injury issues related to human uses of Hanford resources. A draft concept for Human Use and Restoration was developed. The HU-TWG reviewed and discussed the Yakama Nation's proposal "Ethnographic Study to Identify Tribal Cultural Properties at Hanford". The HU-TWG prepared a new work plan and discussed starting Tribal service loss studies**.**

During the year, the Council approved the transition of the Human Uses TWG to a Tribal TWG. Tribal representatives to the Council had for some time been discussing the need to have a forum in which to discuss Tribal technical and sensitive cultural issues among themselves, under the umbrella of the natural resource injury assessment process at Hanford. Because most of the work done of the HU-TWG had been trending towards addressing injury to tribally-sensitive resources and service losses, the Council determined that the appropriate way to proceed was to convert the HU-TWG to a Tribal TWG.

The decision to transition to a Tribal TWG was made in late FY13 so the TWG held only one conference call in July to discuss the various lost service studies that each of the Tribes is preparing to undertake. The Tribal TWG will meet regularly in FY2014.

f. Source and Pathway

The Source and Pathway TWG (S&P-TWG) met on monthly basis until September 2013 when it was combined with GW-TWG per Council decision. During 2013, the TWG completed a five year work plan that was approved by the Council, and it finalized two white papers - one providing an analysis of potential injury from beryllium releases to the environment and the second assessing potential natural resource injury to the Columbia River downstream from Hanford. The S&P-TWG also completed a proposal for a 100 F Area pilot study to assess likely injury in an area where cleanup has been completed. The plan was reviewed by the council and was deferred to January 2014 for Council action. The S&P TWG supported other TWGs in source determination (Zn and Hg) and contaminant (Pu & Am) geochemistry at Hanford. The S&P TWG also initiated planning for an upwelling study. The upwelling study is intended to better characterize the nature and extent of contaminant upwelling in the Reach, but implementation has been deferred because of funding constraints.

5. Project Management

This element includes staffing for the Council, Project Coordination and Trustee Management Oversight. The Council met on a monthly basis and conducted conference calls as necessary to plan and oversee Hanford NRDA activities. The Senior Trustees received a presentation from IEc on the results of the IPA and PED in January 2013. The FY 2015 budget request was developed and

submitted to US DOE in March, 2013. Current year funding/costs were reviewed on a routine basis. Eleven resolutions were approved by the Council in FY 2013.

Larry Goldstein, WA Department of Ecology was chair of the Council for FY 2013. Matt Johnson, CTUIR will be chair in FY 2014 and Tammy Ash, USFWS was elected vice-chair for FY 2014 and will be chair in FY2015.

Strategic planning which was initiated in FY 2012 continued in FY 2013 and resulted in the development of a draft Project Execution Plan (PEP). The PEP defines the overall work scope, schedule, and budget planned for the Hanford injury assessment over the next 10 years. Work will culminate in preparation of a Report of Assessment, which will summarize activities and findings of the injury assessment, and a Restoration and Compensation Determination Plan which will quantify damages and outline restoration plans for the Sites.

6. Information Management

The purpose of this activity is to implement, operate and maintain a data management system (DMS) as outlined in the Data Management Plan approved by the Council. This includes: (1) implementing, operating and maintaining a DMS according to the Data Management System Conceptual Framework, and (2) providing the following functions: data management; document management; GIS and non-GIS data stewardship; QA and data access coordination. The goal of this information integration effort is for the selected contractor for this project, Trustees, other DOE contractors, and research organizations to collaboratively develop and maintain a working database for assessing potential injury to natural resources and the services they provide, resulting from releases of hazardous substances from the Hanford Site.
A preliminary proposal to develop, operate and maintain the DMS was submitted by MSA and a final proposal is in development.

7. Administration

A facilitator continued to assist the Trustees in coordinating and conducting Council meetings. Tasks included scheduling meetings, preparing agendas, recording action items, issuing meeting materials, facilitating meetings and supporting the Council in issue resolution.

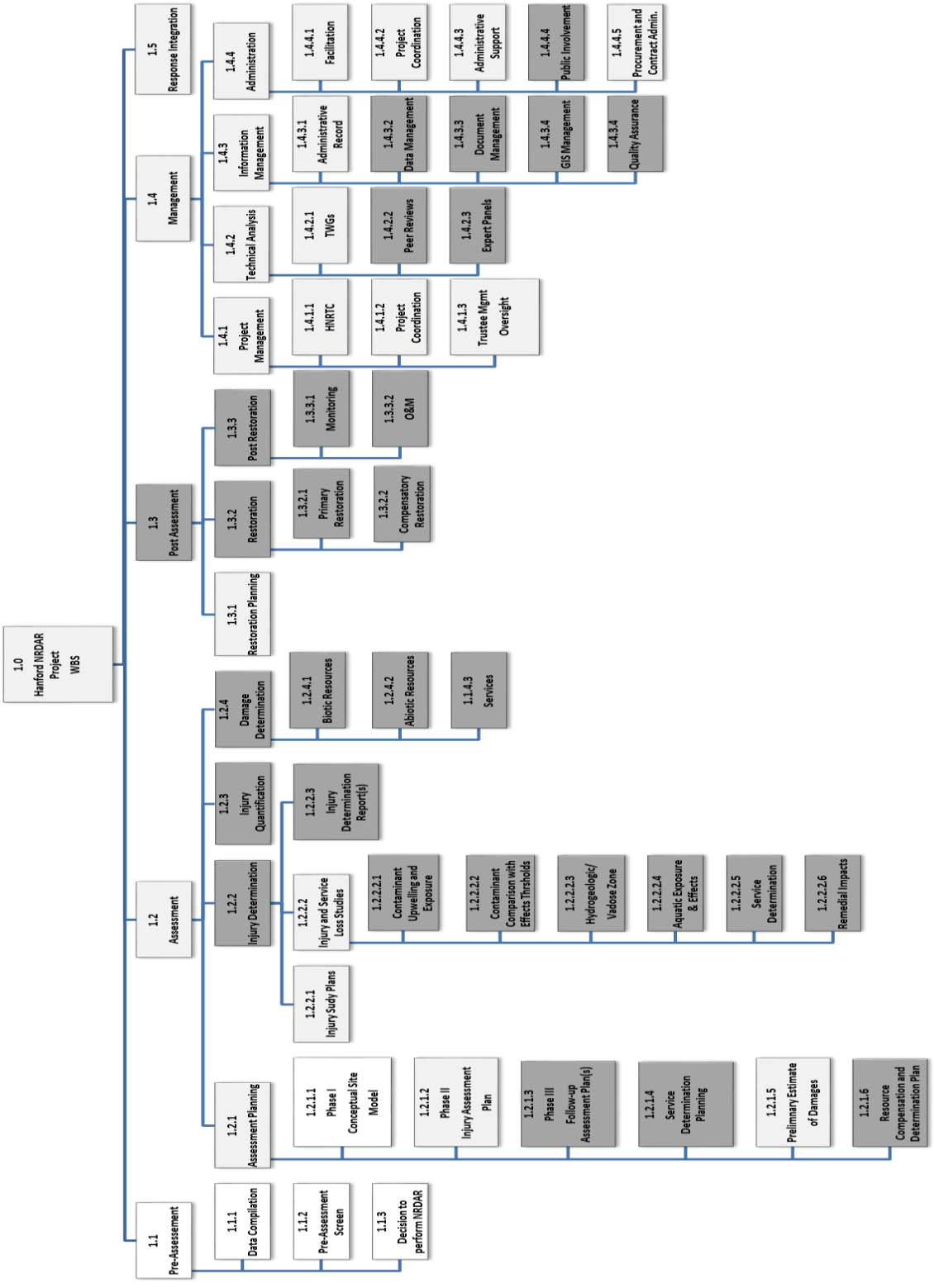
An administrative assistant was hired to assist the facilitator and Trustees in arranging for meeting rooms, conference calls and preparing meeting materials – packets prior to meetings, and meeting summaries afterwards.

An administrative records procedure manual was completed. The purpose of the manual is to outline a process to manage a Hanford Natural Resource Damage Assessment (NRDA) Administrative Record. An Administrative Record facilitates the NRDA process by providing a publicly available, permanent repository for materials relied upon by the Council in making final, consensus-based decisions about damage assessment and restoration actions. The administrative record must also contain sufficient information to support potential judicial review of the Council's decision-making

process. The manual provides detailed information and guidance regarding the collection, arrangement, and indexing of records within an administrative record. It was prepared to assist the Council in developing and maintaining the administrative record. A proposal to implement the procedure is under review.

Public review and comment of the IAP occurred in the 1st quarter of FY 2013 and a public workshop was held in Richland on December 12, 2012. The Hanford Advisory Board's River and Plateau Committee, and subsequently the full HAB, were briefed on the draft IAP late in 2012.

Figure 1


1.0 Hanford NRDAR Project WBS
1.1 Pre-Assessment
1.1.1 Data Compilation
1.1.2 Pre-Assessment Screen
1.1.3 Decision to perform NRDAR
1.2 Assessment
1.2.1 Assessment Planning
1.2.1.1 Phase I Conceptual Site Model
1.2.1.2 Phase II Injury Assessment Plan
1.2.1.3 Phase III Follow-up Assessment Plan(s)
1.2.1.4 Service Determination Planning
1.2.1.5 Preliminary Estimate of Damages
1.2.1.6 Resource Compensation and Determination Plan
1.2.2 Injury Determination
1.2.2.1 Injury Study Plans
1.2.2.2 Injury and Service Loss Studies
1.2.2.2.1 Contaminant Upwelling and Exposure
1.2.2.2.2 Contaminant Comparison with Effects Thresholds
1.2.2.2.3 Hydrogeologic/ Vadose Zone
1.2.2.2.4 Aquatic Exposure & Effects
1.2.2.2.5 Service Determination
1.2.2.2.6 Remedial Impacts
1.2.2.3 Injury Determination Report(s)
1.2.3 Injury Quantification
1.2.4 Damage Determination
1.2.4.1 Biotic Resources
1.2.4.2 Abiotic Resources
1.1.4.3 Services
1.3 Post Assessment
1.3.1 Restoration Planning
1.3.2 Restoration
1.3.2.1 Primary Restoration
1.3.2.2 Compensatory Restoration
1.3.3 Post Restoration
1.3.3.1 Monitoring
1.3.3.2 O&M
1.4 Management
1.4.1 Project Management
1.4.1.1 HNRTC
1.4.1.2 Project Coordination
1.4.1.3 Trustee Mgmt Oversight
1.4.2 Technical Analysis
1.4.2.1 TWGs
1.4.2.2 Peer Reviews
1.4.2.3 Expert Panels
1.4.3 Information Management
1.4.3.1 Administrative Record
1.4.3.2 Data Management
1.4.3.3 Document Management
1.4.3.4 GIS Management
1.4.3.4 Quality Assurance
1.4.4 Administration
1.4.4.1 Facilitation
1.4.4.2 Project Coordination
1.4.4.3 Administrative Support
1.4.4.4 Public Involvement
1.4.4.5 Procurement and Contract Admin.
1.5 Response Integration