2018 State Damage Prevention Program Grant Final Progress Report CFDA Number: 20.720

Award Number: 693JK31840002PSDP

Project Title: 2018 State Damage Prevention (SDP) Program Grants

Date Submitted: October 26, 2019

Submitted by: Randall Knepper, William Ruoff, of

New Hampshire Public Utility Commission

Specific Objective(s) of the Agreement

The purpose of the Agreement is to enhance, improve and replace the existing seventeen year old Underground Damage Prevention database maintained by the Safety Division of the New Hampshire Public Utilities Commission. The existing database is aging, and no longer supported by Microsoft. The intent is to upgrade the database that contains existing enforcement actions before the existing system fails entirely. One of the many features of the new upgrade will allow integration with One Call Center database and feed enforcement actions into the national CGA DIRT database.

Work scope

Elements 1 through 5 are not applicable to this Agreement

Element 6 (Dispute Resolution):

The NH PUC Safety Division administers all dispute resolutions and issues enforcement actions in most cases. The new software and mobile internet access will directly provide the NHPUC Safety Division Staff with the enhanced ability to increase enforcement efficiency in a number of ways:

- Alert messages will be used for excavation damages that occur in the field allowing nearby pipeline safety inspectors the opportunity to visit site if nearby.
- Shorter durations between damage date and closed (resolved) date is envisioned.
- Automatic posting of results of the dispute resolution to websites will be incorporated into software.
- Increase transparency through use of Dashboards updated by data queries will be available for all stake holders. Insurance providers will be able to access the dashboard to determine frequency of violators.
- Greater refinement of notifications of whether expired tickets had occurred or no notice was ever given.

Element 7 (Enforcement):

The new software and mobile internet access will provide the NHPUC Safety Division Staff with the enhanced ability to increase enforcement efficiency and reducing timelines of resolving cases brought before the NH PUC by allowing Staff in a more streamlined manner to see outstanding cases because of increased ad-hoc queering capabilities.

The historical data will be migrated from an existing flat non normalized database to a more robust normalized database with increased capabilities. Damage Prevention Specialists, Pipeline Safety Inspectors, Office Administrative Personnel, and supervisory positions will have access to instantaneous updates of enforcement cases. Currently the NHPUC enforces all cases that it becomes aware of and this will allow it to be done in a more expedient manner.

Element 8 (Technology):

The Microsoft Dynamics software platform will be a secured cloud based platform that will allow synchronous updating of field investigation inspections after a damage occurs as well as rotating random inspections prior to damages occurring. This is a CRM software that seamlessly integrates with existing Microsoft platforms such as outlook for calendaring and emails as well as word for completing enforcement actions such as NOPVs and NOVs that are used by the Safety Division. This software platform will incorporate new training for in-house developers, migration of existing data, developing new fields used for drop downs, establishing a database architecture that is flexible and can incorporate future updates. The field inspection processes will be updated to include integration with external databases such as State of New Hampshire Commercial Business registration databases, historical excavation data of existing contractors, One Call Center databases. Enhanced evidence collection data tools will be incorporated that will reside in the database. The data will reside in the cloud and the NH PUC will pay for annual licenses and storage of data.

Element 9 (Damage Prevention Program Review):

With a more robust database, improved trending will be able to be attained.

Currently we are limited in capabilities of tracking cross border operators such as interstate pipelines, LPG operators and others that have offices in one state but facilities in another. We will be able to show all stakeholders the average time it takes to close a case as well as the specific duration associated with each enforcement action. Shorter processing time will benefit all stakeholders.

We will be able to have data instantaneously posted to the website regarding enforcement actions. Currently operators have to inquire usually through an email or telephone notification of what the status is of an open enforcement case.

By porting over and migrating data from the existing database we will not lose all the past efforts used to collect and review previous enforcement cases. Without a new database the past efforts will not be accessible and easily used for long term trends. The existing database will be shut down and no longer supported.

All stakeholders benefit from an open and transparent dispute resolution and enforcement process and the new database will be configured with this goal in mind.

For the first time New Hampshire will be able to export data to be included in national databases such as CGA's Dirt database because the database will be continuously updated and easily exported.

Accomplishments for this period (Item 1 under Article IX, Section 9.01 Progress Report: "A comparison of actual accomplishments to the objectives established for the period.")

The progress on Elements 6 – 9 is well underway as the design and development of the new database software has been constructed. The project will continue past this Final Progress Report to incorporate those goals that are partially completed and will continually need refinement as future years progress. It is not expected for the continued refinement to repeatedly be submitted as a continuation of this SDP grant application. The SDP application was to jump start and allow this enforcement database to reach implementation stage. The new and improved database project started October 15, 2018 by preparing a sole source contract with Spruce Technology, Inc., receiving New Hampshire Department of Information Technology approvals and subsequent approvals at the Governor's and Executive Council. The administrative process received final approval on January 23, 2019. The Safety Division forwarded the approved contract to PHMSA on February 8, 2019. The initial team meeting with the database developer occurred February 14, 2019.

Since the initial meeting on February 14, 2019 The Safety Division has accomplished:

- meeting weekly with the vendor;
- conceptualized an initial design;
- memorialized business processes associated with New Hampshire Underground Damage and Investigation, Enforcement, and Reporting;
- updated inspection forms for Random and Post Damage Inspections;
- reviewed and associated all applicable New Hampshire Statutes;
- reviewed and associated all applicable New Hampshire Underground Damage Prevention Rules;
- approved a database design that enhances the investigation process;
- performed three reveals or "sprints" which are milestone objectives;
- performed user acceptance testing:
- began entering the 2019 data into the new database during training exercises;
- interfaced with One Call Center data specialists to integrate New Hampshire data requirements with the One Call Center existing database capabilities and the impending One Call Center proposed database upgrades;
- Tested mobile field application versions for both Random Inspections and Post Damage Inspections;
- Interfaced with CGA' Dirt Database specialists to test and review data exchange, cross reference terminology of data fields, develop export capabilities so that data can be forwarded and imported to the national Dirt Database
- To date we have made 92 case entries of 2019 investigations into the new database, and to date we have closed 37cases.

Elements 6-9 have been addressed in an integrated manner for this project and are not easily broken out separately because of the inherent database framework that has been developed. In order to relate the overall progress with the initial work scope an overall

summary is provided in the following Table 1A shown below. A more detailed relationship to each of the Elements 6-9 including descriptions and remarks is provided in Attachment 1B (4 pages) as well.

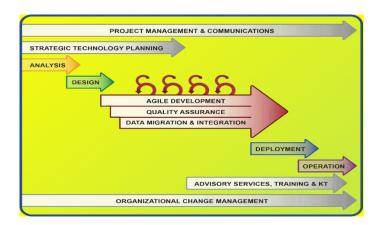
Ta	Table 1A Summary of Goals and Related Progress NH PUC 2018 SDP Grant									
ELEMENT	GOALS	COMPLETE	PARTIALLY COMPLETE	INCOMPLETE	OVERALL					
6	5	2	0	3	60% Incomplete, 40% Complete					
7	5	4	1	0	80% Complete, 20% Partially Complete					
8	10	5	2	3	50% Complete, 20% Partially Complete, 30% Incomplete					
9	6	3	3	0	50% Complete, 50% Partially Complete					
	26	14	6	6						
		54%	23%	23%						

The new Database will aid in the Safety Division administering enforcement for dispute resolution using the selected new enterprise cloud based technology.

An initial schedule was developed and system requirements were analyzed. These included:

- Easily access Dig Safe Ticket Information
- Track Violations and Damages
- Perform Site Inspections
- Issue Notices, Notifications, and Letters
- Create Pictorial Metrics Reports

From a high level the milestone on Software development followed the framework as described below:



A complete examination as to the existing business processes was conducted in an effort to develop data elements as well as defined workflow procedures. Effort was focused on improving the existing business processes including documentation in all areas so that auditing capabilities would easily demonstrate how enforcement actions and dispute resolutions processes were conducted in an impartial manner. This comprehensive business process review was accomplished using weekly meetings and determining manageable segments for review for all members of the Safety Division, the Department

of Information Technology and the vendor.

Quantifiable Metrics/Measures of Effectiveness (Item 2 under Article IX, Section 9.01 Progress Report: "Where the output of the project can be quantified, a computation of the cost per unit of output.")

In course of examining previous enforcement cases, it was discovered that mapping to the proper enforcement statute was not always adhered to. Thus, new processes were put in place to prevent this from occurring in the future with the new database. 982 enforcement cases were reviewed in the old database and data was updated to prepare for migration. A second review of enforcement cases resulted in an additional 868 enforcement cases being reviewed and data modified. This incorporated the most recent 5 years of data for 2014 to 2018. This allows the mapping and migration of the older cases to the new database to be performed properly and placed in the appropriate fields by ensuring accurate data.

The new database has successfully eliminated contractor duplication by incorporating lookup tables and putting in warning messages to prevent duplication. It also eliminates operator duplication using similar lookup table with warning messages. Proper referencing of New Hampshire Statutes was built into the underlying logic of the application and fields. Updates have been added that allow for more accurate closure dates, thus allowing additional metrics associated with processing durations.

The Safety Division is uncertain about how to represent The Cost per Unit metric being sought. Project Costs are considered in totality of the project and in a holistic manner and are not easily segmented into unit costs.

Issues, Problems or Challenges (Item 3 under Article IX, <u>Section 9.01 Progress Report</u>: "The reasons for slippage if established objectives were not met.")

In the course of the project completion, we have found that 23% of the aspirational goals we had were not going to be completed because of software limitations, the amount of work that would be required to accomplish such goal and that the budget would simply not allow for it. The selected platform uses out of the box software platform that required customized implementation schemes to be developed for the New Hampshire Underground Damage Prevention Project that incorporate the business processes, enforcement procedures, underlying rules and regulations and tracking of damages.

A boot camp training was initially expected to be included with the project (estimated \$3,000 expenditure) but was ultimately postponed until the database migration has been satisfactorily completed and all end users had time to get familiar with the new database.

An example of an area of slippage is the portal for external stakeholders that was required (reference Table 1B, Element 6, Goal 4). Because of security access, password protection requirements, and unexpected administration requirements, it was decided that a secure portal itself would be more than the estimated cost of the conversion project. A decision was made to reconsider the portal itself as a separate project to be done later but in a more universally expanded methodology that addressed other PUC portal requirements for Consumer Affairs Division and the Sustainability Division. Access for all external stakeholders to the Underground Damage Prevention Database would be accomplished later as a subproject for a larger access project for the entire PUC as an agency.

Another area that resulted in slippage is there is a concurrent effort underway to revamp software used at the One Call Center for information integration with the new Safety Division platform. Data was anticipated to be imported into the Safety Division Database and used for increased trending and data refinement but that schedule for the One Call Center database replacement project is not controlled by the New Hampshire PUC. Reference Table 1B, Element 9, Goal 2 and Element 8 Goal 8. The One Call Center serves a 5 state region in New England and its deployment with its vendor has been slower than anticipated. We have been able to meet with One Call Center representatives to express our needs and incorporate those Safety Division requirements into the One Call Center's software needs/capabilities but have not been able to put that in practice and verify such functionality.

Final Financial Status Report

Costs incurred to date exceed the amount of the grant. As the project progressed, the amount of administrative time and technical oversight hours exceeded what was originally envisioned. All excess costs beyond the grant amount will be absorbed by the New Hampshire Public Utilities Commission as many of the in progress items continue to be worked upon.

A December 12, 2018 request for \$35,710 was submitted and approved by PHMSA just prior to the government shutdown. This advancement was for the first of three payments for the contract with Spruce Technology, Inc. It also included administrative costs charged to the project based on time sheets for NH Department of Information Technology personnel assigned to the project.

An October 23, 2019 request for the remaining \$35,711 was submitted but rejected by PHMSA on October 25, 2019. It was anticipated the Final Progress Report would be submitted at the same time but was delayed by 3 days. The Safety Division anticipates that this submission of the Final Progress Report and accompanying Financial Report meet the Grant requirements.

No Safety Divisional time was charged to the project as the labor costs are covered under other PHMSA grants awarded. Labor and Fringe Benefits of Department of Information Technology was charged to the project as well as vendor costs.

The first invoice to Spruce was paid on 4/5/2019 and recorded in the PUC accounts on 2/28/2019

The project costs captured from September 28, 2018 through September 27, 2019 has been:

\$16,465.96 (DoIT #1) (Personnel)

\$6,736.11 (DoIT #2) (Fringe Benefits)

\$32,139.00 Feb 28, 2019 invoice from Spruce Technology, paid April 4, 2019 (Contractual)

\$29,786.40 May 31, 2019 invoice from Spruce Technology, paid in June, 2019 (Contractual)

\$6,880.60 June 30, 2019 invoice from Spruce Technology, paid in July, 2019 (Contractual)

Total Amount spent to date is \$92,008.07 as of 9/27/19 time sheets and paid vendor invoices of July, 2019.

A breakdown is attached as Table 1C below:

	TABLE 1C FINAL Progress Report Expenditures 2018 SDP New Hampshire Public Utilities Commission									
Quarter	NH Fiscal Year	End of Pay Period Dates	Personnel	Personnel Costs	Fringe Benefits	Comments				
1	2019	6/21/18 9/13/18	CD	\$0.00	\$0.00	Not charged to SDP Grant				
2	2019	9/29/18-12/6/18	CD	\$4,436.35	\$1,822.00	Charged to SDP				
3	2019	12/20/18-3/14/19	CD	\$7,124.79	\$2,914.30	Charged to SDP				
4	2019	3/28/19-6/6/19	CD	\$2,144.42	\$874.33	Charged to SDP				
1	2020	6/20/19 -9/12/19	CD	\$2,249.64	\$917.23	Charged to SDP				
						Charged to SDP, confirmed in first pay				
2	2020	9/26/19- Current	CD	\$510.76	\$208.25	period				
		Subtotal		\$16,465.96	\$6,736.11					
		Vendor Invoices								
3	2019	2/28/19 - 17011	Spruce	\$32,139.00		Charged to SDP				
4	2019	5/31/19 - 17184	Spruce	\$29,786.40		Charged to SDP				
1	2020	6/30/19 - 18195	Spruce	\$6,880.60		Charged to SDP				
				\$68,806.00						
		TOTAL EXPENSES TO DATE		\$92,008.07						

As stated in the midterm progress report, it was anticipated that \$71,421 costs would be exceeded. This indeed was the case that expenditures incurred have exceeded \$71,421 of the grant but the NH PUC Safety Division will not seek reimbursement for those costs exceeding \$71,421.

Requests of the AOR and/or PHMSA

The New Hampshire PUC Safety Division did not receive any feedback on the February 8, 2019 contract submission but assumes that there are no PHMSA issues with the contract since we have already gone 30 days beyond the submission and the project is well under way.

Delphi E Invoice was rejected on October 25, 2019. A new one will be entered before the end of October 2019.

Table 1B provide details of Goals and Accomplishments and is included in pages 10-13.

Lastly, sample screen shots of the newly designed database are provided on pages 14-15.

Confirmation that Final Progress Report and Final Financial Report are acceptable is requested as well as approval of the Delphi E Invoice for the remaining \$35,711 of the grant.

	Table 1B 2018 SDP Grant for Improvements to New Hampshire Public Utilities Commission Safety Division								
Underground Damage Prevention Database - Final Progress Report Detail									
	GOAL	GOAL DESCRIPTION	COMPLETE	PARTIALLY COMPLETE	INCOMPLETE	REMARKS			
	1	Alert messages will be used for excavation damages that occur in the field allowing nearby pipeline safety inspectors the opportunity to visit site if nearby.			4	Currently process is outside of the new database, we receive notification from utility, which generates gas incident report and then email to safety division staff. Then the process combines with a post inspection "damage" for staff to take action. The capability may be there in the new database but no business process has changed.			
Element 6 (Dispute Resolution)	2	Shorter durations between damage date and closed (resolved) date is the goal.	1			The new process allows the closed date to be recorded "the old process did not", and combined with the damage date the duration of the open investigation is established. Additionally dashboards have been created to signal days elapsed for open investigations thus allowing reminders of older investigations to be closed. Dashboards will provide status of all pending investigations, "previous system was at best only able to determine which ones were pending but not what stage of investigation".			
	3	Automatic posting of results of the dispute resolution to websites will be incorporated into software.			4	Data and Information can be exported from the new database and posted to the appropriate spreadsheets and then posted to the NH PUC website. The automatic feature of the new database is not as seamless as originally envisioned.			
	4	Increase transparency through use of Dashboards updated by data queries will be available for all stake holders. Insurance providers will be able to access the dashboard to determine frequency of violators.			1	Dashboards have been created but only for internal user because of the security protocols and role assignment used for the Dynamics platform, in particular the Field Service Module. This is a cloud based solution so the general public cannot gain entry to view status of investigations. The Increased Transparency will eventually be developed but currently it is not completed. The ultimate solution involves creating a new portal which was outside the scope of this project and will require considerable amount of time and budget to implement. This has been placed globally for a different project that involves many more departments and the portal becomes one part of a larger overall PUC database project in which Underground Damage is just small one part. It is uncertain if the Dashboard can be exported itself but it is envisioned that the Utility and Other Stakeholder's including insurance providers would be given a password protected ability to enter the system to view investigation status as well as submit damage data.			
	5	Greater refinement of notifications of whether expired tickets had occurred or no notice was ever given.	1			The identification of non-notification was established by the entry of eleven zeros for dig safe ticket number in the database. These are easy to recognize, and reports have been made to determine how many and what percent of these occur. For expired tickets, the database has a field for the E26 to be recorded just as the current database. In the old database there was no relationship between the data entries associated with expired tickets and the applicable statutes. The new enhanced Spruce Database does have an association established and thus allows for searches by expired tickets, which then can be incorporated into metrics and the applicable DIRT database.			

		The new software and mobile internet access will provide the NH PUC Safety Division Staff with the enhanced ability to increase enforcement efficiency and reducing timelines of resolving cases brought before the NH PUC by allowing Staff in a more streamlined manner to see outstanding cases because of increased ad-hoc queering capabilities.	1		The Microsoft Dynamics 365 Field Service Module mobile application has been applied and successfully tested in the field. This capability did not exist in the previous database. Both random inspections and post inspections will be processed with the new mobile application (Resco Mobile CRM).
7 (Enforcement)	2	The new software and mobile internet access will provide the NH PUC Safety Division Staff with the enhanced ability to increase enforcement efficiency and reducing timelines of resolving cases brought before the NH PUC by allowing Staff in a more streamlined manner to see outstanding cases because of increased ad-hoc queering capabilities.	1		Ad Hoc Querying capabilities has been tested using the built in filter and customization capabilities using the Advanced Find and Create Customized Search Queries features. This capability did not exist in the previous database.
	3	The historical data will be migrated from an existing flat non-normalized database to a more robust normalized database with increased capabilities.		1	The migration from the old existing database to the new database has been mapped but has not been migrated. It's anticipated that the 2018 data will migrate first, then 2017 data, and so on. The current 2019 Data is being entered into the new database and will not be available in the old database. The old database soon will be no longer available so it is imperative that the older information be migrated so it will be available.
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Element		Damage Prevention Specialists, Pipeline Safety Inspectors, Office Administrative Personnel, and supervisory positions will have access to instantaneous updates of enforcement cases.	1		Damage Prevention Specialists, Pipeline Safety Inspectors, Office Administrative Personnel, and supervisory positions now have access to instantaneous updates of enforcement case. (All users can see data and have instantaneous access, and changes are synchronized continuously.)
	5	Currently the NHPUC enforces all cases that it becomes aware of and this will allow it to be done in a more expedient manner.	1		All cases are also being entered into the new database but this has been enhanced with the development of Random and Post Inspection Reporting to be included as part of evidence and also as a check to see how those who don't (have damage) are found in compliance. Random Inspections will allow for confirmation with data that New Hampshire Underground Damage Prevention Program is effective.

	1	The Microsoft Dynamics software platform will be a secured cloud based platform that will allow synchronous updating of field investigation inspections after a damage occurs as well as rotating random inspections prior to damages occurring. This is a CRM software that seamlessly integrates with existing Microsoft platforms such as Outlook for calendaring and emails as well as Word for completing enforcement actions such as NOPVs and NOVs that are used by the Safety Division.	1			The software platform for the database is developed and we are currently entering Random Inspections, Post Damage Inspections, Non-Utility Reports and E-26 reports filed by Operators into the new database. We have been able to bring into the database emails, Dig Safe Tickets, photos, videos, certified mailings and other correspondence associated with each case. We have also created and printed NOPV letters and have sent them to the prospective violators. Daily, we are able to update the information for each case as it becomes available such as fines collected and executed consent agreements. Penalty training sessions conducted by the PUC are scheduled entered into the new database. From the training session we were able to update and close the case with all the perinent documentation.
	2	This software platform will incorporate new training for in-house developers.			1	The training of in-house developers has not taken place at this time. A BootCamp will be budgeted for outside this project for a one week intensive MS Dynamics 365 Field Service Module training for an administrator (DOIT) of the software. Training has been completed for end users of Safety Division.
gy)	3	This software platform will incorporate migration of existing data		1		Migration of the existing data is in process at this time. 2018 Data is in process of being migrated. Once complete, 2017 data will be entered and so on. Training has been completed for end users.
Element 8 (Technology)	4	This software platform will incorporate developing new fields used for drop downs	1			New fields to be used for drop downs have been established. Contractor list is more streamlined. Operator list is more streamlined. Google location addressing is more simplified. Accurate Statute associations have been established,
Eleme	5	Establishing a database architecture that is flexible and can incorporate future updates.	1			Database architecture is flexible and allows for future updates.
	6	The field inspection processes will be updated to include integration with external databases such as State of New Hampshire Commercial Business registration databases.			√	The field inspection process has not been able to interface with external databases such as State of New Hampshire Commercial Business registration database at this time.
	7	The field inspection processes will be updated to include integration with access to a summary of historical excavation data of existing contractors. The current database has access to this but not from the field. The summary of historical violations issued will be maintained and incorporated into the new database.			√	Historical excavation data of existing contractors has been included in the architecture for the new database. The database does have a field module component that allows for access but uncertain if incorporated into the new field inspection processes,
	8	The field inspection processes will be updated to include integration with access to One Call Center databases		1		One Call Center database is in the process of being redeveloped by the One Call Center. The PUC has met with the One Call Center and expressed the fields that we would like to be able to link to, but at this time, we are dependent upon the schedule of the One Call Center. Assurances have been made that the capability will exist, but we have not been able to verify yet in practice.
	9	Enhanced evidence collection data tools will be incorporated that will reside in the database.	4			The Microsoft Dynamics 365 Field Service Module mobile application allows for attachments to be uploaded, including evidence.
	10	The data will reside in the cloud and the NH PUC will pay for annual licenses and storage of data	√			This is a cloud-based application and licensing agreements and data storage licensing agreements have been completed.

	1	With a more robust database, improved trending will be able to be attained.			The new database through the dashboards and other features will give us accurate statistic and related information in a timely manner.
N)	2	Currently The NH PUC is limited in capabilities of tracking cross border operators such as interstate pipelines, LPG operators and others that have offices in one state but facilities in another.		٧	One Call Center database is in the process of being redeveloped by the One Call Center. The PUC has met with the One Call Center and expressed the fleds regarding cross-border operators that we would like to be able to link to, but at this time, we are dependent upon the schedule of the One Call Center. Assurances have been made that the capability will exist, but we have not been able to verify yet in practice.
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ram Rev	3	We will be able to show all stakeholders the average time it takes to close a case as well as the specific duration associated with each enforcement action. Shorter processing time will benefit all stakeholders.			The new database through the dashboards and other features gives us accurate statistic and related information in a timely manner.
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Element 9 ige Prevention Program Review)		We will be able to have data instantaneously posted to the website regarding enforcement actions. Currently operators have to inquire usually through an email or telephone notification of what the status is of an open enforcement case.		7	The Data and Information that relate to each case will be selected and exported from the database, and then posted to the appropriate spreadsheets. The posted spread sheets are then forwarded to the PUC web department to post on the NH PUC website. The automatic feature of the new database is not as seamless as originally arvisioned.
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(Damage	5	By porting over and migrating data from the existing database we will not lose all the past efforts used to collect and review previous enforcement cases. Without a new database the past efforts will not be accessible and easily used for long term trends. The existing database will be shut down and no longer supported.		1	The migration from the old existing database to the new database is being mapped to be migratable but has not been fully migrated yet. It's anticipated that the 2018 data will be completely migrated first, then 2017 data, and so on. The portions that relate to business process change will have to be manually entered.
		All stake holders benefit from an open and transparent dispute resolution and enforcement process and the new database will be configured with this goal in mind. For the first time New Hampshire will be able to export data to be included in national databases such as CGA's Dirt database because the database will be continuously updated and easily exported.	7		We have sent CGA Dirt report staff sample data tables and we are working with them to finalize the format that we will forward them. Current plan is to send the closed 2019 Damage/Violation files by March 2020.

Sample Screen Shots of Newly Developed Damage Database